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WILCOX & CO.

THE NEW INTERNATIONAL ENCYCLOPÆDIA

SUPPLEMENT

VOLUME II

NEW YORK
DODD, MEAD AND COMPANY
1930

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KEY TO PRONUNCIATION

ā	as in ale, fate. Also see **ĕ**, below.
ā̇	" " senate, chaotic.
â	" " glare, care, and as *e* in there. See **ĕ**, below.
ă	" " am, at.
ä	" " arm, father.
ȧ	" " ant, and final *a* in America, armada, etc. In rapid speech this vowel readily becomes more or less obscured and like the neutral vowel or a short *u* (*ŭ*).
a	" " final, regal, where it is of a neutral or obscure quality.
a̤	" " all, fall.
ē	" " eve.
ē̇	" " elate, evade.
ĕ	" " end, pet. The characters *ĕ*, *ā*, and *â* are used for *ä*, *ae* in German, as in Baedeker, Gräfe, Händel, to the values of which they are the nearest English vowel sounds. The sound of Swedish *ä* is also sometimes indicated by *ĕ*, sometimes by *â* or *ă*.
ẽ	" " fern, her, and as *i* in sir. Also for *ö*, *oe*, in German, as in Göthe, Goethe, Ortel, Oertel, and for *eu* and *oeu* in French, as in Neufchâtel, Crèvecœur; to which it is the nearest English vowel sound.
e	" " agency, judgment, where it is of a neutral or obscure quality.
ī	" " ice, quiet.
ī̇	" " quiescent.
ĭ	" " ill, fit.
ō	" " old, sober.
ō̇	" " obey, sobriety.
ô	" " orb, nor.
ŏ	" " odd, forest, not.
o	" " atom, carol, where it has a neutral or obscure quality.
oi	" " oil, boil, and for *eu* in German, as in Feuerbach.
o͞o	" " food, fool, and as *u* in rude, rule.
ou	" " house, mouse.
ū	" " use, mule.
ū̇	" " unite.
ŭ	" " cut, but.
ụ	" " full, put, or as *oo* in foot, book. Also for *ü* in German, as in München, Müller, and *u* in French, as in Buchez, Budé; to which it is the nearest English vowel sound.
û	" " urn, burn.
y	" " yet, yield.
B	" " the Spanish Habana, Córdoba, where it is like a *v* made with the lips alone, instead of with the teeth and lips.
ch	" chair, cheese.
D	as in the Spanish Almodovar, pulgada, where it is nearly like *th* in English then, this.
g	" " go, get.
G	" " the German Landtag, and *ch* in Feuerbach, buch; where it is a guttural sound made with the back part of the tongue raised toward the soft palate, as in the sound made in clearing the throat.
H	" *j* in the Spanish Jijona, *g* in the Spanish gila; where it is a fricative somewhat resembling the sound of *h* in English hue or *y* in yet, but stronger.
hw	" *wh* in which.
K	" *ch* in the German ich, Albrecht, and *g* in the German Arensberg, Mecklenburg; where it is a fricative sound made between the tongue and the hard palate toward which the tongue is raised. It resembles the sound of *h* in hue, or *y* in yet; or the sound made by beginning to pronounce a *k*, but not completing the stoppage of the breath. The character K is also used to indicate the rough aspirates or fricatives of some of the Oriental languages, as of *kh* in the word Khan.
n̲	" in sinker, longer.
ng	" " sing, long.
N	" " the French bon, Bourbon, and *m* in the French Étampes; where it is equivalent to a nasalizing of the preceding vowel. This effect is approximately produced by attempting to pronounce "onion" without touching the tip of the tongue to the roof of the mouth. The corresponding nasal of Portuguese is also indicated by N, as in the case of São Antão.
sh	" " shine, shut.
th	" " thrust, thin.
TH	" " then, this.
zh	" *z* in azure, and *s* in pleasure.

An apostrophe ['] is sometimes used to denote a glide or neutral connecting vowel, as in tā'b'l (table), kăz''m (chasm).

Otherwise than as noted above, the letters used in the respellings for pronunciation are to receive their ordinary English sounds.

When the pronunciation is sufficiently shown by indicating the accented syllables, this is done without respelling; as in the case of very common English words, and words which are so spelled as to insure their correct pronunciation if they are correctly accented. Pronunciation is discussed in the NEW INTERNATIONAL ENCYCLOPEDIA.

M

McADOO, William Gibbs (1863–). An American cabinet officer (see Vol. XV). In 1913 he was appointed Secretary of the Treasury by President Wilson. His tenure of this office was marked by the enormous complications and transactions of the entrance of the United States into the World War, and in this work he showed great versatility and efficiency. In addition to his duties as Secretary of the Treasury, he was also Director General of Railways in 1917–19 and *ex-officio* chairman of the Federal Reserve Board. He resigned as Secretary of the Treasury on Dec. 10, 1918, and as Director General of Railways on Jan. 10, 1919. On May 7, 1914, he married Eleanor Wilson, daughter of President Woodrow Wilson. In the Democratic National Convention held in New York City in 1924, McAdoo and Governor Smith of New York controlled enough votes to checkmate each other. The result was that neither was nominated, and John W. Davis was selected as a compromise candidate after more than 100 ballots had been cast. Later, Mr. McAdoo engaged in law practice at Los Angeles and Washington, D. C., taking little part in the presidential campaign of 1928. See Railways.

MACALESTER COLLEGE. A coeducational liberal arts college under Presbyterian auspices at St. Paul, Minn., opened in 1885, as the outgrowth of two academies founded by a pioneer missionary in Minnesota, the Rev. Edward Duffield Neill, D.D. The number of students increased from 399 in 1913 to 497 in 1927–28; the faculty from 21 to 56 members, and the library from 13,600 to 19,300 volumes. The endowment of the college in 1928 amounted to $1,259,837 and the income to $220,832 in 1927–28. The Macalester Forward Movement, launched in 1925, secured for the college $825,000 in pledges and gifts, of which amount over $400,000 was given by the Board of Trustees; between 1924 and 1928, four new buildings were erected on the campus: a gymnasium and a men's dormitory, each costing approximately $200,000; a central heating plant; and the president's residence. Among the outstanding gifts to the college was that of $50,000 from Thomas W. Synott to be held in trust by the Board of Christian Education of the Presbyterian Church, U. S. A., for the maintenance of a chair in the Department of Religious Education. President, John C. Acheson, A.M., LL.D.

McALEXANDER, Ulysses Grant (1864–). An American army officer, born in Dundas, Mich. He was graduated from the United States Military Academy in 1887 and commissioned second lieutenant in the same year. During the Spanish-American War, he served in the field and was recommended for promotion for gallantry under fire. He saw service also in the Philippines and in 1906 was a member of the General Staff Corps. After serving as instructor of troops in 1916–17, he was given command of the 18th Infantry in France. As commander of the 38th Infantry, he took part in the second Battle of the Marne and in other campaigns. He was credited with breaking the great German offensive on the Marne on July 15, 1918, and won the sobriquet of "The Rock of the Marne." In July, 1924, he was promoted to the rank of major general and in the same year retired on account of physical disability. He received decorations from the American, French, and Italian governments. He wrote *History of the Thirteenth Regiment* (1905).

McALLISTER, Addams Stratton (1875–). An American electrical engineer (see Vol. XIV). During 1918 he became connected with the Ordnance Department, Washington, D. C., and in 1921 with the Bureau of Standards. Since 1923 he has been engineer-physicist of the Bureau of Standards. He contributed many articles on engineering subjects to technical publications during the period 1914–24 and published *The Descendants of John Thomson* (1917). He compiled and edited the *National Directory of Commodity Specifications* (U. S. Dept. of Commerce, 1925); *Standard Year Book* (1927); *Directory of Commercial Testing and College Research Laboratories* (1927), *Standards and Specifications in the Wood-Using Industries* (1927).

McANDREW, William (1863–). An American school administrator and editor. He was born at Ypsilanti, Mich., and graduated at the University of Michigan (1886). He was superintendent of schools at St. Clair, Mich., (1886–88), teacher and principal of the Hyde Park High School, Chicago (1889–91), and for two years district passenger agent of the Great Northern Railway at St. Paul, Minn. He then became principal of the Pratt Institute High School, Brooklyn, N. Y. (1892–98) and later organized the Washington Irving High School (for girls) of New York City, serving as principal until 1914. For ten years (1914–24), he was associate superintendent of schools in New York City and was then called to Chicago as superintendent of schools of that city. In the same year (1924), he became editor of the *Educational Review*. In 1927 his retention in office at Chicago became a political issue because of the campaign promise of Mayor William Hale Thompson to bring about his removal. A trial was begun on charges of insubordination, but various other accusations were injected into the proceedings. After hearings occupying several months, the Board of Education voted for his dismissal. His contract had already expired. He continued as editor of the *Educational Review*, and in that capacity won commendation from well-known educators throughout the country. He is the author of *The Public and Its Schools* (1916).

MacARTHUR, Douglas (1880–). An American soldier, born in Arkansas. He was graduated from the United States Military Academy in 1903 and was commissioned second lieutenant of engineers in the same year. In 1917 he was appointed colonel of infantry in the National Army and in the same year became Chief of Staff of the 42d Division. He commanded the 84th Infantry Brigade in 1918 and the 42d Division later in the same year. He took part in all the great operations in France and served with the Army of Occupation in Germany. He was made a brigadier general of the Regular Army in 1920, and major general in 1925. In 1919 he was appointed superintendent of the United States Military Academy and in 1922–25 commanded the Department of the Philippines. He received several divisional citations and decorations from the French, Italian, and Belgian governments.

McBAIN, Howard Lee (1880–). An American lawyer and educator, born in Toronto, Canada. He graduated from Richmond (Va.) College in 1900 and afteward studied at Columbia and the University of Chicago. After teaching in schools in Richmond, he lectured on constitutional history at the University of Virginia. He was appointed instructor of political science at Columbia in 1907, and in 1909 he became dean of the College of Political Science at George Washington University. From 1910 to 1913, he was associate professor of political science at the University of Wisconsin. In 1913–17 he was associate professor of municipal science and administration and in 1917–25 Eaton professor at Columbia University. Since 1925 he has been Ruggles professor of constitutional law there. He was a member of many legal and learned societies and the author of *How We Are Governed in Virginia and the Nation* (1908); *The Law and Practice of Municipal Home Rule* (1916); *American City Progress and the Law* (1917); *The New Constitutions of Europe* (with L. Rogers, 1922); *The Living Constitution* (1927); *Prohibition, Legal and Illegal* (1928).

McCARRISON, Robert (1878–). An Irish physician. Born in Lisburn, County Antrim, he was educated at Queen's College, Belfast, and entered the Indian Medical Service in 1901. He developed a special interest in goitre and cretinism and during 1913–14 investigated these affections for the Government. Later, he visited many medical centres in English-speaking countries to lecture on goitre and made a tour of the United States for this purpose in 1921. His major writings are *Collected Papers on Goitre and Cretinism* (1916); *The Thyroid Gland in Health and Disease* (1917); *Studies in Deficiency Disease* (1921); and *The Simple Goitres* (1928). He was placed in charge of the Pasteur Institute at Coonoor on its establishment and was a special worker for the Research Fund Association of India, 1918–26.

MACAULAY, Rose (?–). A British novelist, who was also a journalist and a poetress. Her novels, full of humor and wit, powerful description and sound character studies, depict the age in which she lived, often with a satiric turn. They are *The Furnace* (1907); *What Not: A Prophetic Comedy* (1919); *Potterism* (1920); *Dangerous Ages* (1921); *Mystery at Geneva* (1922); *Told by an Idiot* 1923); *Orphan Island* (1924); and *Crewe Train* (1926). Her poems include *The Two Blind Countries* (1914). Her essays were collected in *A Casual Commentary* (1925), and she wrote one on the correct usage of the English language entitled *Catchwords and Claptrap* (1915).

McCHORD, Charles Caldwell (1859–). An American lawyer and public official (see Vol. XIV). From 1910 to 1926 he served as a member of the Interstate Commerce Commission, being chairman at various periods after 1915. In 1918–19 he was a member of the Railway Wage Commission and arbitrator of the War Labor Board.

McCOLLUM, Elmer Verner (1879–). An American physiological chemist, born near Ft. Scott, Kan., and educated at Kansas and Yale universitites. From 1907 to 1917, he held the chair of agricultural chemistry in the University of Wisconsin, resigning to accept the professorship of biochemistry in the Johns Hopkins University School of Hygiene and Public Health. He has published many papers on nutrition, diet, vitamins, etc., and several textbooks, which include *Textbook of Organic Chemistry* (1916); *The Newer Knowledge of Nutrition* (1918); *The American House Diet* (1920); and *Foods, Nutrition, and Health* (1925). Professor McCollum has published an account of the fourth vitamin, known as Vitamin D, lack of which from the nutriment is believed to play an important rôle in the genesis of rickets. He received the Howard N. Potts Gold Medal of the Franklin Institute (1921), the Isaac Ridgeway Trimble Medal (1923), and the John Scott Medal from the City of Philadelphia (1924).

McCOMBS, William Frank (1875–1921). An American lawyer (see Vol. XIV). From 1912 until 1916, he was chairman of the Democratic National Committee. He was offered but declined the ambassadorship to France. A volume giving Mr. McCombs' side of his controversy with President Wilson concerning the recognition accorded him for securing the nomination of Mr. Wilson, was published in 1921.

McCONNELL, Francis John (1871–). An American bishop of the Methodist Episcopal Church (see Vol. XIV). In 1928 he was transferred from Pittsburgh to the New York area. At the same time, he was elected president of the Methodist Board of Foreign Missions, and shortly afterward he succeeded Dr. S. Parkes Cadman (q.v.) as president of the Federal Council of Churches of Christ in America. Bishop McConnell has had extensive experience in the mission fields and in social work. An investigation of the steel industry by the churches in 1920 was headed by him. He is the author of *Democratic Christianity* (1919); *Church Finance and Social Ethics* (1920); *Public Opinion and Theology* (1920); *Living Together* (1923); *Is God Limited?* (1924); *The Christ-like God* (1927); and *Humanism and Christianity* (1928).

McCORMICK, Cyrus Hall (1859–). An American manufacturer, born at Washington, D. C., and educated in the public schools. Entering his father's business, he invented the reaping machine and was president of the McCormick Harvesting Machine Company from 1894 to 1902 and of the International Harvester Company from 1902 to 1919, when he became chairman of the board. In 1917 he was a member of the special diplomatic mission of the United States to Russia. He was a trustee of Princeton University and a director of the McCormick Theological Seminary.

McCORMICK, Paul John (1879–). An American jurist, who was born in New York City and studied at the San Diego, Calif., High School; All Hallows College, Salt Lake City; and St. Ignatius College, San Francisco. For two years, he was assistant librarian at the Los

Angeles County Law Library. He served as assistant district attorney of Los Angeles County from 1905 to 1910, and as judge of the Superior Court of Los Angeles County from 1910 to 1924. By appointment of President Coolidge, he became United States district judge in the southern district of California in February, 1924. He decided the case of the United States *v.* Pan-American Petroleum Company, concerning the lease of 30.000 acres of land in the Naval Oil Reserve of California and involving the issue of fraud by Secretary of the Interior Fall in making the lease. For 12 years (1912–24), Judge McCormick was instructor in law at the University of Southern California. In May, 1929, President Hoover appointed him to the National Law Enforcement Commission.

McCORMICK, Ruth Hanna (1880–). An American Congresswoman. She was born at Cleveland, Ohio, a daughter of the late Senator Marcus A. Hanna. Her formal education was received in private schools. In 1903 she married Medill McCormick (died, 1925). Interested in political, civic, and industrial problems, she took an active part in the Progressive movement in the Republican Party in 1912. Since 1924 she has been a member of the Republican National Committee from Illinois. In 1928 she was elected to Congress as Representative.

McCORMICK, Vance Criswell (1872–). An American newspaper publisher and public official, born in Harrisburg, Pa., and educated at Yale University. For several years, he was engaged in the newspaper business in Harrisburg. He served as mayor of that city from 1902 to 1905. In 1914 he was Democratic candidate for governor and in 1916 served as chairman of the Democratic National Campaign Committee. He was chairman of the War Trade Board from 1917 to 1919 and in the former year was also a member of the War Commission sent to Great Britain and France. At the peace conference in Paris, he acted as adviser to the American commission.

McCOY, Frank Ross (1874–). An American soldier, born in Lewistown, Pa. He was graduated from the United States Military Academy in 1897 and was appointed 2d lieutenant of the 8th Cavalry in the same year. He served on the western frontier in Cuba, in the Philippines, and in the Santiago campaign. In Cuba and the Philippines, he acted as aide to General Wood and was for several years aide to President Roosevelt. He was appointed a member of the General Staff in 1911 and after service as military attaché in Mexico became a member of the General Staff of the American Expeditionary Forces in 1917. He commanded the 63d Infantry Brigade in 1918 and was director of the Army Transport Service and deputy director general and later director general of transportation for the A. E. F. in 1918–19. In the latter year, he also served as chief of staff to the American military mission to Armenia and as special commissioner to the Philippines. He was appointed by President Coolidge to supervise the presidential election of Nicaragua in 1928 and was also chairman of the commission to conciliate the boundary disputes between Bolivia and Paraguay in 1928–29. He was promoted to the rank of major general in 1929. He wrote *Principles of Military Training* (1918).

MacCRACKEN, William Patterson, Jr. (1888–). An American lawyer and public official, who was born in Chicago and educated at the law school of the University of Chicago. Admitted to the Illinois bar in 1911, he began practice in Chicago and became Assistant Attorney General of Illinois in 1923 and assistant state's attorney of Cook County in 1924. During 1917–18 he served in the U. S. Air Service. From Aug. 11, 1926, to March, 1929, he was Assistant Secretary of Commerce for Aëronautics. He served also as secretary of the American Association.

McCULLOUGH, Ernest (1867–). An American civil engineer, born on Staten Island, N. Y., and educated at the Van der Naillen School of Engineering in San Francisco. During 1893–96 he was editor of *Engineer and Contractor* in San Francisco; he became associate editor of *Engineering-Contracting* (Chicago) in 1909 and of the *Railway Age* in 1910. He was later an associate editor of *The Amerícan Architect* and in 1925 became editor of *Building Age and National Builder,* New York. During the World War, he was a lieutenant colonel in the Chemical Warfare Service in France, and in 1919–20, director of the officers' school for that service at Lakehurst, N. J. He is the author of *Country Roads* (1891); *Farm Drainage* (1892); *Municipal Public Works* (1894); *Engineering Work in Towns and Cities* (1906); *Reinforced Concrete* (1908); *Engineering as a Vocation* (1911); *Practical Surveying* (1915); *Practical Structural Design* (1917); *Everybody's Money* (1923); and *Class Warfare* (1927).

McCULLY, Newton Alexander (1867–). An American naval officer, born in Anderson, S. C. He graduated from the United States Naval Academy in 1887 and in 1889 was made ensign. He was promoted to be commander in 1909, captain in 1913, and rear admiral in 1918. From 1914 to 1917, he was naval attaché at St. Petersburg and represented the Navy Department in connection with the Russian commission to the United States. In 1917–18 he commanded the patrol squadron off the coast of France and in 1919 was commander of the American naval forces in American waters. In 1920 he acted as special agent for the Department of State in southern Russia. He was chief of the Naval Mission to Brazil, 1925–27.

MacCURDY, George Grant (1863–). An American anthropologist (see Vol. XIV). Since 1923 he has been research associate, with the rank of professor, and curator of anthropological collections at Yale. He was also director of the American School of Prehistoric Research in Europe (1921–22, and after 1924). He became a member of the National Research Council in 1925. Professor MacCurdy is the author of *Human Skeletal Remains from the Highlands of Peru* (1923); and *Human Origins —Manual of Prehistory* (2 vols., 1924).

McCUTCHEON, George Barr (1866–1928). An American author (see Vol. XIV). He was president of the Author's League of America in 1924–26. He wrote: *From the House Tops* (1916); *The Light That Lies* (1917); *Green Fancy* (1917); *Shot with Crimson* (1918); *The City of Masks* (1918); *Sherry* (1919); *Anderson Crow, Detective* (1920); *West Wind Drift* (1920); *Quill's Window* (1921); *Yollopp* (1922); *Viola Gwyn* (1922); *Oliver October* (1923); *East of the Setting Sun* (1924); *Romeo in Moon Village* (1925); *Kindling and Ashes* (1926); *The Inn of the Hawk and Raven* (1927); *Blades* (1928); and *The Merivales* (1929).

McCUTCHEON, John Tinney (1870–). An American author and cartoonist, born in Tippecanoe County, Ind., a brother of George Barr McCutcheon (see above). He was graduated at Purdue University. He was on the staff of the Chicago *Record* and *Record-Herald* (1889–1903), where he began drawing political cartoons in the national campaign of 1896. Much of his work, however, has been outside the field of politics. He was on the dispatch boat *McCulloch* in the Battle of Manila Bay, May 1, 1898. In the military occupation of the Philippines and in the Boer War, he was an observer and correspondent. He joined the Boers in the interest of the Chicago *Record.* He was at Vera Cruz, Mex., in 1914 and later in the year was with the Belgian and German armies in the World War. In 1915–16 he was in France, Saloniki, and the Balkans. He is the author of *Stories of Filipino Warfare* (1900); *Cartoons by McCutcheon* (1903); *Bird Center Cartoons* (1904); *The Mysterious Stranger* (1905); *Congressman Pumphrey, The People's Friend* (1907); *In Africa* (1910); *T. R. in Cartoons* (1910); *Dawson '11, Fortune Hunter,* (1912); *The Restless Age* (1921); and *An Heir at Large* (1923).

McDERMOTT, George Robert (1860–). An American naval architect, born at Glasgow, Scotland. After an academic and technical education in Glasgow, he served as naval architect for several shipbuilders in Scotland and in the naval construction works in England. He removed to the United States and was successively assistant professor of naval architecture and professor of naval architecture in charge of the Department of Naval Architecture and Marine Engineering at Sibley College in Cornell University. During the World War, he served with the U. S. Shipping Board and the Emergency Fleet Corporation and as technical adviser of the American Bureau of Shipping in 1919. He is the author of *Screw Propeller Computer* and *Text-Book on Screw Propellers* (1903).

McDONALD, Ellice (1876–). An American cancer investigator and chemist. He was born at Fort Ellice, Can., and graduated at McGill University in 1897 (M.D., 1901). From 1907 to 1922, he was surgeon at the New York Post-Graduate Medical School. Since 1922 he has been assistant professor of gynæcology and director of the cancer research laboratory of the University of Pennsylvania Graduate School of Medicine. He has studied particularly the application of the atomic theory to cancer research. He is the author of *Blood Studies in Cancer* (1929).

MACDONALD, The Rt. Hon. James Ramsay (1866–). A British Prime Minister and leader of the Labor Party (see Vol. XIV). He was not in sympathy with Great Britain's entry into the World War and resigned as leader of the Labor Party in 1914. He was defeated for Parliament in the "khaki election" of 1918, but was returned in 1922 and became official leader of the Opposition, the Labor Party having become the second party in the House of Commons. From January to November, 1924, he was Prime Minister, First Lord of the Treasury, and Secretary of State for Foreign Affairs in the first Labor government of Great Britain. His domestic policy was characterized by unexpected moderation. Great Britain recognized Soviet Russia on Feb. 2, 1924, and an Anglo-Russian treaty was signed which was never ratified. He also summoned the conference in London which led to the adoption of the Dawes Plan and consistently advocated leniency toward the Central Powers and coöperation with the League of Nations. Publication by the Conservatives of the so-called "Zinovieff letter," the authenticity of which was later questioned, led to his overwhelming defeat in the general election in November. During a lecture tour of the United States in 1927, his health broke down but he gradually recovered and resumed his activities as leader of the Labor Party in Parliament. He became Prime Minister and First Lord of the Treasury for the second time in June, 1929, as a result of a Labor victory in the general .election. He immediately renewed negotiations toward a naval armament limitation agreement with the United States and the resumption of diplomatic relations with Soviet Russia. In October, 1929, at the invitation of President Hoover, he paid an official visit to the United States to discuss with the President naval limitation and other Anglo-American problems. The first British Prime Minister to visit America while in office, he was enthusiastically received in New York, Washington, and Philadelphia, and by the United States Senate, which he was invited to address. A few days after his arrival in Washington, where he was the guest of President Hoover at the White House, and at the President's summer camp, a statement summarizing the discussions jointly prepared was issued at the conclusion of Premier MacDonald's visit. A call for a five-power naval conference to begin the third week in January, 1930, in London, was issued by the British Foreign Office during his stay in Washington. While at the capital he received the honorary degree of LL.D. from George Washington University. On his way back to London, Premier MacDonald made notable addresses in New York and visited several of the Canadian cities. Internally, the first months of his administration were marked by a strike of more than 500,000 cotton-mill workers in Lancashire. His writings include *National Defence:A Study in Militarism* (1917); *The Government of India* (1919); *Parliament and Revolution* (1920); *Socialism: Critical and Constructive* (1921); *Margaret Ethel MacDonald* (1924); and *Wanderings and Excursions* (1925). Consult *From Doughty Street to Downing Street,* by Herbert Tracy (1924); *J. Ramsay MacDonald, 1923–25,* by "Iconoclast" (Mary Agnes Hamilton) (1925); and *J. Ramsay MacDonald, Labor's Man of Destiny* by H. Hessell Tiltman (1929).

McDOUGALL, William (1871–). An Anglo-American psychologist (see Vol. XIV). During the World War, he was attached to the medical service of the British Army. In 1920 he was called from his post at Oxford to head the psychology department at Harvard University. Since 1927 he has been professor of psychology at Duke University, Durham, N. C. In his *Outline of Psychology* (1923), he modified his conception of instinct so as to allow for growth and transformation of the presumed hereditary dispositions.

Professor McDougall's other works deal largely with the problems of national psychology which transcend mere science and involve ethical theory. *The Group Mind* (1920) and *Is America Safe for Democracy?* (1921) defend the superiority of the Nordic race. *Ethics and Some Modern World Problems* (1924) contains a warning against sentimental idealism as a guiding principle of national conduct. He also wrote *Outline of Abnormal Psychology* (1926); *Janus* (1927); and *Character and the Conduct of Life* (1927). He took a leading part in the activities of both the British Societies for Psychical Research. See Social Psychology.

McELROY, Robert (McNutt) (1872–). An American educator, born at Perryville, Ky., and educated at Princeton University, in Germany, and at Oxford. In 1898 he was instructor of history at Princeton and was successively assistant professor of American history and Edwards professor of American history (1909–25). He was also head of the department of history and politics at Princeton, 1912–16, was the first American exchange professor to China in 1916–17, and was educational director of the National Security League from 1917 to 1919. He was appointed Harmsworth professor of American history at Oxford for the term 1925–35 and Sir Charles Watson lecturer in American history, 1926. He was a member of many learned societies and wrote *Kentucky in the Nation's History* (1909); *The Winning of the Far West* (1914); *The Representative Idea in History* (1917); *Grover Cleveland—the Man and the Statesman* (1923); and *The Pathway of Peace* (1927). He edited a collection of speeches of W. Bourke Cockran (1925) and was coeditor of *Putman's Historical Atlas,* also *Phelps Historical Atlas* (1927).

McELWAIN, Frank Arthur (1875–). An American bishop of the Protestant Episcopal Church, born at Warsaw, N. Y., and educated at Trinity College and the Seabury Divinity School. He was ordained in 1903, held several pastorates in Missouri and from 1907 to 1912, was warden of the Seabury Divinity School. In 1912 he was elected Suffragan Bishop of Minnesota and was consecrated bishop in 1917.

McFARLAND, Joseph (1868–). An American pathologist and bacteriologist, born at Philadelphia. Soon after receiving his M.D. from the University of Pennsylvania in 1889, he became professor of pathology and bacteriology in the Medicochirurgical College, from which he resigned in 1916 to take a similar chair in the University of Pennsylvania. He has published several textbooks: *Pathogenic Bacteria* (1886): *Textbook of Pathology* (1904); and *Biology, General and Medical* (1910). A semipopular work, *Fighting Foes too Small to See,* was published in 1924, and in the same year his *Surgical Pathology.* He also collaborated with Dr. John B. Deaver in *The Breast* (1917).

McFEE, William (1881–). An American author, born in London and educated in the East Anglican School, Bury St. Edmunds, England. He entered the marine service as engineer and chief engineer of transports. In 1911 he went to the United States. He wrote *An Ocean Tramp* (1908), which was followed by *Aliens* (1914); *Casuals of the Sea* (1916); *Captain Macedoine's Daughter* (1920); *A Six-Hour Shift* (1920); *Harbors of Memory* (1921); *Command* (1922); *Race—a Prelude* (1924); *Swallowing the Anchor* (1925); *Sunlight in New Granada* (1925); *The Life of Sir Martin Frobisher* (1928); *Pilgrims of Adversity* (1928); and *Sailors of Fortune* (1929). His books show great descriptive power and an unusually attractive style.

McGILL UNIVERSITY. A Canadian institute at Montreal, Quebec, founded in 1821, standing at the head of a group of affiliated colleges and schools, and itself affiliated with the universities of Oxford, Cambridge, and Dublin. The student enrollment numbered 1600 in 1914, dropped during the War to 1045, but rose to 2875 in the autumn session of 1928. The enrollment in the French Summer School of 1928 was 193. The faculty increased from 265 to 473 members and the annual income from $820,000 to $2,046,688. The library was increased from 184,000 to 273,633 volumes. The productive funds of the University amounted to $18,153,446 in 1928, as compared with $8,207,000 in 1914. The university received $1,000,000 in 1918 from the Carnegie Corporation of New York, "in recognition of the noble and devoted service and sacrifice of McGill toward Canada's part in the great war." Sir William C. MacDonald bequeathed various sums to the University, including $500,000 toward the endowment of the Medical School, $300,000 toward the endowment of the Conservatory of Music, $20,000 to provide traveling scholarships in the faculty of law, and $1,000,000 for MacDonald College. The University also received $100,000 from the estate of James Ross in 1914. In 1920 subscriptions made to the Centennial Fund totaled $4,440,000, not including gifts of $1,000,000 each from the Rockefeller Foundation and from the Quebec government. In 1924 the Rockefeller Foundation made a gift of $500,000 for medical research, Lady Roddick gave $50,000 for the erection of gates in memory of her late husband, Sir Thomas Roddick; and Lady Strathcona gave $120,000 to endow the chair of zoölogy. In 1928 Lady Osler, widow of Sir William Osler, bequeathed £10,000 for the upkeep of the Osler Library at the University.

A biological building was erected in 1922 at a cost of $716,000, and a pathological building costing $450,000, was opened in 1924; an electrical engineering building was erected in 1925 as an annex of the engineering building; and in 1926 an arts building was erected at a cost of $750,000. Changes in curriculum during the period under review included: The lengthening of the course in the school of commerce from three to four years in 1923; the requirement of two pre-medical years in the Faculty of Arts for entrance to the Faculty of Medicine, where the course is one of five years, inaugurated in 1924; and the further introduction in 1925 of the two years of college work requirement in the schools of law and dentistry; and at the commencement of the 1927–28 session, one year of college work as a requirement for entrance to the school of applied science. Sir Arthur Currie, G.C.M.G., K.C.B., LL.D., succeeded Sir William Peterson, G.C.M.G., K.C.B., LL.D, D.Litt., as president in 1920.

McGLACHLIN, Edward Fenton (1868–). An American soldier, born in Fond du Lac, Wis. He was graduated from the United States Military Academy in 1889 and commissioned in the artillery. Promoted to be colonel in 1916, he was made brigadier general of the National Army in 1917 and in 1918 major general. He served in the Philippine campaigns and from 1914 to 1916 was commandant of the School of Fire for Field Artillery. In 1917 he was appointed commander of the 165th Field Artillery Brigade and later commanded several other brigades. He was made chief of artillery of the 1st Army Crops in 1918 and commander of army artillery and chief of artillery of the 1st Army in the same year. From November, 1918, to September, 1919, he was commander of the 1st Division, and from 1919 to 1921, he commanded the 7th Division. From 1921 to 1923, he was commandant of the Army War College. He became a major general of the Regular Army in 1922 and was retired in the following year. He contributed many articles to army periodicals.

MacGOWAN, Kenneth (1888–). An American author, born at Winthrop, Mass., and educated at Harvard. He was editor of *The Theatre Arts Magazine* (1919–25), dramatic critic for *Vogue* (1920–24), and directed the Provincetown Players, 1924–25, the Greenwich Village Theatre, 1925–27, and the Actors' Theatre in 1927. He produced *All God's Chillun Got Wings; Desire Under the Elms;* and other popular plays. Previously he had been dramatic, literary, and photoplay critic for the *Philadelphia Evening Ledger* (1914–17), New York *Tribune* (1918), and New York *Globe* (1919–23). His books on the theatre are *The Theatre of To-Morrow* (1921); *Continental Stagecraft* (1922); and *Masks and Demons* (1923).

McGRAW, John J. (1873–). An American professional baseball player and manager, born at Truxton, N. Y. He was with the Olean Club in 1890, Cedar Rapids in 1891, and Baltimore, 1891 to 1899, becoming manager in the last-named year. In 1900 he played with the St. Louis National League team and managed the Baltimore American League Club in 1901 and 1902. Since 1902 he has been manager of the New York National League team, familiarly known as the "Giants," winning pennants in 1904, 1905, 1911, 1912, 1913, 1917, 1921, 1922, 1923, and 1924, and world's championships in 1905, 1921, and 1922, a record of achievement attained by no other big league manager.

McGREGOR, James Howard (1872–). An American zoölogist, born at Bellaire, Ohio. He was educated at Ohio State and at Columbia universities. He was assistant in zoölogy at Ohio State University (1894–95). In 1897 he went to Columbia University, becoming associate professor (1914–24), and professor of zoölogy in 1924. He published articles on vertebrate morphology and palæontology and modeled an important series of reproductions of heads of types of primitive man.

MACHADO, Bernardino (1851–). A former President of Portugal, born in Rio de Janeiro. Elected a representative in Parliament in 1882, he became Minister of Public Works in 1893. He played a leading part in the establishment of the Portuguese Republic and in 1915 was elected President. He was again President for a short time in 1926, but was forced to flee to Paris, where he remained the leader of a group of political refugees seeking the overthrow of the government.

MACHADO de MORALES, Gerardo (1873–). A President of Cuba, born in Santa Clara and educated in the schools of that city. As a young man, he joined the revolutionary forces of General Juan B. Zayas and rose to the rank of brigadier-general in the Cuban war for independence. Later, he served successively as Mayor of Santa Clara, inspector general of the army, and Secretary of Interior. He was elected President by the Liberal Party over General Menocal in November, 1924, and was reëlected without opposition in 1928. The constitution was altered during his first term as President, extending the term of this office to six years. His administration was marked by improvement in the economic condition and the road system of the country, the forcible suppression of Communist propaganda, and the intensification of the agitation for the repeal of the Platt Amendment. See Cuba.

MACHAR, Joseph Svatopluk (1864–). A Czech poet and essayist, born at Kolin. He was a bank official in Vienna from 1891 to 1918—his most productive literary period. His works, which are satirical, pro-Socialistic, and anti-clerical, include *Confiteor,* a poetical trilogy (1887–92); *Sonette,* poem (1891–93); *Tristium Vindobona* (1893); *Die Streiter Gottes* (1898); *Golgotha* (1899); *Magdalena* (1904); *Im Strahl hellenischer Sonne* (1906); *Rom* (1907); *Das Gift aus Judäa* (1907); *Katholische Erzählungen* (1911); and *Heidnische Flammen* (1912).

MACHEN, Arthur (1863–). An English writer. His early books include *The Chronicle of Clemendy; The Great God Pan; The Three Imposters; The Hill of Dreams,* which acquired considerable vogue both in England and the United States. His later publications included *The Great Return* (1915); *The Secret Glory* (1922); *Far-Off Things* (1922); *Things Near and Far* (1923); *Ornaments in Jade* (1924); *The London Adventure: an Essay in Wandering* (1924); *The Canning Wonder* (1925); and *Dreads and Drolls* (1926).

MACHINE GUN ORGANIZATION. See Armies and Army Organization.

MACHINE GUNS. See Ordnance; Small Arms.

McINTYRE, Frank (1865–). An American military officer, born at Montgomery, Ala., and educated at the United States Military Academy. He entered the United States Army as second lieutenant in the 19th Infantry, serving in various ranks until he attained that of brigadier general in 1912. Meanwhile, he saw duty on the Mexican border, in the War with Spain, in the Philippines (1899–1902) and with the general staff (1902–04). He was attached to the Bureau of Insular Affairs in 1905, became its chief in 1912, and again in 1920. During the World War, he was assistant chief of staff with the rank of major general.

MACKAIL, John William (1859–). A British classicist (see Vol. XIV). He was president of the Classical Association in 1922–23. Among his more recent publications are *Life of George Wyndham* (1925); *Classical Studies* (1925); *J. L. Strachan Davidson—a Memoir* (1926); and *Studies of English Poets* (1926).

McKEE, Ralph Harper (1874–). An American chemist, born at Clinton, Mo., and educated at Wooster and Chicago universities. During 1901–09 he was professor of chemistry at Lake Forest, and during 1909–16 he held a similar chair at the University of Maine; in 1917 he became professor of chemical engineering at Columbia. In New York, Professor McKee was consultant to various chemical corporations. During the World War, he was director of the United States Ordnance School of Explosives.

McKELLAR, Kenneth Douglas (1869–). A United States Senator, who was born at Richmond, Ala., and graduated from the University of Alabama (B.A., 1891; LL.B., 1892). He removed to Memphis, Tenn., was a Democratic Presidential elector in 1904 and a delegate to the Democratic National Convention of 1908.

In 1911 he was elected Representative to Congress to fill an unexpired term and was reëlected for two terms (1913–17) to represent the 10th Tennessee District. He was then elected to the U. S. Senate for three terms (1917–35).

McKEN′NA, Rt. Hon. Reginald (1863–). An English statesman and financier (see Vol. XIV), a member of the Privy Council. From 1911 to 1915, he served as Home Secretary. In the latter year, he was Chancellor of the Exchequer, and as such introduced a new war loan and brought in the budget of September, 1915, which was recognized as an able attempt to deal with the financial conditions arising out of the World War. He retired from politics to assume the chairmanship of the Midland Bank, Limited in 1919. He was a member of the British-American Debt Fund Commission in 1923. He wrote *Post-War Banking Policy* (1928).

McKENNA, mȧ-kĕn′ȧ, Stephen (1888–). A British novelist, who was educated at Westminster and Christ Church, Oxford. He was in the Intelligence Section of the War Trade Intelligence Department during the World War and in 1917 was a member of the Balfour Mission to the United States. His works include *Sonia* (1917); *Midas and Son* (1919); *Lady Lilith* (1920); *While I Remember* (1921); *Confessions of a Well-Meaning Woman* (1922); *Vindication* (1923); *An Affair of Honor* (1925); *Saviours of Society* (1926); *The Secretary of State* (1927); *The Unburied Dead* (1928); *The Datchley Inheritance* (1929).

MacKENNAL, Sir Bertram (1863–). A British sculptor. He was born at Melbourne, Australia, and received his art training in Paris. His early work attracted attention by its originality, but in recent years he has shown more conformity to British conventions in art. Among his works are the equestrian statue of Edward VII in Trafalgar Square, London, unveiled in 1921; the War Memorial at Islington; statues of Queen Victoria for India, Australia, and Blackburn; the pediment of the new Government Buildings at Westminister; the National Memorial to Gainsborough (1913), and the Memorial Tomb of King Edward VII at St. George's Chapel, Windsor. See Sculpture.

McKENNA REPORT. See Reparations.

MACKENSEN, măk′ĕn-zĕn, August von (1849–). A Prussian field marshal, born at Hausleipnitz in Saxony. He was at Danzig commanding the 17th Army Corps when the Crown Prince was sent there to be kept from troublesome political activities. On the eastern front in 1914, he commanded the 9th Army and won engagements with the Russians at Kutno, Lodz, and Lowitz. In 1915 he headed the German troops in western Galicia and later in the same year was made a field marshal. He was the commanding general also of the troops which defeated Serbia and Rumania during 1915 and 1916. After the Armistice in 1918, the French interned him at Neusatz, where he was forced to remain until nearly the end of 1919, although the German government protested vigorously.

MACKENZIE, Compton (1883–). A British author (see Vol. XIV), who served with distinction during the World War, and was made an officer of the Order of the British Empire in 1919. His later works include *Guy and Pauline* (1915), published as *Plasher's Mead* in the United States; *Sylvia Scarlett* (1918); *Poor Relations* (1919); *Columbina*, a play (1920); *Rich Relatives* (1921); *The Parson's Progress* (1923); *The Heavenly Ladder* (1924); *The Old Men of the Sea* (1924); *Coral* (1925); *Fairy Gold* (1926); *Rogues and Vagabonds* (1927); *Vestal Fire* (1927); and *Extraordinary Women* (1928).

MACKINTOSH, Kenneth R. (1875–). An American jurist, who was born at Seattle, Wash., studied at the University of Washington, and was graduated from Stanford University (1895). After receiving the degree of LL.B. at Columbia (N. Y.) in 1900, he began the practice of law at Seattle. He was prosecuting attorney of King County (1905–09), judge of the Superior Court of King County (1912–18), associate justice of the Supreme Court of Washington (1918–27), and chief justice since 1927. In May, 1929, President Hoover appointed him a member of the National Law Enforcement Commission.

McLEAN, Angus Wilton (1870–). An American governor, born in Robeson County, N. C., and educated in the law department of the University of North Carolina in 1892. He took an active part in State Democratic politics. From 1918 to 1920, he was director of the War Finance Corporation in Washington and was its managing director in 1920–21. In the same year, he served as Assistant Secretary of the Treasury. He was a member of several commissions during the World War. In 1924 he was elected Governor of North Carolina for the term 1925–28.

McLEAN, George Payne (1857–). A United States Senator (see Vol. XIV). He was reëlected to the Senate for the two terms, 1917–29, and retired in 1928, before the expiration of his second term.

MACLEOD, John James Rickard (1876–). A Scotch-American physiologist and Nobel Prize winner, born at Dunkeld, Scotland, and educated at the University of Aberdeen. In 1898 he devoted himself to the study of physiology and in 1903 was called to the chair of physiology at Western Reserve University. He resigned this professorship in 1917 to accept a like chair in the University of Toronto, where he became the senior member of the group of workers who discovered insulin. The Nobel Prize in medicine for 1923 was divided between MacLeod and Banting (q.v.). He had already published a book on diabetes. In 1928 he left the University of Toronto to become Regius Professor of physiology at the University of Aberdeen. Beginning as a collaborator in small textbooks on physiology and chemistry, he later wrote *Diabetes* (1913); *Physiology and Biochemistry in Modern Medicine* (1918); and *Carbohydrate Metabolism and Insulin* (1926).

McMASTER, William Henry (1877–). A United States Senator, who was born at Ticonic, Iowa, and studied at Beloit College, Wis. Since 1901 he has been engaged in country banking. He was a member of the South Dakota House of Representatives in 1911 and of the South Dakota Senate in 1913–15. He was elected lieutenant governor (1917–19) and governor for the terms 1921–23 and 1923–25. In 1923 he began a successful agitation for a reduction in the price of gasoline. He was elected to the United States Senate as a Republican for the term 1925–31.

MacMILLAN, Donald Baxter (1874–). An American explorer. He was born at Provincetown, Mass., was graduated from Bowdoin College (1898), and became principal of the Levi Hall School at North Gorham, Me. (1898–1900), head of the classical department of Swarthmore (Pa.) Preparatory School (1900–03), and instructor in the Worcester (Mass.) Academy (1903–08). He was a member of the Peary North Polar Expedition of 1908–09 and of the Cabot Labrador party in 1910. In the two following years, he made ethnological researches among the Labrador Eskimos. He led the Crocker Land Expedition in 1913–17 and became professor of anthropology at Bowdoin College. In 1920 he was engaged in the exploration of Hudson Bay. He commanded the Baffin Land Expedition (1921–22), the North Greenland Expedition (1923–24), and the MacMillan Polar Expedition (1925), in which he had the coöperation of the U. S. Navy in the form of an airplane unit directed by Commander Richard E. Byrd. In 1927 he was awarded the Elisha Kane Gold Medal "for daring exploration and scientific researches." In 1927 and 1928, he conducted explorations in Labrador and in 1929 in the Baffin Bay region. He is the author of *Four Years in the White North* (1918, 1925) and *Etah and Beyond* (1927).

MacMONNIES, FREDERICK (WILLIAM) (1863–). An American sculptor (see VOL. XIV). He executed the heroic figure, "Civic Virtue," at the City Hall Fountain in New York (1919). It was the subject of considerable controversy. One of his best-known later works is the memorial of the Battle of Princeton (at Princeton, N. J.), including an equestrian relief of Washington.

MacMURRAY, JOHN VAN ANTWERP (1881–). An American diplomat, who was born at Schenectady, N. Y., and graduated from Princeton (1902). He completed a law course at Columbia (LL.B., 1906) and was admitted to the New York bar. He entered the diplomatic service as secretary of legation and consul general at Bangkok, Siam, in 1907. For three years, he was second secretary of the Embassy to Russia and then returned to the United States, serving first as assistant chief and later as chief of the State Department's Division of Near Eastern Affairs (1911–13). For the next six years, he was secretary of legation at Peking and counselor of the Embassy at Tokyo. In 1919 he was appointed chief of the Division of Far Eastern Affairs at the State Department, Washington. He was one of the assistants at the Conference on Limitation of Armaments in 1921–22 and was observer for the Government at the Chinese-Japanese Shantung negotiations (1921–22). He was appointed Assistant Secretary of State in 1924, and Minister to China in 1925 serving until 1929 when he resigned. He edited *Treaties and Agreements With and Concerning China, 1894–1919* (2 vols., 1921).

McNARY, CHARLES LINZA (1874–). A United States Senator, who was born near Salem, Oreg., and studied under private tutors and at Stanford University. Admitted to the Oregon bar in 1898, he became deputy district attorney for the Third Judicial District of Oregon (1906–13) and justice of the State Supreme Court (1913–15). In 1916–17, he was chairman of the Republican State Central Committee and in 1917 he was appointed U. S. Senator to fill an unexpired term. He was elected for the two succeeding terms (1919–31). He became chairman of the Senate Committee on Agriculture and Forestry and was one of the sponsors of the McNary-Haugen Bill for farm relief.

MacNEIL, HERMON ATKINS (1866–). An American sculptor (see VOL. XIV). He won the gold medal at the Panama-Pacific International Exposition in 1915. Two years later, he was awarded the medal of honor of the Architectural League in New York. In 1923 he was awarded the Saltus Medal for excellence.

MacNIDER, HANFORD R. (1889–). An American soldier and banker, who was born at Mason City, Iowa, and graduated at Milton (Mass.) Academy and Harvard (1911). He was connected with the First National Bank of Mason City (1911–16) and since 1920 has been president of a local company of investment bankers. He served on the Mexican border with the Iowa National Guard (1916–17) and in the World War was commissioned second lieutenant in the 9th U. S. Infantry where he was promoted through the grades to lieutenant colonel. He resigned from the Army in September, 1919. For his service in the field, he was awarded the D. S. C. with cluster (U. S.), the Croix de Guerre, five citations (French); and the Croce al Merito di Guerra (Italian). He was elected national commander of the American Legion in 1921. He went to the Republican National Convention of 1924 as delegate-at-large from Iowa, and was Assistant Secretary of War from October, 1925, to January, 1928.

McPHERSON, WILLIAM (1864–). An American chemist and university professor. He was born at Xenia, Ohio, and graduated at Ohio State University, where he became a member of the faculty in 1892, attaining a full professorship of chemistry in 1897. Since 1911 he has been dean of the Graduate School in the same institution and in 1924 was acting president. In the World War, he was commissioned major and served as adviser to the trench-warfare section of the Ordnance Department. Later he became a lieutenant colonel in the Chemical Warfare Service. In 1929 he was elected president of the American Chemical Society.

McRAE, JAMES HENRY (1863–). An American soldier, born in Lumber City, Ga. He was graduated from the United States Military Academy in 1886. Commissioned second lieutenant, he rose to the rank of major general in the National Army in 1918, and brigadier general in the Regular Army in 1920, and major general in the Regular Army in 1922. He took part in the Spanish-American War and in the campaigns in the Philippines. In 1917 he commanded the 9th Brigade, 5th Division, and in 1918–19 was commander of the 78th Division, participating in the St. Mihiel and Meuse-Argonne operations. In 1921–22 he was assistant chief of staff, he was commandant in 1922–24 of the 5th Corps Area, in 1924–26 of the Philippines Department, in 1926 of the 9th Corps Area, and in 1926–27 of the 2d Corps Area. He retired in 1927. He received decorations from the American and foreign governments.

MacVEAGH, CHARLES (1860–). An American lawyer and diplomat. He was born at West Chester, Pa., and graduated at Harvard. After receiving the degree of LL.B. at Columbia, in 1883, he practiced law in New York City until 1925. After 1901 he was general solicitor and assistant general counsel of the U. S. Steel Corporation and in October, 1925, he was appointed American Ambassador to Japan.

MADAGASCAR. A French island colony off the southeastern coast of Africa. Area, 241,094 square miles; population, census of 1926, 3,621,343, of whom 18,040 were French and 11,359 other non-Malagasy, largely Asiatics. The populations of the chief towns in 1926 were: Antanànarìvo, the capital, 70,847; Tamatave, 15,022; Diégo Suarez, 8604; Mananjary, 12,013; Fianarantsoa, 11,156. The principal ports are Tamatave (east coast), Majunga (northwest), Diégo Suarez (north), Tulear (southwest). In 1927 the area under rice was 1,392,425 acres; manioc, 682,925 acres; maize, 213,540 acres; sweet potatoes, 244,825 acres; and coffee, 113,537 acres. Other crops of importance are sugar cane, cacao, and vanilla. Besides these, the export trade embraces raffia, graphite, tanning bark, caoutchouc, tapioca, and gold. The extensive cattle breeding accounts for the importance of the hide industry as well as the appearance of local meat-packing plants. Large factories for preserving and chilling meats are located at Majunga, Diégo Suarez, and other centres. Cattle numbered 7,139,900 in 1925, as compared with 5,320,200 in 1913. Exports for 1913, 1920, 1921, and 1927 were 56,054,377, 235,942,698, 108,308,000, and 375,035,956 francs. Imports for the same years were 46,747,000, 279,694,657, 225,921,000, and 579,860,066 francs. Leading imports are cotton goods, beverages, metals, machinery, and clothing. In 1927, 5914 vessels of 2,554,619 tons entered and 5934 vessels of 2,543,899 tons cleared at Madagascar ports. In 1912, 1,756,764 tons entered. The length of railway line in operation in July, 1927, was 429 miles, of which 324 miles were main line and 105 branch lines. The rolling stock in operation comprised 65 locomotives, 46 passenger cars and 426 freight cars. The railways are supplemented by 693 miles of auxiliary motor-bus services. A good system of metaled roads, 1800 miles long, makes communication between the various centres easy. The 1927 budget totaled 289,991,138 francs, as compared with the 1911 budget of 31,153,000 francs. By Jan. 1, 1928, the public debt had mounted to £4,200,000. The colony prospered during and after the War, and work on internal improvements has gone on steadily.

MADARIAGA, Salvador de. (1886–). A Spanish critic, essayist, poet, novelist, and publicist, born at Corunna. Educated in Madrid and Paris, he was a journalist and literary critic in London (1916–21) and then became affiliated with the League of Nations Secretariat at Geneva, as a member of the Press Section (1921–22), director of the Disarmament Section (1922–27), secretary of the Third (Disarmament) Commission of the League Assembly (1922–27). He lectured in the United States from 1927 to 1928, when he was called to the chair of Spanish studies at Oxford University. His works include *Shelley and Calderon*, essays (1920); *Spanish Folksong* (1922); *The Genius of Spain* (1923); *The Sacred Giraffe* (1926); *Englishmen, Frenchmen, Spaniards* (1928); and other publications in Spanish and French.

MADELIN, Louis (1871–). A French historian who was born at Neufchâteau (Vosges), educated at the Collège Fénelon at Bar-le-Duc, the University at Nancy, and the École des Chartes. He was a member of the French School in Rome, was chargé of a course at the Sorbonne (1905–1910), and lectured in the United States and Canada for the Alliance Française in 1907–08. During the World War, he was on the general staff. His writings include *Fouché* (1901); *La Rome de Napoléon* (1903); and *La révolution* (1910), all crowned with Academy prizes; *Croquis lorrains* (1905); *France et Rome* (1911); *Danton* (1912, trans. 1921); *La bataille de France* (1919); *Les Heures merveilleuses d'Alsace et de Lorraine* (1920); *Le Chemin de la Victoire* (1920, 2 vols.); *L'Expansion française* (1921); *La France du directoire* (1922) and *La France de l'Empire* (1926), two series of lectures; *Le maréchal Foch* (1925); and *Les Hommes de la révolution* (1928). In 1927 he was elected to the French Academy.

MADRID. The capital and largest city of Spain. The population in 1927 was estimated to be 808,366, having increased from 751,352 in 1920. Since the World War, Madrid has advanced materially in an effort to keep abreast of its growing population. Older streets and buildings have been demolished to make way for modern thoroughfares, such as the Gran Via, and for the erection of shops, hotels, and commercial buildings. The Calle de Alcalá is flanked almost its entire length by new palatial buildings, the most prominent of which are the terraced structure of the Compañia Telefóncia de España and the 16-story building erected by *La Prensa,* Madrid's leading newspaper. Many beautiful homes also have been erected in the Castellana, the city's most fashionable residential section, and model tenements are being constructed in great numbers to provide proper housing conditions for the poorer element. The years 1924–26 each witnessed the construction of more than 1000 buildings.

In October, 1919, the first underground electric railway in Spain was inaugurated at Madrid. It covered a distance of three miles. During the first 10 years of its existence, it showed sufficient profits to attract enough capital to extend its scope. The extension which was added in 1929 made the total length six miles. The University of Madrid, which had hitherto been scattered throughout the city, is being centralized by the construction of new buildings on government land in the district of Moncloa. The construction includes class buildings, laboratories, libraries, dormitories, a clinic and hospital, gymnasia, and a stadium. The idea was inspired by King Alfonso, who desired to leave a worthy living monument of his reign.

MAETERLINCK, mä'tẽr-lĭnk or mȧ'tĕr'lăɴ', (Fr. pron.) Maurice (1862–). A Belgian poet (see Vol. XIV). During the World War, he did relief work in France and Belgium and wrote in opposition to the German rule in Belgium. His later books included *The Wrack of the Storm* (1916); *The Betrothal* (1918); *The Burgomaster of Stilemonde* (1918); *Les Sentiers dans la Montagne* (1919); *L'Intelligence des fleurs* (1921); *La grande énigme* (1924); *The Great Secret; The Life of the White Ant* (1926), and *The Life of Space,* essays (1928). He visited the United States in 1921, with the intention of lecturing in various cities, but his lack of acquaintance with the English language led to the abandonment of this enterprise. Consult *Maeterlinck's Symbolism,* by H. Rose (1921).

MAGNESIUM. See Chemistry.

MAGNETISM. See Physics.

MAINE. Maine is the thirty-eighth State in size (33,040 square miles) and the thirty-fifth in population; capital, Augusta. The population increased from 742,371 in 1910 to 768,014 in 1920, a gain of 3.5 per cent; estimated population, 1928, 795,000. The white population rose from 739,995 (1910) to 765,695 (1920), the native white, from 629,862 to 658,346. The number of Negroes decreased from 1363 to 1310; of foreign-born whites, from 110,133 to 107,349. The urban population mounted from 262,248 to 299,569, while the rural population fell from 480,123 to 468,445. The growth of the principal cities was as follows: Portland (1910), 58,571 to (1920) 69,272; Lewiston, 26,247 to 31,791; Bangor, 24,803 to 25,978.

Agriculture. Maine is one of the New England States in which there was only slight decline in the percentage of the rural population, 64.7 in 1910 to 61 in 1920. Subsequently, the number of farms increased 3.7 per cent, or from 48,227 in 1920 to 50,033 in 1925; the acreage of land in farms nevertheless decreased from 5,425,968 to 5,161,428. The improved land in farms totaled 1,977,329 acres in 1920. Crop land acreage (1925) was 1,643,515. The total value of farm property rose from $199,271,998 in 1910 to $270,526,733 in 1920, and then declined moderately to $197,269,810 in 1925; the average value per farm was $3320 in 1910, $5609 in 1920, and $4914 in 1925. In interpreting these values, the inflation of the currency incident to the World War is to be taken into consideration. The total percentage of land used for agricultural purposes decreased from 32.9 in 1910 to 28.4 in 1920 and to 27 in 1927. Of the total number of farms in 1925, 47,984 were operated by owners; 350, by managers; and 1699, by tenants. The comparative figures for 1910 are 56,454; 999; and 2563. White farmers in 1920 numbered 48,214, as compared with 59,987 in 1910; foreign-born farmers, chiefly Canadians, numbered 4384, compared with 4973. Farms reported as under mortgage numbered 13,023 in 1920 and 11,925 in 1925. The number of dairy cows in 1920 was 217,021; 151,277 in 1925; "beef" cows, 9956 in 1920 and 6983 in 1925; sheep, 119,471 in 1920 and 84,680 in 1925. There was a noticeable increase in dairying up to 1920, later it was somewhat checked. The growing of potatoes for seed had become a large industry. The estimated production of the chief farm crops in 1928 was as follows: Corn, 520,000 bushels; oats, 4,200,000; potatoes, 37,840,000; and hay, 1,597,000 tons. Comparative figures for 1913 are corn, 608,000 bushels; oats, 5,600,000; potatoes, 28,160,000; and hay, 1,194,000 tons.

Manufactures. While Maine is not one of the most important industrial States, it has manufacturing interests of great importance.

Education. In the course of recent years, there has been marked improvement in educational conditions in the State. Special attention is given to the needs of rural communities. The Legislature enacted in 1919 provision for rotation agricultural schools under the supervision of the State Board for Vocational Education; the Industrial Education Act was amended to provide for a programme of Americanization; a rural teaching provision was virtually established, which is said by experts in education to be one of the most direct approaches to the rural-school problem yet presented; and a State-wide compulsory physical education law and an act reorganizing the law affecting the schools in unorganized territory were passed. Subsequently came the establishment of the State school fund, to be distributed on the basis of teaching positions, aggregate daily attendance, and school census, approximately one-third each; and the establishment of a special school for the training of rural leaders. Consolidation of schools is gradually taking place. By an act of the Legislature of 1923, all towns were required to have their buildings in a sanitary and satisfactory condition by 1927. In 1914 the total enrollment was 146,620; in the year 1925–26 it was 148,596, of whom 121,534 were enrolled in elementary schools and 27,062 in secondary schools. Expenditure in 1925–26 for public day schools was: current, $9,114,484; outlays: $1,128,920. The percentage of illiteracy in the State decreased from 4.7 in 1910 to 3.9 in 1920: among the native whites from 1.5 to 1.3 per cent; among the foreign-born whites, from 14.5 to 12.0; and among the Negroes, from 10.3 to 6.8 per cent.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $11,133,604 (of which $2,179,063 was aid to local education); for conducting public-service enterprises, $142,802; for interest on debt, $826,208; for permanent improvements, $8,006,992; total, $20,109,606 (of which $10,396,000 was for highways, $2,677,875 being for maintenance and $7,718,125 for construction. Revenues were $17,419,442. Of this, property and special taxes formed 39.4 per cent; departmental earnings and charges for officials' services, 7.9 per cent; sales of licenses and the tax of gasoline, 42.9 per cent. Property valuation was $724,938,295; State taxation thereon, $4,879,722. Net State funded debt on June 30, 1927, was $21,567,699.

Political and Other Events. The death of Senator Edwin C. Burleigh on June 16, 1916, made two Senate elections necessary. Carl E. Milliken was elected governor and Frederick Hale and Bert M. Fernald were elected senators. In the presidential election in November, 1916, Charles E. Hughes received 69,506 votes; President Wilson, 64,118. The first national park east of the Mississippi, comprising 5000 acres, was created at Mt. Desert Island, in July, 1916. On Sept. 10, 1917, a woman-suffrage amendment was defeated. A budget system was inaugurated in this year. In 1918 Carl E. Milliken was reelected governor, and Senator Fernald was reëlected to the Senate. The Republicans also elected a large majority of the members of the Legislature. In the presidential voting of 1920, W. G. Harding received 136,355 votes; J. M. Cox, 58,961. In 1920 Frederick H. Parkhurst, Republican, was elected governor. Governor Parkhurst died on Jan. 31, 1921, 24 days after he had taken the oath of office, and was succeeded as governor by Percival P. Baxter, President of the Senate. In 1922 Governor Baxter was reelected, and Senator Hale was reëlected to the Senate. The State's presidential vote in 1924 was: Coolidge, 138,440; Davis, 41,964; R. O. Brewster, Republican, was elected governor. A referendum proposal to repeal the direct primary was lost in 1927. William Tudor Gardiner, Republican, was elected governor in 1928; the vote for President was: Hoover, 179,923; Smith, 81,179.

Legislation. The Legislature of 1914 amended the workmen's-compensation law. A woman-suffrage measure failed by a narrow margin to pass the House of Representatives. The liquor laws were amended in 1917. The Legislature in 1919 made provision for the voting of women for President and passed a measure providing for the registration of persons employed as counsel or agents to promote or oppose legislation. The Legislature of 1921 passed measures regulating the use of aircraft, extended the jurisdiction of the Public Utilities Commission over certain motor vehicles, amended the State Prohibition Law to harmonize with the Federal law, provided a bonus to soldiers and sailors who fought in the War with Spain, and amended the workmen's-compensation law. In 1923 the Legislature passed a bill to facilitate coöperative marketing of agricultural products and made it criminal conspiracy for two or more persons to conspire to sell liquor in violation of the law. In this period was developed a policy of improved highways, and bonds to the amount of $9,000,000 had been authorized and issued, under public referendum. In 1923 the State refused, by public referendum, to institute a 48-hour law for women and minors. The majority opposed was over 20,000. The State water-power policy instituted by Fernald, prohibiting transmission of hydroelectric power beyond the borders of Maine, was constantly under fire but was not changed in this period. Successive acts raised the gasoline-tax rate to four cents a gallon in 1927. A measure of 1927 admitted the State to the terms of the Federal Maternity and Infancy Act.

MAINE, University of. A State institution of higher learning for men and women, at Orono, Me., founded in 1865. The enrollment for the period 1914–28 grew from 1058 to 1390, with a summer session registration of 315 in the latter year. The faculty was increased from 126 to 224, divided as follows in 1928: Teaching and administration, 150; agricultural extension service, 48; experiment station, 26. The library was increased from 40,000 to 87,799 volumes. The productive funds amounted to $866,823, and the income to $933,349, in 1928, as compared with an income of $642,756 in 1923–24. A department of music was established in 1916; a new building for the college of arts and sciences, for which funds were provided by the State Legislature, was ready for occupancy in the autumn of 1924; several units of a gymnasium-armory, to cost $500,000, were provided for in 1925 by gifts from alumni, as a memorial to Maine men killed in the World War; in the following year, a laboratory for mechanical engineering, a gift of the late Oliver Crosby of the class of '76, to be known as the Crosby Memorial Laboratory, was under construction; and a building to provide for laboratory instruction in dairy husbandry was completed in 1927. In 1928 Rogers Hall, for dairy manfactures, named for Dr. Lore A. Rogers, '96, bacteriologist of Washington, D. C., was occupied, and a horticultural building was nearing completion. President, Harold Sherburne Boardman, C.E., D.Eng., LL.D., acting president, from 1925, was inaugurated in 1926.

MALACCA. See Straits Settlements.

MALARIA. The World War caused malaria to be carried to Great Britain and France after long years of immunity, and drove home strongly the fact that it is still the world scourge which nullifies the efforts of man to civilize certain of the world's areas. The successful campaign against malaria in the temperate zones will not be repeated in the tropics until our knowledge of the disease has been increased. Quinine is powerless against certain types of tropical malaria; while the *anopheles* mosquito, which can be made the object of an intensive campaign of eradication in the United States, is not the sole means of distribution of the plasmodium in the tropics. Other insects are doubtless involved, of whose life cycle and habits little is known.

In Saloniki during the War, the disease behaved like tropical malaria, and not more than 20 per cent of the men responded to quinine; in this case, the infection probably proceeded from Egypt and could be classed as tropical. In regard to malaria in the United States, the work of the Rockefeller Foundation appears to show that the control of the disease is a matter simply of money and engineering. It is true that in rural sections the cost would be prohibitive and that systematic use of quinine must be added. This drug should be given in childhood and youth, for malaria is but infrequently contracted after this period.

There was held in Rome, during Oct. 3–6, 1928, the first International Malaria Congress, which was opened officially by Premier Mussolini. The first subject to be discussed was that of the unity or duality of the malarial parasite. The unicists, who follow the lead of Laveran, the French discoverer of the *plasmodium malariæ*, were once in the ascendant but are now heavily outnumbered by the pluralists—to such an extent, in fact, that the delegates were almost unanimous. Different species of the parasite account for the great differences in the clinical course and explain why we have a benign and a malignant malaria.

MALAY STATES, Federated. A federation of native States in the Malay Peninsula under British protection. The territory, made up of Perak, Selangor, Negri Sembilan, and Pahang, had an area of 27,506 square miles in 1921 and a population of 1,324,890. The 1911 population was 1,036,999. The 1921 population was composed of 510,821 Malays, 494,548 Chinese, 305,219 British Indians (172,465 in 1911), 5686 Europeans, and 3204 Eurasians. The estimated population in June, 1926, was 1,476,032. The chief town, Kuala Lumpur, has an estimated population of 80,000. Indian laborers continue to predominate on the estates. The leading activities centre in the rubber and tin industries. Coconuts, rice, sugar, tapioca, pepper, and gambier are also cultivated. The country was little touched by the War and the succeeding depression. Exports for 1927 totaled £39,619,922; imports, £20,309,979. Leading imports in 1927 were rice, machinery, cigarettes and tobacco, kerosene and motor oils, and cotton goods. The principal exports were rubber, tin ore, tin, and copra. In 1927, 10,677 vessels, exclusive of native craft, of 7,027,914 tons entered and cleared ports of the Federated Malay States. Government accounts for 1927 were: revenues, £12,297,187; expenditures, £10,880,790. The public debt on Dec. 31, 1927, was £9,355,000. In 1927 there were 1105 miles of railway in operation, compared with 614 miles in 1912. The government scheme calls for a network of railways over the whole peninsula and in 1927 about 81 miles of line were under construction.

MALAY STATES, Nonfederated. Five Malay States not included in the Federation. These are (1) *Johore*, with an area of 7678 square miles and a population of 309,293. The State greatly increased in population after 1911 and also progressed economically. Rubber, tin, and copra are the leading exports. Exports in 1921 and 1927 were Straits $32,029,128 and $88,317,154; imports were Straits $24,730,135 and $39,422,852. The government expenditure for 1927 was Straits $15,348,473; revenue, $18,239,023. (2) *Kedah* has an area of 3800 square miles and a population of 338,554. Chief articles of commerce are rice, rubber, coconut, tapioca. The tin mines are rapidly being exhausted. Exports in 1927–28 were $28,509,759; imports, $9,280,175. Government expenditure for 1927 was Straits $7,335,338; revenue, $7,722,507. (3) *Perlis* has an area of 316 square miles, and a population of 40,091. Leading products are rice, tin, and guano; the last two were declining. (4) *Kelantan* has an area of 5713 square miles and a population of 309,293. Agriculture is the leading activity; rice, rubber, and coconut raising ranking highest in importance. Rubber is the chief article of commerce. Exports in 1927 were Straits $9,021,746; imports were $6,530,025. Valuable mining concessions, said to contain gold, galena, pyrites, and tin, are owned by British companies. State expenditures in 1927 amounted to $2,949,438; revenue, $2,448,090. (5) *Trengganu* has an area of 5500 square miles and a population of 153,092. Industries are similar to those of Kelantan. Exports in 1927 were Straits $8,244,479; imports, $6,064,758. State expenditures for 1927 were $1,542,404; revenues, $1,402,550. Tin and wolfram mines are worked. All the States have native sultans at whose courts reside British advisers representing Great Britain.

MALIPIERO, FRANCESCO (1882–). An Italian composer, born at Venice. Although he began to study the violin at the age of six, his instruction was very desultory. Not until 1899 did he begin to study with interest and systematically at the Liceo Musicale in Venice, under Enrico Bossi, whom he followed to Bologna (1902) on his becoming director of the Liceo there. After completing his studies, Malipiero devoted himself entirely to composition. At different times, he lived in Venice, Rome, Paris, and Asolo. In 1924 he became director of the Liceo Musicale in Florence. His earliest compositions were influenced by Wagner, but these he himself destroyed. He adopted the principles of futurism, of which he is one of the leading exponents. Of his operas, *Elan e Fuldano; Canossa; Il Sogno d'un Tramonto d'Autunno; Pantea;* a trilogy, *L'Orfeide* (*La Morte delle Maschere, Sette Canzoni,* and *Orfeo*); *San Francisco d'Assisi; Filomela e l'Infattuato,* only four were produced (but only in the cities indicated), *Canossa* (Rome, 1914); *Sette Canzoni* (Paris, 1920); *Orfeo* (Düsseldorf, 1925), and *Sior Todero Brontolon* (Monte Carlo, 1928). In the matter of mechanical stage-effects, Malipiero's demands are so extravagant as to constitute an effective barrier against the performance of those operas. A ballet, *La Mascarade des Princesses captives,* was produced in Brussels (1924). For orchestra, he wrote *Dai Sepolcri; Dalle Alpi; Sinfonia delle Eroi; Sinfonia del Mare; Impressioni dal Vero* (two series; *Pause del Silenzio; Ditirambo Tragico; Illustrazioni di un Poema Cavallcresco; Armenia; Sinfonia del Silenzio e della Morte; Oriente immaginario;* and *La Cimarosiana.* His *Rispetti e Strambotti* for string quartet won the Berkshire Prize (1920). He also wrote piano numbers.

MALMÉDY. See EUPEN, MALMÉDY, AND MORESNET.

MALTA. A British island colony in the Mediterranean Sea. The total area of Malta and its two islet dependencies is 122 square miles; civil population in 1921, 213,024; estimated in 1927, 227,440. Agriculture is the chief activity. Leading products are wheat, barley, vegetables, grapes and other fruits, and cotton. Trade (excluding goods in transit) for 1913–14 and 1927 totaled £1,154,363 and £1,006,881 in exports, and £2,589,272 and £4,285,436 in imports. The State budget increased over the period 1913–28 from £423,108 in revenues and £402,521 for expenditures (1913–14) to £823,138 and £887,523 (1926–27). In 1921 a Maltese constitution was promulgated for the purpose of giving the natives a responsible government. A bicameral house was provided with its own local ministry. Certain "reserved" matters, however, including control of naval, military, and air forces, imperial interests, external trade, immigration, and treaties, were to be controlled by the governor and a nominated council. Valetta, the chief town, continues as an important port of call and the headquarters for the British Mediterranean fleet.

MALTA FEVER. This acute infectious disease known under a variety of names of which undulant fever is one of the best known was at first recognized only in the Mediterranean Basin of Europe as a malady largely transmissible by milk, in particular, goats' milk. Its incidence, however, was evidently much greater, for in 1913 its existence was first recognized in the United States, and in 1918 Dr. Alice Evans of the U. S. Public Health Service was able to show that the causal agent was identical with that of infectious abortion in domestic animals. This common origin of a human and animal disease has been recognized in several different parts of the world, as Italy, the Near East, and South Africa. It is extremely probable that many cases masquerading as typhoid which give a negative Widal reaction have been examples of Malta fever. Recently, the problem of Malta fever has become much complicated because different strains of the causal organism have been isolated which seem to be pathogenic only for certain animals. Thus, infectious abortion in cattle does not seem very dangerous to mankind, although occasionally a connection may be traced; and it has been suggested that unexplained abortion in women may be traced to this source although, in human Malta fever, abortion plays no greater rôle than in any other febrile affection. The number of human cases in the United States increased from 24 in 1925 to 649 in 1928. See VETERINARY MEDICINE.

MAN, ANCIENT. See ANTHROPOLOGY.

MAN, ISLE OF. See GREAT BRITAIN.

MAN, PREHISTORIC RACES OF. There is now no general disagreement concerning man's relation to the anthropoid apes, but the many finds of fossil forms intermediate to man and the apes made during the period 1914–28 have raised questions of the precise nature of that relationship.

It is commonly held that monkeys, apes, and man are derived from a generalized tarsioid (lemur-like creature) of Eocene times, estimated at four million years ago. The developing brain and eye played leading parts in this evolution, according to Elliot Smith (*The Evolution of Man,* 1924). By Miocene times (two million years ago), a host of anthropoids or man-like apes had appeared, whose fossil remains have been found from Europe to India. Gregory and Hellman hold that man and at least three of the living anthropoids (gorilla, chimpanzee, and orangutan) derive common descent from one of these Miocene types, *Dryopithecus;* that, in fact, it is possible to fix on one particular species, *D. rhenanus* (*Anthropological Papers, American Museum of Natural History*, 28, 1926). This view is based especially on a comparison of the forms of their teeth, but is substantiated by other features.

H. F. Osborn maintained on the contrary that the point of departure is more remote, in Eocene times or the early part of the succeeding epoch, Oligocene. He postulated a Dawn Man of that period, wholly dissociated from the anthropoids, and with all subsequent development increasingly divergent (*Science*, 1927, 481). His view was dictated in part by an effort to prove that man's ancestry and the ape's have been separate over a long period. Particular evidence for it rested, in part, on a supposed anthropoid tooth from the Pliocene of Nebraska. W. K. Gregory showed, however, that Osborn had drawn a false analogy from the early separation and parallel development of horses, camels, and related forms. He conclusively demonstrated that the anthropoid forms and man were highly variable, approaching and diverging at many points in their career (*Science*, 1927, 601).

The place of man's origin would seem to be in the great forest that covered the central part of the Old World land-mass in Miocene times, in the remnants of which the anthropoids now live (Congo, Malay Archipelago). The discovery of Piltdown man in the early Pleistocene (Ice Age, the last million years) of England has led Hrdlička, Hooton, and others to consider the possibility of a European or an African origin. Others still look to Asia, partly because of the fossil anthropoids of India and the semi-human Pithecanthropus of Java: Mendes-Correa suggests the borders of the Indian Ocean (*Scientia*, 1927); Matthew, central Asia. At least America is definitely excluded by Gregory's determination that the molar tooth of the supposed anthropoid *Hesperopithicus* of the Nebraska Pliocene (the epoch preceding the Ice Age) is that of a fossil peccary (*Science*, 1928, 597).

No new finds of *Pithecanthropus erectus* have been made, but in 1926 J.G. Andersson announced the discovery of molar and pre-molar teeth near Peking in deposits of the same age as *Pithecanthropus* (upper Pliocene or lower Pleistocene). How far these are homoid remains to be seen. While the original *Pithecanthropus* remains were found in 1891, it was only in 1923 that it became known that Dubois had found at the same time part of the lower jaw of another individual, but apparently belonging to the same genus. The net result of this new information is to give added certainty to the existence of this genus.

There is still considerable dispute as to the Piltdown remains, discovered in 1912. The skull is incomplete: part of the brain case, portions of the face, some teeth, and half of a lower jaw. These were not found in immediate association. A reconstruction of the skull fragments shows a decidedly modern type with a high skull capacity. The jaw and teeth, however, are ape-like in appearance and distinctly at variance with the skull. Non-British students were strongly inclined to view the jaw as that of a chimpanzee (although fossil anthropoids were hitherto unknown in England) and unconnected with the distinctly human skull. New discoveries of skull and teeth, reported in 1924, confirmed the strange association. A radiographic study of the tooth-cavity shows the characteristics of modern man, Heidelberg and Neanderthal types, not those of the apes (Mac Curdy, *Scientific Monthly*, 1924). The geological position is still uncertain, but on the basis of its low development, Piltdown is assigned to the lower Pleistocene by some, to the third interglacial period (late Pleistocene) by others.

A series of remains of Neanderthal man (late Pleistocene), with whom is associated Mousterian culture, have been found since the World War in several parts of Europe and as far east as Palestine. Doubt no longer remains as to the identity of this homoid species. Prevailing opinion is that this type, as well as *Homo sapiens* (modern man), was derived from *Homo Heidelbergensis* of early or middle Pleistocene age. A child's cranium of Neanderthal type, found at La Quina, differs so much from that of a modern child as to suggest that the point of separation must have been very remote. In 1914 the lower jaw of an adult and an incomplete skeleton were found at Ehringsdorf, near Weimar. While held generally to be Neanderthaloid, it is the opinion of some that these resemble Piltdown and represent a type of a more remote period than Neanderthal. It is now generally believed that the Neanderthal species left no living descendants, although earlier opinion maintained that Australians and Tasmanians presented Neanderthaloid characters, which could even be identified among the peoples of Frisland. Recently, Hrdlička affirmed that *Homo sapiens*, as a whole, was derived from an aberrant type of Neanderthal (*Jour. Royal Anth. Inst.*, 57, 249).

South Africa presented three puzzling forms: that of Boskop, Transvaal, in 1914; Broken Hill, Rhodesia, in 1921; and the Taungs skull, Bechuanaland, in 1925. The antiquity of all three is uncertain. R. Broom, who held the Boskop skull to be of exceedingly primitive character, suggested that it may be ancestral to Neanderthal as well as Crô-Magnon (early *Homo sapiens*), and proposed a new specific name for it, *Homo capensis* (*Anthropological Papers, American Museum of Natural History*, 23, 1918). This find has attracted little attention. The fauna associated with the Broken Hill finds does not indicate great antiquity, but the type is truly ancient. In this case, a large part of the skeleton was found, and fragments from the skeleton of at least one other individual. The brain case is low-vaulted, indicative of low cranial capacity; the large gorilla-like face has the masive brow ridges of Neanderthal; the teeth are large and the jaws massive. On the other hand, the skeleton indicates erect posture and straight legs similar to modern man. Elliot Smith considered it a form of earlier origin than Neanderthal, but persisting in marginal South Africa to a late date. The Taungs skull aroused considerable controversy. R. A. Dart considered this immature specimen as more homoid than any anthropoid, but Keith, Boule, and others held it a fossil anthropoid. On the side of its antiquity, the find is equivocal; R. B. Young maintained that the skull was washed into the fissure in which it was found, and Schwartz that the tropical forest in which the animal lived may have persisted in South Africa until recent date (*Nature*, 1925, 195, 22; *Trans. Geol. Soc. S. Africa*, 28, 55).

The best known of the early forms of our own species (*Homo sapiens*) is the Crô-Magnon race. In the opinion of E. Hooton, the assemblage of skeletons attributed to this race does not represent a true race (*Ancient Inhabitants of the Canary Islands*, 1925), but is an arbitrary group of ancient types, selected because of the large size of the skulls, combining a narrow head with a disproportionately wide face. These, in his view, are hybrids resulting from the crossing of a dolicocephalic (narrow headed) group, having faces of medium width (such as Galley Hill, Brünn), with a broad-faced brachycephalic (broad headed) people (Ofnet, Grenelle). The relation of existing races to this and other Upper Pleistocene races is still uncertain. Caucasians are commonly said to derive from Crô-Magnon and Brünn, Negroids from the Grimaldi race of the same age, but no ancestral Mongoloid types have yet been discovered. No very ancient forms of the American Indian variety of the Mongoloid race have been located, although attributed finds have been frequently reported. The Talgai skull from Queensland was thought to be ancestral to the Australian aborigines, but the remains and their antiquity are too equivocal to warrant that view.

A conservative view of the classification of living races is that of Kroeber (*Anthropology*, 1923), who makes the major groups Caucasian, Mongoloid, and Negroid, leaving the Polynesians, Ainu, Indo-Australians, and Australians unclassified because of doubtful affiliation. Elliot Smith adds the Australians as a fourth and most primitive division, from which Negroids, Mongoloids, and Caucasians range in order as more specialized forms (*Evolution of Man*, 1924). R. B. Dixon makes quite a different analysis (*Racial History of Man*, 1923). Taking three cranial features, cephalic index, height index, and nasal index, he bases a system of races on them alone, to the exclusion of such hitherto universally accepted features as pigmentation and hair texture. Dividing each character into three classes, he has twenty-seven possible groups of which eight are considered primary races. The combination of these in each racial group is then analyzed. While the scheme has the merit of insisting on the complexity of racial amalgamation and the variability of human groups, the results have met with general skepticism. Some progress has also been made in classification by the use of blood-precipitation tests, but the results are not conclusive.

Several local studies deserve notice: F. Sarasin's *Anthropologie der Neu-Caledonier und Loyalty-Insulaner* (1916–1922), Matsumura's "Cephalic Index and Stature of the Japanese" (*Jour. Fac. Sci., Imp. Univ. Tokyo*, 1925); Sullivan's "Racial Types in the Philippine Islands" (*Anthro. Papers., Amer., Mus. Nat. Hist.*, 1918), and Dunn's "Anthropometric Study of Hawaiians of Pure and Mixed Blood" (*Papers, Peabody Museum*, 1928).

As to the cause of racial differentiation, Keith suggests the influence of the ductless glands (*Brit. Assn. Adv. Sci.*, 1920). E. Fischer insists on a view often neglected by race classifiers, namely, that man is a domesticated animal and hence has developed variations corresponding to those differentiating races of cattle, etc. (*Zeit. f. Morphologie u. Anthro.*, 18, 1914). The differences in hair form, bone structure, and musculature among living races are precisely of the order of those setting off domestic animals from wild species. One current explanation for differences in pigment is based on their relative absorption of light; Shaxby and Bonnell found, however, that there is no difference in the reflective properties of Caucasian and Negroid skins (*Man*, 1928, No. 42).

For the purpose of race classification, it has been assumed that such features as head form, hair texture, etc., are fixed by heredity alone; but paralleling Fischer's thought, Boas has investigated the effects of changed environment on physical types. To his earlier demonstration that children of immigrants to the United States differ from their parental types in head form, face width, and stature (*Rept. Immigration Comm.*, 39, 1911), Boas now adds evidence from Porto Rico and elsewhere (*Proc. Nat. Acad. Sci.*, 1916, 713). A summary of such investigations is Boas's "Report on an Anthropometric Investigation of the Population of the United States" (*Jour. Amer. Statistical Assn.*, 1922). F. Sarasin also has discussed the possibility of convergent development of hair form in diverse races (*Anthropologie der Neu-Caledonier*, 1916–1922). Such changes, which imply the possibility of similarities by convergence, render the structure of race classifications exceedingly shaky.

MAN, SCIENCE OF. See ANTHROPOLOGY; ETHNOGRAPHY; ETHNOLOGY; MAN, PREHISTORIC RACES OF.

MANCHECOURT. See LAVEDAN, HENRI.

MANCHESTER. An important manufacturing city of England and the centre of the world's cotton trade. The population at the census of 1921 was 730,307; in 1927 it was estimated to be 751,900. The municipal area is 21,690 acres (about 34 square miles). Manchester is the distributing centre of the cotton spinning and weaving industries of Lancashire for the whole world and of butter and foodstuffs for the most densely populated part of England. It also contains large engineering machinery works and factories for the manufacture of silks, chemicals, india-rubber goods, etc. In 1924 the total value of silk fabrics and yarns produced in Great Britain was £5,543,000, of which about £2,131,900 was manufactured in Manchester.

Manchester is the fourth port in the British Isles, being surpassed only by London, Liverpool, and Hull. It has direct access to the sea by means of the Manchester Ship Canal, which has a total length of 35.5 miles. In 1925 this canal was deepened from 28 feet to 30 feet from the entrance locks at Eastham to Ellesmere Port, a distance of about five miles. Increased facilities for handling cargo were also installed at a cost of nearly £500,000. In 1926 the net tonnage of ships engaged in foreign trade was 3,554,667 for arrivals and 3,241,062 for departures. The value of the sea-borne trade of the port was £96,448,534.

The construction of a service reservoir at Heaton Park, which was begun in 1907 and suspended during the period of the World War, was resumed in 1923 and completed in 1927. It has a surface area of 77.5 acres, an average depth of 26 feet, and a capacity of 570,000,000 gallons. At a cost of £6,500,000 the corporation has assured a supply of 50,000,000 gallons of water per day from Lake Thirlmere in Westmoreland, the water being conveyed a distance of 100 miles to the distributing reservoir. An additional supply is obtained from a series of reservoirs in the Longdendale Valley, and with a wise provision for the future needs of this industrial area, the corporation in 1919 obtained Parliamentary powers to acquire and use Hawcswater, also in the Lake District. The daily average distribution for 1927–28 was 55,000,000 gallons.

A new art gallery and museum have been erected in the central part of the city at a cost of £300,000. In front of the building are statues of the Duke of Wellington, John Dalton, Queen Victoria, James Watt, and Sir Robert Peel. The Royal Exchange was reconstructed, 1915 to 1921, with a clock tower 180 feet high. In 1919 a replica of George Gray Barnard's statue of Abraham Lincoln in Cincinnati was erected in Platt's Field Park. Manchester claims to be the birthplace of free public libraries, the first having been opened in 1852. In 1929 the Central Reference Library had 255,218. volumes, exclusive of the foreign, music, and commercial libraries; 25 district libraries are distributed throughout the city.

MANCHURIA, man-chōō'rē-ȧ. A Chinese outer territory, with an approximate area of 363,700 square miles and a population estimated at 24,520,661 in 1927. Immigration from Central China is increasing the population by a million yearly. The capital and chief town, Mukden, has about 350,000 inhabitants; the chief port is Dairen. Other large towns are Harbin (365,000), Newchwang (82,100), Kirin (540,214), Ying-k'ou (60,000), and An-tung (72,500). The extraordinary fertility of the soil and the improved railway facilities caused Manchuria to grow more rapidly than any other section of China. In 1927 it was estimated that 81,718,945 acres of land were under cultivation. The soya bean, millet, kaoliang (a sort of sorghum), wheat, and rice are the principal crops. Tobacco, beets, and flax also are grown. Gold, iron, coal, salt, natural soda, and magnesite also are worked to some extent. The constant application of the principal concessionaire in the country, the South Manchuria Railway, to industrial activities has met with excellent results. Principal works are bean mills, flour mills, sugar refineries, distilleries, and iron and steel factories. The trade of Manchuria reflected the same condition. Imports of foreign goods steadily increased from 72,431,345 taels in 1913 to 136,926,411 in 1921; exports from 94,053,423 to 196,820,680 in 1921. The combined export and import trade during the year ended Mar. 31, 1928, amounted to 662,000,000 taels. The total railway mileage in 1929 was 3622. See China and Japan.

History. Events of the World War, and, in later years, an enormous influx of immigration from China combined to increase both the wealth of Manchuria and the intensity of the international struggle for its possession. The Chinese Eastern Railway, key to the wealth of the province, was taken over by the Allies in 1917. American engineers operated it until 1922, when it was turned over to China. In 1924 the Soviet government secured an agreement for the control of the railroad by a board of directors appointed jointly by the two governments, at the same time pledging itself to refrain from Communistic propaganda in China. Friction developed which came to a head July 10, 1929, when the Nanking government arrested many Russian officials and employes of the railroad and replaced them with Chinese and White Russians. The excuse for this action was that a raid on the Soviet Consulate at Harbin on May 27, preceding, had uncovered a Communist plot to overthrow the Nationalist government. A Russian ultimatum was ignored; on July 18 the Soviet government severed diplomatic relations, and the threat of war led the United States and other leading powers to intervene on July 19 to the extent of calling the attention of both governments to their obligations under the Kellogg-Briand Pact. While armed forces faced each other across the border and numerous minor clashes were reported, negotiations between the two governments continued into the winter months without a settlement of the dispute.

MANDATES. The decision of the Paris Peace Conference (see Peace Conference and Treaties) to establish a mandatory system under supervision of the League of Nations instead of permitting the outright annexation of the former German colonies and Turkish territories by the victorious Allies, resulted in the creation of a very significant and novel form of international control over colonial possessions. Colonies with an aggregate area about 1,250,000 square miles and a total population of more than 15,000,000 were placed under mandates of the League of Nations. Article 22 of the Covenant which was prefaced to the five major peace treaties provided that certain territories taken from the defeated powers and "not yet able to stand by themselves" should be administered by more civilized nations acting as "mandatories" or trustees for the League of Nations, in which, presumably, ultimate sovereignty is vested. There were to be three classes of mandates: Class A, including territories taken from Turkey; Class B, including former German colonies in central Africa; and Class C, comprising German Southwest Africa and the former German island possessions in the Pacific. The principal Allied and Associated Powers, to whom these areas were ceded by Turkey and Germany, reserved the right to distribute the territories in question, and to draft the mandates, before turning the system over to the League for permanent operation. Accordingly, the Supreme Council on May 7 distributed the B and C mandates as follows: German East Africa to Great Britain, Togoland and the Cameroons (q.v.) to Great Britain and France, Southwest Africa to the Union of South Africa, Samoa to New Zealand, Nauru to the British Empire, German New Guinea to Australia, and German islands north of the equator to Japan.

There remained the A mandates. Because of the uncertainty regarding the Turkish peace settlement, these were not distributed until the San Remo Conference of Premiers in April, 1920. The San Remo decision, confirmed on May 5, allotted Syria to France, and Palestine and Mesopotamia to Great Britain. It had been intended that Armenia also should become an A mandate, but as neither the United States nor any other power cared to assume responsibility for Armenia's welfare, no mandate was issued. See Armenia.

As the premiers at San Remo not only assigned the mandates but also sealed a compact for exclusive Anglo-French exploitation of the oil resources in Mesopotamia, the United States government immediately addressed a note of protest, May 12, 1920, to Great Britain, insisting on equal treatment for subjects of all nations. Refusing to be referred by Lord Curzon to the Council of the League (Curzon letter of August 9), the Washington government insisted on Nov. 20, 1920, that the drafts of mandates must be communicated to it for criticism before final approval, and that the United States had a just claim to all privileges, in regard to mandates, enjoyed by members of the League. The first point, it may be noted, was satisfied subsequently by preliminary publication of draft mandates; the second was guaranteed by special treaties which the United States later negotiated with individual mandatory powers. The United States also objected to the assignment of Yap to Japan, and not until the Washington Conference was this dispute settled by a special treaty recognizing the Japanese mandate for assuring the United States of cable and wireless facilities. See YAP; WASHINGTON CONFERENCE.

Meanwhile, work proceeded on the drafts of the mandates, for each mandated territory was to be entrusted to the mandatory power only on a conditional basis laid down in a separate charter or mandate, drafted by the chief Allied powers, but approved and granted by the League Council. The C mandates, offering the least difficulty, were first formulated and received the Council's stamp of approval on Dec. 17, 1920. These were five in number: Union of South Africa mandate for former German Southwest Africa, Australian mandate for New Guinea, New Zealand mandate for western Samoa, British Empire mandate for Nauru Island, and Japanese mandate for the Caroline and Marshall Islands. In each of these territories, the mandatory power was authorized to exercise full power of administration and legislation, subject to reservations for the prohibition of slavery and forced labor, of the arms and liquor traffic, of fortifications and military training of natives save for local defense, and subject also to a guarantee of religious freedom. Japan would gladly have added a provision for the open door, but the other powers, especially the Australasian Dominions, unwilling to throw their Pacific mandates open to Japan, refused.

Difficulties with the Holy See regarding the Palestine mandate, and with the United States regarding Mesopotamia, delayed the definitive approval of the other mandates. On Aug. 1, 1922, the Council approved B mandates for northern Cameroon (British), southern Cameroon (French), western Togoland (British), eastern Togoland (French), Ruanda and Urundi (Belgian), and East Africa or Tanganyika Territory (British). A notable feature of these mandates was the inclusion of elaborate provisions for the welfare of the natives, the abolition of slavery, and equality of commercial and industrial opportunity in these territories among members of the League, in addition to the stipulations contained in the C mandates. The A mandates for Palestine (British) and Syria and Lebanon (French) were approved on July 24, 1922, and published by the League on August 12; that for Mesopotamia had long been drafted but had aroused so much international difficulty and was so vitally dependent on British relations with the natives that its confirmation was delayed (see IRAQ.) The A mandates were particularly interesting; they were designed to be transitional measures to assist backward countries until fit for independence. Special provisions were inserted for the development of autonomy and for the protection of antiquities or archæological remains.

All mandates imposed on the mandatory power the obligation to make regular reports of its administration to a Permanent Mandates Commission appointed by the League. This is undoubtedly the most unusual and the most valuable feature of the entire system; the knowledge that such reports will receive full publicity and open discussion has acted as a potent stimulus to good administration.

The Mandates Commission has received criticism at times from the Mandatory Power for its excess of zeal in securing information. In February, 1926, the administration of the mandate over Syria by France came before the League of Nations due to criticisms by the representatives of the people of Syria. In 1927 the Mandates Commission considered a number of minor items including the relations of the Union of South Africa to the Southwest Protectorate, involving the definition of the term "possess sovereignty." This subject continued to be discussed in the following year and a report was adopted by the Council aiming to clarify the situation calling attention as it did to conditions new to international law which had developed in the relations of mandated territory to the mandatory powers and to the League of Nations itself.

Full information regarding the mandates and their administration is made available by the League of Nations in its publications containing minutes of the Mandates Commission and supplementary official documents. See AFRICA; LEAGUE OF NATIONS.

MANÉN, mȧ-nān′. JUAN (1883–). A Spanish violinist and composer (see VOL. XIV). He added to the list of his works: The operas, *Der Weg zur Sonne* (Brunswick, 1926), and *Nero und Acté* (Karlsruhe, 1928); a symphonic poem, *Nueva Cataluna;* two violin concertos; a piano concerto; *Variations* on a theme of Paganini for violin and orchestra; *Suite* for piano and violin with orchestra; *Concerto grosso* for two violins and orchestra; a piano quartet; a string quartet; a piano quintet. He also published numerous transcriptions for violin and edited the works of Paganini.

MANGIN, mȧɴ′zhăɴ, CHARLES MARIE EMMANUEL (1866–1925). A French soldier, born in Sarrebourg, Meurthe. He served on the staff of Marchand's Fashoda mission in 1897 and played a prominent part in the conquest of Morocco from 1911 to 1913, in the latter year being made brigadier general. In the World War, he commanded a division at the Battle of the Marne and by his personal example of courage saved a threatening situation. He commanded at Verdun, where in March, 1916, he recaptured the fortresses Douaumont and Vaux. In the last two years of the War, he commanded the 6th and then the 10th Armies and in the defensive of April, 1917, his tactics were criticized but an inquiry exonerated him. In July, 1918, he defeated the Germans north of Château-Thierry and forced them to retreat. During these operations, he had under his command important American forces. Following the Armistice, he commanded the Allied Army of Occupation, with headquarters at Mayence. He was the organizer of the French "black army," was a member of the Higher Council of War, and received many decorations, foreign as well as French. He received the Grand Prix de la Littérature française in 1925, and wrote *La force noire*, crowned by the Academy in its fourth edition, 1921 (1910); *Comment finit* *la guerre* (1921); *Commentaires et Portraits* (1922); and *Autour de l'Amérique latine* (1922). Consult *Le Général Mangin,* by Gabriel Hanotaux (1925).

MANITOBA, măn'ĭ-tō'bȧ. A Canadian province with an area of 251,832 square miles; population in 1911, 461,394; in 1921, 610,118, an increase of 32.2 per cent. In 1929 it was estimated at 663,200. The rural population in 1926 made up 56.4 per cent of the whole, as compared with 56.6 per cent of 1911. Males, in 1921, continued in excess of females, the division being 320,567 to 289,551. The leading cities, with their populations in 1926, were Winnipeg, the capital, 191,998 (136,035 in 1911); Brandon, 16,443; St. Boniface, 14,187; Portage la Prairie, 6513. In 1916 settlers of American origin numbered 18,274. There were, besides the settlers of British descent, large colonies of German, Austro-Hungarian, and Russian farmers.

Industry. To a large extent, the province's very rich natural resources remain undeveloped. The population is settled in the agricultural districts of the West and South, and as farming and pastoral pursuits are the leading activities, comparatively little attention is given to the forests, fishing grounds, water power, or mineral deposits. The area under field crops in 1927 was 6,561,884 acres. The acreage under spring wheat in 1927 (2,195,377 acres) was less than that of 1911 (3,094,833 acres). Oats in 1927 were planted on 1,544,511 acres. Barley, rye, flax, roots, and forage crops are the other important field products. The total value of field crops in 1926 was $120,026,000. The augmentation of live stock indicates the new interest of the province. Cattle in 1927 numbered 707,210, against 409,718 in 1913; sheep in 1927 were 135,982, against 42,840 in 1913; swine in 1927 were 387,260 against 184,745 in 1913. In 1927, 71 dairy establishments produced a product value of $8,385,844 as against the total output of $593,375 in 1910. Mineral areas included rich gold fields in The Pas district and at Elbow Lake; copper ore in the Flin Flon district; gypsum, and building materials. The total mineral production in 1927 was $2,832,905. Other products yielded: furs, 1925–26, $1,869,904; fish in 1927, $2,039,738; lumber cut, 1925, $2,178,051. In 1926 there were 797 industrial establishments; meat packing, milling, etc., are the most important; capitalized at $127,445,924 and employing 21,201 workers (17,325 in 1910). Materials used were valued at $75,000,529 and the product at $132,718,452; in 1910 the product had been $53,673,609. Out of 3,309,000 horse power estimated as available, in 1928, 255,125 was being used.

Communications. In 1928 there were in operation 4697 miles of railway as compared with 3993 miles in 1913. The telephone system, provincially owned, had 275,073 miles of line in 1928. There were 71,187 telephones on the lines. The Dominion Railway from The Pas to Port Churchill (Hudson Bay), to make possible wheat shipments via Hudson Bay, was completed in 1928–29.

Government. Revenues and expenditures for 1913 were $5,788,070 and $5,314,849; for 1928, $10,741,076 and $11,243,693. The gross debt in 1928 was $77,050,659. In 1927–28 there were 148,763 pupils in the 3987 public schools. The enrollment had been 83,679 in 1913. The University of Manitoba had 2747 students in 1927–28; the Agricultural College, 1074 students in 1926. Expenditures for maintenance of state-controlled elementary and secondary schools were $9,181,640 for the year ending June 30, 1927. Total expenditures for education in 1913 were $5,036,795; in 1926, $10,952,462. The province is represented by six members in the Senate and 17 in the House of Commons of the Dominion Parliament. Women are permitted to stand for Parliament. Proportional representation has been adopted as the method for choosing the representatives for the city of Winnipeg.

MANIU, JULIU (1873–). A Rumanian Prime Minister, born at Szilagysomlyo. From 1906 to 1910, he was a member of the Diet. He was President of the provisional government formed in 1918, and in 1919 became President of the National Rumanian Party which consolidated with the National Peasant Party in 1926. As leader of the National Peasant Party, he became Prime Minister Nov. 11, 1928, following the resignation of the ministry headed by Vintila Brătianu.

MANLY, CHARLES MATTHEWS (1876–1927). An American mechanical engineer, born at Staunton, Va., and educated at Furman University and Cornell. After graduation, he became assistant to Secretary Langley of the Smithsonian Institution in his work on aviation and built and piloted the first Langley aëroplane in 1903. He organized the Manly Drive Company in New York in 1905 and was its chief engineer, thereafter serving as consulting engineer to various corporations and to the British War Office (1915) in the development of large aëroplanes in the United States. During 1915–20 he was associated with the Curtis Aëroplane and Motor Corporation, but later devoted his attention chiefly to consulting practice under Manly & Veal. He patented nearly 50 inventions in automotive transportation, power generation, and transmission. In 1918 he was a member of the United States Commission to the International Aircraft Standards Conference in London. He was associated with S. P. Langley in the production of his *Memoirs on Mechanical Flight* (1911).

MANN, ALBERT RUSSELL (1880–). An American agricultural educator, born at Hawkins, Pa., and educated at the New York State College of Agriculture and the University of Chicago. In 1908 he was appointed assistant professor of the dairy industry at New York State College and in the same year was secretary of the State Commission of Agriculture. He was successively secretary, registrar and editor, professor of rural social organizations, acting dean, and dean (from 1917) of the New York State College of Agriculture at Cornell. He was also director of the Cornell University Agricultural Experiment Station after 1925 and director of extension work. He was a member of many scientific societies and the author of *Beginnings in Agriculture* (1911).

MANN, HEINRICH (1871–). A German novelist and dramatist, born at Lübeck, the brother of Thomas Mann. He studied in Lübeck and Berlin. His early novels *Im Schlaraffenland* (1901); *Die Göttinnen* (1902–04), and *Die Jagd nach der Liebe* (1905), were acclaimed only by a few distinguished critics. He reached a wider circle of readers with *Professor Unrat* (1906); *Zwischen den Rassen* (1907); *Der Untertan* (1911); *Die Armen* (1912), and *Der Kopf* (1925). With his *Mutter Marie* (1927), he reached the American market, an English translation being published in 1928. He has also written the plays, *Der Weg zur Macht* (1918) and *Das gastliche Haus* (1923), and the essays *Macht und Mensch* (1919) and *Diktatur der Vernunft* (1923).

MANN, James Robert (1856–1922). An American legislator (see Vol. XV). He was reëlected Representative to Congress for successive terms from 1903 to 1923. He was minority leader from the 62d to the 65th Congresses and was Republican leader up to the time of his death. He was recognized as one of the most efficient parliamentarians in the House and was perhaps its most conspicuous member for many years.

MANN, Thomas (1875–). A German novelist, born at Lübeck, the brother of Heinrich Mann. He studied at the universities of Munich and Bonn. After the publication of *Die Buddenbrooks* (1903), a novel of an old patrician family of Lübeck, supposed to be partly autobiographical, he grew in popularity. Since the World War, he has written *Friedrich und die grosse Koalition*, historical essays (1915); *Betrachtungen eines Unpolitischen* (1918); *Von deutscher Republik* (1923); *Bemühungen* (1925); *Pariser Rechenschaft* (1926); and other contributions to German post-war literature. He has become known in America through translations of *Der Zauberberg* (1924), in English *The Magic Mountain* (1928); *Buddenbrooks* (1928); *Three Essays* (1929).

MANNERHEIM, Baron Carl Gustaf (1867–). A Finnish soldier, born at Villnäs. He was an officer in the Russian Army from 1889 to 1917, and in the Finnish civil war of 1917–18, led the White Armies which defeated the attempt to establish a Bolshevist government. He was Regent of Finland in 1918–19 and has since been commander-in-chief of the garrison at Helsingfors.

MANNING, William Thomas (1866–). A Protestant Episcopal bishop (see Vol. XV). He was rector of Trinity parish from 1908 to 1921. In the latter year, he was consecrated Bishop of New York. During the World War, he served as volunteer chaplain at Camp Upton. He was a chevalier of the Legion of Honor of France and an officer of the Order of the Crown of Belgium. Soon after his consecration as bishop, he began an active campaign for the completion of the Cathedral of St. John the Divine in New York City.

MANOURY, Michel Joseph (1847–1923). A French general, born at Maintenon, and educated at the École Polytechnique in Paris. He served in the Franco-Prussian War of 1870 and was general of a division in 1905. In the latter year, he received the command of the artillery of the forts of Paris and was president of the Commission of Military Schools. In 1910 he was appointed military governor of Paris and a member of the special council of war. In 1914 he was placed in command of the French Reserve Force near Paris, and it was his successful attack on September 6 which first checked General Von Kluck's drive toward Paris. He was wounded at Soissons in March, 1915.

MANSFIELD. Katherine (1890–1923) (Mrs. John Middleton Murry). An English writer, born in New Zealand. She began writing at an early age, her first published work being *In a German Pension* (1911), and soon won her way to the front rank among contemporary writers of fiction. Her book of short stories, *Bliss and Other Stories*, published in 1920, won much favorable comment. This was followed by *The Garden Party and Other Stories* (1922); and, posthumously, *Poems* (1923); *The Doves' Nest and Other Stories* (1923); *The Journal of Katherine Mansfield* (edited by J. Middleton Murry, 1927), and *Letters of Katherine Mansfield*, also edited by her husband (2 vols, 1928). Before her death, she and S. S. Koteliansky translated Maxim Gorki's *Reminiscences of Leonid Andreyev* (1928).

MANSHIP, Paul (1885–). An American sculptor, born in St. Paul, Minn. He studied art in New York and Philadelphia, and in 1909, winning a scholarship of the American Academy in Rome, he went to Europe for three years. His debt to Greece may be traced in such pieces as "The Centaur and the Dryad," "Briseis," the "Infant Hercules" fountain made for the courtyard of the American Academy at Rome, "The Lyric Muse" and "The Little Brother." The beautiful patina of these pieces is a peculiarity of Manship's work. His gleanings from Hindu and Buddhist sculptures are seen in "The Dancer and Gazelles" and the "Flight of Night." While there is reverence for tradition in Mr. Manship's sculpture, there are also very modern notes in some of his figures, e.g., "Yawning." In 1914 he was elected an Associate of the National Academy; two years later, he was made a full member. Among his works are the J. P. Morgan memorial at the Metropolitan Museum in New York City; the Civic Forum Medal; and "Dancing Girl and Fauns" and "Indian and Prong-Horn Antelope" at the Art Institute, Chicago. The bronze statuette, "Yawning," is at the St. Paul Institute, and the portrait study of his daughter, "Pauline," is in the Metropolitan Museum. The group, "Dancers and Gazelles," was exhibited at the Luxembourg in Paris and also at the Corcoran Art Gallery, Washington, and the Cleveland Museum. Copies of "Centaur and Dryad" are at the Metropolitan and at the Detroit Institute of Arts. His work won the gold medals of the American Institute of Architects (1921), American Numismatic Society (1924), and the Sesquicentennial Exposition, Philadelphia (1926). In 1929 he was awarded the National Arts Club Sculpture Prize for his "Flight of Europa."

MANTLE, (Robert) Burns (1873–). An American newspaper writer, born in Watertown, N. Y. He became dramatic editor of *The Daily News* (New York) and dramatic correspondent of the Chicago *Tribune* in 1922. He was previously dramatic editor of *The Evening Mail* (New York) and Sunday editor of the Chicago *Tribune*. He was best known as the editor of *The Best Plays* and *Year Book of the Drama in America*, which appeared regularly after 1919. He wrote *Our Playwrights of Today* (1928).

MANUFACTURES. See Boots and Shoes; Iron and Steel; Leather; Motor Vehicles; Paper and Wood Pulp; Petroleum; Rubber; Silk; Silk, Artificial; Textile Manufacturing; United States, under *Manufactures*.

MANURES. See Fertilizers.

MANZ, Gustav (1868–). A German writer and editor of the *Tägliche Rundschau* of Berlin. He is the author of *M. Beer* (1892); *Das Tagebuch* (1893); *Das Lebende Wort* (1913); *Hundert Jahre Berliner Humors* (1916); *Martin Luther im Deutschen Wort und*

Lied (1917); *Finnland ohne Alkohol?* (1925). He also edited Emil Gött's *Verbotene Früchte* (1894); and *Briefe an einen Freund* (1919); works by Möricke (1912); Scheffel's *Ekkehard* (1916); *Selected Writings of Theodor Storm* (1917); Friedrich Vischer's *Auch Einer; Lachender Ernst*, an anthology of German humor; and Leander's *Träumereien an französischen Kaminen*.

MARATHON. See Olympic Games.

MARCH, Peyton Conway (1864–). An American soldier, born in Easton, Pa. He graduated from the United States Military Academy in 1888 and in the same year was commissioned second lieutenant in the artillery. He saw service in the Philippines in military operations and later as administrator. From 1903 to 1907, he was a member of the General Staff in the Army and in 1904 was observer in the Russo-Japanese War. He commanded the artillery branch of the American Expeditionary Forces from the American entrance into the World War until 1918, when he was appointed acting chief of staff. On May 20, 1918, he became general and chief of staff and held that position throughout the remainder of the War. He was awarded the Distinguished Service Medal and decorations of England, France, and other European countries. He was retired in 1921.

MARCONI, mär-kō'nē, Guglielmo (1874–). An Italian electrical engineer (see Vol. XV). He was chosen a Senator in 1918. During the World War, he took charge of the Italian government's wireless operation. After the War, he experimented successfully on the beam system of radio telegraphy. His invention, tested in October, 1926, speeded up the transmission of words. In 1924 his marriage with the Hon. Beatrice O'Brien was dissolved, and in 1927 he married Contesa Maria Cristina Bezzi-Scali.

MARCOSSON, Isaac Frederick (1877–). An American editor, born at Louisville, Ky., and educated in the schools of Louisville. From 1894 to 1903, he was on the staff of the Louisville *Times*. In 1903 he became associate editor of *The World's Work*, with which he continued until 1907, when he became a member of the staff and financial editor of the *Saturday Evening Post* (Philadelphia). From 1910 to 1913, he was editor of *Munsey's Magazine*. During and following the World War, he traveled about Europe and other parts of the world to investigate conditions and contributed articles to the *Saturday Evening Post* and other periodicals. He wrote: *The War After the War* (1916); *The Rebirth of Russia* (1917); *The Business of War* (1917); *Adventures in Interviewing* 1919); *An African Adventure* (1921); *The Black Golconda* (1924); and *Caravans of Commerce* (1927). He was the coauthor, with Daniel Frohman, of *Charles Frohman, Manager and Man* (1917).

MARGUERITTE, Paul. See Margueritte, Victor.

MARGUERITTE, mär'g'-rēt', Victor (1866–). A French author (see Vol. XV), who collaborated with his brother Paul previous to the latter's death in 1918. After the World War, he began writing sensational stories, *La Garçonne* (1922) being the best known. In 1925 he founded *Appel aux Consciences*, a periodical devoted to the question of War guilt, and in 1926, *Evolution*, a monthly devoted to international questions. His later works include *Pour Mieux vivre*, essays (1914); *La Terre natale* (1915); *Au Bord du gouffre*, essays (1919); *Un Cœur farouche* (1920); *Le Soleil dans la géole* (1921); *La Maison de l'homme*, a play (1922); *Le Compagnon* (1924); *Les Coupables* (1925); *Les Criminels* (1925); *La "dernière guerre"* (vol. i, 1925); and *Ton corps est à toi* (1927).

MARIANNE, or **LADRONE, ISLANDS.** See Pacific Ocean Islands.

MARIE, Auguste (1891–1929). A French physician and bacteriologist. A member of the staff of the Pasteur Institute, Paris, he announced discovery of a new serum for use in canine rabies in 1921. In February, 1929, he announced a cure for paralysis of the insane, but his chief effort was in the direction of improving the serum in use to combat the *Bacillus botulinus.* He worked constantly with this deadly organism, but in spite of all precautions he became infected. As the mind in this form of poisoning remains unaffected, he was able to describe his own symptoms to the last hour, death taking place 14 days after inoculation. He was posthumously awarded the Médaille d'Honneur des Épidémies. In addition to his work at the Pasteur Institute, he was the head of the Asylum de Ste. Anne.

MARIE, Pierre (1853–). A French physician and neurologist. In 1885 he published a thesis on a previously unknown disease —acromegaly—with reports of two cases. This when republished in the *Revue de Medecine* (1885) gave him a wide reputation and in 1891 a work, *Essays on Acromegaly*, was published in English by the New Sydenham Society. In 1892 appeared his *Leçons sur les maladies de moelle*, which was at once translated into English and German. He edited the *Revue neurologique* from 1893 to 1904, and in 1911, jointly with Creuzon, he brought out a large work by French neurologists, *La Pratique Neurologique*. In 1926 appeared the first volume of his reprinted articles under the title *Travaux et Memoires*.

MARIENWERDER. See Allenstein-Marienwerder.

MARIE OF RUMANIA (1875–). Former Queen and grandmother of King Michael of Rumania. Daughter of the Duke of Edinburgh and the Grand Duchess Marie of Russia, and granddaughter of Queen Victoria, she married Crown Prince Ferdinand of Rumania when she was 17 years old. From 1914, when her husband succeeded to the throne, until his death in June, 1927, she exercised a strong influence upon the course of Rumanian and Balkan politics, and was generally credited with bringing Rumania into the World War on the side of the Allies. Two of her daughters became the queens of Greece (now a republic) and Jugoslavia, respectively. Her eldest son, Prince Carol, renounced his right to the Rumanian throne in 1925. A tour of the United States, which she made in 1926, attracted wide publicity. She is the author of *The Lily of Life; Stealers of Light; My Country;* and *Ilderim.* In 1918 she was made an honorary member of the French Academy of Fine Arts.

MARIETTA COLLEGE. A nonsecretarian, coeducational institution at Marietta, Ohio, founded in 1835. The enrollment of the college, between 1914 and 1928, increased from 200 to 393, of whom 239 were men and 154 women. The faculty increased during the period from 19 to 37, three new members having been added in 1928. The productive funds increased from

$700,000 to $1,264,811, and the income in 1928 was $147,534. The library increased from 60,000 to 94,365 volumes in the same period. A department of geology was established in 1919; the entrance requirements were raised in the autumn of 1922; and annually, from 1925, the Alumni contributed toward the revolving fund of the college. A number of new buildings were constructed including a residence hall for women; a fund was being raised during the period for the construction of a men's gymnasium, and in 1928 was begun the construction of a Field House for men, to cost $200,000. The Betsey Mills Club, a fully equipped women's gymnasium, with swimming pool, was completed in 1928, as a centre for the physical education work of the young women of the college. Edward Smith Parsons, A.M., L.H.D., succeeded G. Y. Hinman as president in 1919.

MARINE, MERCHANT. See SHIPPING; SHIPBUILDING; etc.

MARINE CORPS, UNITED STATES. During the World War and since, the Marine Corps has served on vessels of the fleet, and on shore in France, Haiti, Santo Domingo, Nicaragua, Cuba, Peking, the Azore Islands; and at naval stations at home and abroad. The 4th and 5th Brigades of marines and 12 replacement battalions served with the American Expeditionary Forces in France, and the First Marine Aviation Squadron with the northern bombing group in France.

The 5th Regiment of Marines landed in France with the first expedition of American troops in June, 1917; with the 6th Regiment of Marines and the 6th Machine Gun Battalion of Marines, it formed the 4th Infantry Brigade of the 2d Division, U. S. Army. This division was the first one ready for service on the fighting line, and the remarkable work of the 4th Brigade of Marines around Château-Thierry and in Belleau Wood gave the corps world-wide fame. The regular strength of this brigade was 258 officers and 8211 enlisted men. During its service in France, chiefly between Mar. 15, and Nov. 11, 1918, its casualties were: killed in action or died of wounds received in action, 2457; wounded, 8898; total, 11,355, almost 3000 more than the total number of officers and men at any one time. The services of the Marine Corps in Nicaragua in connection with the insurrection and subsequent pacification and election were notable and constructive. See NICARAGUA. The strength of the Marine Corps, as authorized by the Naval Appropriation Act for 1928–29, consists of 1176 commissioned officers, commissioned warrant officers, and warrant officers, and 18,000 men.

MARINE ENGINES. See SHIPBUILDING; INTERNAL-COMBUSTION ENGINES.

MARINETTI, mär'ē-nět'tē, FILIPPO TOMMASO (1878–). An Italian poet and playwright (see VOL. XV), founder of the Futurist movement. His later works include *Guerra, sola igiene del mondo* (1915); *Democrazia futurista* (1919); *Otto anime in una bomba; L'alcova d'acciaio* (1921); *Gli indomabili* (1922); *Amori futuristi; Il Tamburo di fuoco* (1922); *Futurismo e fascismo* (1924); and *Prigionieri e Vulcani*. Consult *Marinetti, l'uomo e l'artista*, by Emilio Settimelli (1921), and *Filippo Tommaso Marinetti*, by T. Domino (1921).

MARINKOVIĆ, VOYISLAV (1876–). A Jugoslavian public official, born in Belgrade. He was Serbian representative at the Inter-Allied Conference in Paris in 1916, Minister of Public Welfare from 1914 to 1917, Minister of Interior (1921–22), and Minister for Foreign Affairs in 1926 and again in 1929. Since 1919 he has been a leader of the National Democratic Party.

MARINUZZI, GINO (1882–). An Italian conductor and composer, born at Palermo. After completing his studies at the Conservatory in Palermo, he was conductor at various theatres in Italy and made frequent appearances as guest-conductor in Paris, Madrid, and Buenos Aires. From 1919 to 1921, he was with the Chicago Opera Association. In 1922 he became principal conductor at the Teatro Regio in Turin. He composed the operas, *Il Sogno del Poeta* (Palermo, 1889), *Barberina* (ib., 1903) and *Jacquerie* (Buenos Aires, 1918; Chicago, 1920). He also wrote a symphonic poem, *Sicania*, and an orchestral suite, *Siciliana*.

MARKETING. See AGRICULTURE and HORTICULTURE.

MARLATT, CHARLES LESTER (1863–). An American entomologist (see VOL. XV). He continued as assistant chief entomologist in the Bureau of Entomology, Department of Agriculture, until 1927, when he became chief of the bureau. During the years 1919–26, he was a member of the editorial committee of the *Journal of Agricultural Research*. His leading activities have been concerned with the enforcement of the Plant Quarantine Act.

MARNE, BATTLES OF THE. See WORLD WAR, under *Western Front*.

MARQUESAS ISLANDS. See PACIFIC OCEAN ISLANDS.

MARQUETTE UNIVERSITY. An institution of higher learning for men and women under Roman Catholic direction at Milwaukee, Wis., founded in 1907. The student enrollment increased in the period between 1914 and the autumn of 1928 from 1187 to 2889 regular students, 289 students in night courses in business administration, 22 in dental hygiene, 426 in the high school, 167 in the music academy, 86 in the nursing courses, and 328 in the teachers' course, making a grand total of 4233 in the University. In addition, the summer-session registration in 1928 amounted to 796. The number of members in the faculty rose from 254 to 379, and the number of volumes in the library from 30,000 to 47,700. In 1918 the University received $333,333 from the Carnegie Foundation and in 1922, $800,000 under the will of Mrs. Harriet Cramer. A gymnasium and a new building for the college of dentistry were built, and a science building and law building were under construction in 1924, as well as a new high-school building. In the latter year, additional courses were added and the department of education was further developed; a division of graduate study was organized and a dean appointed; courses in hospital administration were begun in 1924, and developed in 1925, under the leadership of the Rev. C. B. Moulinier; and in 1926 the school of speech was organized. Marquette enjoys the services of Jesuit instructors and administrative officers who receive no compensation other than maintenance, the value of their services over the cost of their maintenance for 1926–27 being estimated at $119,500. President, the Rev. William M. Magee, S.J., A.M., LL.D.

MARQUIS, DON(ALD ROBERT PERRY) (1878–). An American newspaper writer and author, born at Walnut, Ill. For several years, he was associated with Joel Chandler Harris in editorial work in Atlanta, Ga. Moving to New

York, he wrote the *Sun Dial* column in the New York *Evening Sun*. In its conduct, he achieved a distinctive reputation as a wit and philosopher. In 1923 he was columnist for the New York *Tribune*. His writings include: *Hermione* (1916); *Prefaces* (1919); *The Old Soak*, a play (1921); *Carter and Other People* (1921); *Noah an' Jonah an' Cap'n John Smith*, poems (1921); *Poems and Portraits* (1922); *Revolt of the Oyster* (1922); *Sonnets to a Red-haired Lady* (1922); *The Old Soak's History of the World* (1924); *The Dark Hours* (1924); *Out of the Sea* (1927); *Archy and Mehitabel* (1927); *The Almost Perfect State* (1927); *When the Turtles Sing and Other Unusual Tales* (1928).

MARR, Carl von (1858–). A German painter who was born in Milwaukee, Wis., studied in Weimar, Berlin, and Munich and after 1893 was professor at the Academy of Munich. He excels in historical and allegorical figures and groups and is represented in the galleries in Munich, Berlin, Bremen, Königsberg, Budapest, and the Metropolitan Museum in New York.

MARRIAGE. See Divorce; Eugenics.

MAR'RIOTT, Sir John Arthur Ransome (1859–). A British historian, educated at Repton and New College, Oxford, where he was a lecturer in 1884. He was Dunkin lecturer in sociology (1903–04), and was greatly interested in the Oxford University extension movement, being secretary to its delegacy from 1895 to 1920. Elected to Parliament as a Conservative in 1917, he served on the Select Committee on National Expenditure (1917–20) and was chairman of the Select Committee on Estimates (1924–25). In 1924 he was knighted. His publications include *Makers of Modern Italy* (1889); *Charles Kingsley* (1892); *George Canning and His Times* (1903); *English Political Institutions* (1910); *England Since Waterloo* (1913); *English History in Shakespeare* (1918); *The Right to Work* (1919); *Syndicalism: Economic and Political* (1921); *England under the Tudors* (1922); *Economics and Ethics* (1923); *Our Own Times* (1924); *The Mechanism of the Modern State* (2 vols., 1927); *Empire Settlement* (1927); and *How We Are Governed* (1928).

MARSAL, Frédéric François. See François-Marsal, Frédéric.

MARSEILLES, mär-sālz′. The principal seaport of France, second city of the Republic in point of population, capital of the Department of Bouches-du-Rhône, and 862 kilometers (535.6 miles) from Paris. The population at the census of 1926 was 652,196. The suburbs, with a constantly increasing population, are forming a group of small cities around Marseilles. In April, 1927, the waterway through the Rove Tunnel, which had taken 23 years to complete at a cost of 135,000,000 francs, was formally opened by President Doumergue. This tunnel is the principal feature of the southern section of the 50-mile Marseilles-Rhône Canal, connecting the Port of Marseilles with the Étang de Berre, a lake about 14 miles northwest of the city and separated from the sea by a narrow neck of land. The tunnel is 4½ miles long, 72 feet wide, and 37 feet 6 inches high above water level, with a water depth of 13 feet. Two 1500-ton barges can pass through it without difficulty. This was the last connecting link of the Marseilles-Rhône canal system, joining the Netherlands, and Central Europe. It is at sea level throughout its entire length except for a single lock at Arles. The opening of the southern section has developed Port de Bouc on the Étang de Berre as an annex port to Marseilles. The project dates from 1841, but work on it was begun only in 1906. It has been declared to be the greatest engineering feat of its kind since the construction of the Panama Canal. See Canals.

In recent years, the Port of Marseilles, comprising 11 miles of quays and 750 acres of dock area, has expanded far along the shore toward the north, and plans for future expansion will carry it still farther in the same direction. Before the outbreak of the World War, the problem of increasing port facilities was being attacked on far-reaching lines in a scheme which estimated future requirements until 1932 on the assumption of a 3 per cent annual increase in traffic. Events proved that actuarial basis to have been a conservative one. The low French railway charges encouraged foreign manufacturers to ship their product for transit to Mediterranean countries and the Near East by the overland route to Marseilles. In 1928, 4271 vessels of 11,574,657 tonnage entered the port and 4472 vessels were cleared. The passenger traffic also increased to approximately 800,000 a year, half of which was between France and the North African colonies. In 1928 was undertaken the enlargement of the Bassin de la Joliette and construction of the Bassin du Pharo at an estimated cost of 416,000,000 francs. The Chamber of Commerce also adopted plans for the construction of two other basins extending out to sea from the southern end of the port.

MARSEILLES-RHÔNE CANAL. See Canals and Marseilles.

MARSHALL, Archibald (1866–). A British novelist, who was educated at Highgate School and Trinity College, Cambridge. He worked in London, studied for the clergy, and became a publisher and journalist. For three years after his marriage (1902), he lived in the Black Forest, which is feelingly described in *Exton Manor* (1907). He traveled much, including three visits to the United States, where he received an honorary Litt.D. from Yale University. His best-known books are the series about the Clinton family: *The Squire's Daughter* (1909); *The Eldest Son* (1911); *The Honour of the Clintons* (1913); *The Old Order Changeth* (1915); and *The Clintons and Others* (1919). These have humor and show a keen observation of English country life. His other works include *Peter Binney, Undergraduate* (1899); *Richard Baldock* (1906); *Roding Rectory* (1914); *Upsidonia* (1915); *Watermeads* (1916); *Abington Abbey* (1917); *The Graftons* (1919); *The Hall and the Grange* (1921); *Anthony Dare* (1923); *The Education of Anthony Dare* (1924); *Anthony Dare's Progress* (1925); *The Allbright Family* (1926); *Simple Stories* (1927); and *Simple People* (1928). He also wrote two books on his travels: *Sunny Australia* (1911) and *A Spring Walk in Provence* (1920), and edited an abridged edition of *Boswell's Johnson* (1923).

MARSHALL, Louis (1856–1929). An American lawyer and publicist (see Vol. XV). He took part in many arbitrations and mediations between employers and laborers and was a member of the arbitration board which settled the New York clothing workers' strike in 1919. He was also chairman of the commission to fix the price of bread and secured the enactment of laws regulating private and foreign bankers and other reform legislation. In 1920–21 he was president of the Jewish Relief Committee which collected more than $75,000,000 for relief of Jewish war sufferers. He was also a member of the international committee whose efforts resulted in treaties with Poland, Rumania, Jugoslavia, Czechoslovakia, and other countries, to guarantee equal rights to racial, religious, and linguistic minorities.

MARSHALL ISLANDS. See PACIFIC OCEAN ISLANDS.

MARSTON, ANSON (1864–). An American civil engineer. He was born at Seward, Ill., studied at the West Rockford (Ill.) High School, Berea College, Ky., and Cornell University, receiving the degree of C.E. at Cornell in 1889. For three years, he was engineer on location and construction work for the Missouri Pacific Railway. He went to the Iowa State College at Ames as professor of civil engineering in 1892, and after 1904 was dean and director of the engineering department, which under his administration has had a rapid growth. As a member of the Iowa State Highway Commission (1904–27), of which he was chairman for three years, he directed the building of State roads. In the World War, he served as major and lieutenant colonel of the U. S. Army Engineers, commanding the 97th Engineers until demobilization.

MARTEAU, mär'tō' HENRI (1874–). A French violinist (see VOL XIV). In 1915 he resigned his professorship at the Königliche Hochschule für Musik in Berlin and was second conductor at the opera in Göteborg until 1920. During 1921–24 he was professor of violin at the Deutsche Akademie in Prague and then for two years its director. After teaching a year at the Leipzig Conservatory (1926–27), he became principal professor of violin at the Dresden Conservatory in 1928. He wrote an opera, *Meister Schwalbe* (Plauen, 1921); two violin concertos; a 'cello concerto; *Sinfonia Gloria Naturae;* three string quartets; a clarinet quintet; *Serenade,* for wind-instruments; pieces for organ; choruses; and several books of studies for violin.

MARTIN, EVERETT DEAN (1880–). An American sociologist, born at Jacksonville, Ill., and educated at Illinois College in Jacksonville and at McCormick Theological Seminary. In 1907 he was ordained into the Congregational ministry and served as pastor in several churches in Illinois. From 1910 to 1914, he was pastor of the Unitarian church in Des Moines, Iowa, and from 1916, lecturer on social philosophy at the People's Institute, New York. He was assistant director and secretary, from the latter year, of the Cooper Union Forum and acting director in 1921–22. He founded the People's School of Philosophy, lectured on social psychology at the New School for Social Research (1922), and was chairman of the National Board of Review of Motion Pictures. His book, *The Behavior of Crowds* (1920), attracted attention. It was followed by *Mystery of Religion* (1924); *Psychology, What It Has to Teach You* (1924); *Meaning of a Liberal Education* (1926).

MARTIN, FRANKLIN H. (1857–). An American surgeon, born at Ixonia, Wis. He received his M.D. degree from Chicago Medical College in 1880, was cofounder of the Chicago Post-graduate Medical School and organized the Charity Hospital. In 1905 he founded and became editor of the periodical, *Surgery, Gynæcology, and Obstetrics* and in 1913 he organized the American College of Surgeons. His private practice has been largely gynæcology and abdominal surgery and he has been associated in the same capacity with colleges and hospitals. Numerous foreign distinctions have been conferred on him. He published *Treatise on Gynæcology* (1903); *South America from a Surgeon's Viewpoint* (1923); and *Australia and New Zealand* (1924).

MARTIN, GLENN L. (1886–). An American airplane manufacturer, born at Macksburg, Iowa. In 1907 he began to build gliders and in the next year designed and built the pusher type of airplane. In 1909 he established one of the first airplane factories in the United States and built monoplanes, water aircraft, etc. He gave many exhibition flights in Canada and the United States and in 1912 moved his factory to Los Angeles. The War Department ordered his model *TT* in 1913, and later the Army adopted it for training purposes. During 1914–16 he built for the Government of Holland and produced several new models for the U. S. Army. In 1917 he organized his own company at Cleveland and began designing and building the Martin bomber, the first American-designed airplane for Liberty engines.

MARTIN, HELEN REIMENSNYDER (1868–). An American author (see VOL. XV). Her later books include: *Those Fitzenbergers* (1917); *Gertie Swartz: Fanatic or Christian?* (1918); *Maggie of Virginsburg* (1918); *The Schoolmaster of Hessville* (1920); *The Marriage of Susan* (1921); *The Church on the Avenue* (1922); *The Snob* (1924); *Challenged* (1925); *Ye That Judge* (1926); *Sylvia of the Minute* (1927).

MARTIN DU GARD, ROGER (1881–). A French novelist and palæographer who was born in Paris and educated at the University and the École des Chartes. His works portrayed the social and mental state of France at various periods. *Jean Barois* (1913) did this for the period of the Dreyfus case, continuing to the World War, and *Les Thibault* (1922–) was a similar study of post-war France. It is the story of a bourgeois family and was published intermittently as separate volumes of a series, these volumes being *Le cahier gris* (1922); *Le pénitencier* (1922); *La belle saison* (1923); *La consultation* (1928); and *La sorellina* (1928). He also wrote *Devenir* (1908); *Le testament du père Lelcu,* a play produced as part of the repertory of the Vieux Colombier Theatre from 1914 to 1921, and *La Gonfle, une farce paysanne* (1928).

MARTINELLI, mär'tê-nĕl'lē, GIOVANNI (1885–). An Italian operatic tenor, born at Montagnana. He began his musical career as a clarinet player in an Italian regiment and later studied singing with Mandolini. He made his début in Verdi's *Ernani* in Milan (1910). In 1912 he sang at Covent Garden and in 1913 he became one of the leading tenors at the Metropolitan Opera House, where, after the death of Caruso, he succeeded to many of the latter's rôles. He was also heard in Rome and Buenos Aires.

MARTINEZ RUIZ, JOSÉ (1874–). A Spanish novelist, essayist, journalist, and critic, who wrote under the pseudonym of "Azorin." After studying law at the University of Valencia, he took up letters in Madrid, publishing his first novel, *La Voluntad*, in 1902. He was elected to the Cortes in 1907 and 1914. As a writer, he is known for his close study of the social and spiritual surroundings of Spain's most noted literary figures. Other works include *El Alma Castellana* (1900); *La Ruta de Don Quijote* (1905); *Castilla* (1912); *Al margen de los clásicos* (1915); *Clásicos modernos;* and *Los valores literarios.*

MARTINEZ SIERRA, Gregorio (1881–). A Spanish dramatist, born in Madrid, who produced his first play, *El Poema del trabajo*, in 1898. Abandoning the theatre temporarily for journalism and novel writing, he returned after his Spanish translations of the Catalan dramatist, Santiago Rusiñol, were popular successes. Then followed *La Sombra del padre* (1909); *Canción de Cuna* (1911); *Lirio entre espinas* (1911); *El Reino de Dios* (1916); *Don Juan de España* (1922); and his dramatization of Dicken's *Cricket on the Hearth, El Grillo del Hogar* (1923).

MARTINI, mär-tē'nē, Ferdinando (1841–). An Italian dramatist and public official, born at Monsummano. He was Minister of Education (1892–93), Governor of Eritrea (1898–1908), and Minister of Colonies (1914–16). His works include *I nuovi ricchi* (1863); *Il peggior passo è quello dell' uscio* (1873); *La Marchesa* (1876); *Nell' Affrica italiana* (1891); *La Vipera,* a comedy (1894); and *Peccato e Penitenza* (1913).

MARTINIQUE, mär'tē'nēk'. An island colony of France, located in the Lesser Antilles in the West Indies. Its area is 385 square miles; population at census of 1927, 234,695. The chief commercial town is Fort-de-France, with a population of 43,338. The population is almost wholly Creole except for the considerable number of British Indian, Chinese, and African laborers. Sugar, rum, and cocoa are the chief products. The sugar export, which reached 40,000 tons before the World War, rose to 40,397 tons in 1927. Rum exports in 1927 totaled 5,224,021 gallons. Exports for the years 1913, 1920, and 1927 were 28,896,814, 128,953,479, and 229,373,089 francs, respectively. Imports for the same years were 22,144,315, 132,186,517, and 212,594,604 francs. In 1911, 88 vessels of 156,000 tons entered Martinique ports, while in 1927, 550 vessels of 1,040,764 tons entered. The budget for 1927 balanced at 66,103,756 francs. Martinique was visited by a severe tropical hurricane which swept over the French West Indies, Sept. 12, 1928. Although loss of life was small, the damage to crops was considerable, particularly to fruit and cacao trees and to sugar cane.

MARYLAND. The forty-first State in size (12,327 square miles) and the twenty-eighth in population; capital, Annapolis. The population increased from 1,295,346 in 1910 to 1,499,661 in 1920, or by 11.9 per cent; estimated population, 1928, 1,616,000. The white population rose from 1,062,639 (1910) to 1,204,737 (1920); Negro, from 232,250 to 244,479; native white, from 958,465 to 1,102,560. The foreign-born white population fell from 104,174 to 102,177. The urban population was 658,192 in 1910, 869,422 in 1920; the rural decreased from 637,154 to 580,239. The growth of the principal cities was as follows: Baltimore (q.v.), 1910, 558,485; 1920, 733,826; Cumberland, 21,839 to 29,837; Hagerstown, 16,507 to 28,064.

Agriculture. After a period of decline, the number of farms increased 2.3 per cent, or from 47,908 in 1920 to 49,001 in 1925; but the area in farms decreased 6.5 per cent, or from 4,757,999 to 4,433,398 acres. The improved land in farms in 1920 embraced 3,136,728 acres. Crop land acreage (1925) was 2,227,515. The total value of farm property rose from $286,167,028 in 1910 to $463,638,120 in 1920, but declined to $397,092,670 in 1925; the average value per farm was $5849 in 1910, $9678 in 1920, and $8104 in 1925. In interpreting these values, the currency inflation incident to the World War is to be taken into consideration. The total percentage of land used for agricultural purposes decreased from 79.5 in 1910 to 74.8 in 1920 and to 69.7 in 1925. Of the total number of farms in 1925, 35,138 were operated by their owners; 936, by managers; and 12,937, by tenants. The comparative figures for 1910 are 33,519; 988; and 14,416. White farmers numbered 41,699 in 1920 and 42,280 in 1925; colored, 6209 in 1920 and 6721 in 1925. The farms reported as under mortgage numbered 11,339 in 1920 and 10,513 in 1925. The number of dairy cows was 188,537 in 1920; 172,581 in 1925; "beef" cows, 13,704 in 1920 and 19,160 in 1925; mules, 32,621 in 1920 and 30,733 in 1925; swine, 306,452 in 1920, and 187,656 in 1925; sheep, 103,027 in 1920 and 91,878 in 1925. The estimated production of the chief crops in 1928 was as follows: Corn, 19,345,000 bushels; wheat, 8,745,000; oats, 1,701,000; potatoes, 5,405,000; sweet potatoes, 1,500,000; apples, 2,190,000; peaches, 465,000; pears, 193,000; tobacco, 21,700,000 pounds; hay, 759,000 tons. Comparative figures for 1913 are corn, 22,110,000 bushels; wheat, 8,113,000; oats, 1,260,000; barley, 145,000; potatoes, 3,741,000; hay, 491,000 tons; and tobacco, 18,500,000 pounds.

Mineral Production. Coal maintained its rank as the leading mineral product of the State from 1914 on, but the output underwent a gradual decline. The average yearly production for the period 1911–15 was 4,549,000 short tons; for 1916–20; 4,148,000; for 1921–25, 2,033,000. There was a partial recovery in 1926, when 3,078,353 short tons, in value $6,800,000, were produced. In 1927, a year of labor troubles in the coal fields of the United States, the production of Maryland fell to 2,814,842 tons, valued at $5,817,000. In 1928 the total production was 2,686,979 tons valued at $4,954,000, the output of 80 mines. The clay products of 1926 attained a value of $6,073,247. The stone output of that year totaled $2,177,102. The entire mineral production of the State for 1927 as reported by the U. S. Bureau of Mines was $20,469,294.

Manufactures. Maryland is an important manufacturing State. In 1909 there were in the State 4837 manufacturing establishments; in 1919, 4937; in 1925, 3179 and in 1927, 3205. Persons engaged in manufactories numbered 125,761, 165,875, 125,761, and 126,700; and capital invested amounted to $251,226,828 in 1909 and $619,606,983 in 1919. The products in 1909 were valued at $315,669,150; in 1919, at $873,944,744; in 1925, at $925,688,028; and in 1927, at $943,410,896. The large increase in the value of products about 1919 was chiefly due to the change in the industrial conditions brought about by the War and cannot properly be used to measure the normal growth of production during the period involved; but the increase in the number of wage earners up to the year 1919 clearly indicates a decided increase in the intrinsic value of manufactures. The manufacture of men's clothing ranks first in value of product: in 1909 it was $36,921,000; in 1914, $39,048,000; and in 1919, $72,589,000. Shipbuilding made great gains, from $3,535,000 in 1909, and 4,521,000 in 1914, to $67,310,000 in 1919; the extraordinary growth in the value of this product was due to the increase in shipping during the War. Slaughtering and meat packing had products valued in 1909 at $13,683,000; in 1919 at $43,228,000; and in 1925, at $38,425,638. Fertilizers to the value of $9,673,000 were manufactured in 1909; $37,014,000 in 1919; and $28,150,127 in 1925. The chief manufacturing city of the State is Baltimore, having 2502 manufacturing establishments in 1909, with products valued at $186,978,000; 2797 with $677,878,000 in 1919; and products to the value of $678,947,000 in 1925.

Education. Marked improvement was made both in administration and development of the school system. In 1916 the school system was reorganized, and the issuing of teachers' certifications was made a State function. An equalization fund was established enabling every county to pay the State minimum salaries. This fund made it possible to secure a salary increase, ranging from $150 to $700 per teacher. Efforts were made in a publicity campaign (1921–22) to promote the organization, administration, and supervision of schools; to secure larger attendance at the State normal schools; establishing extension courses for teachers during the school year at State expense; promoting attendance at summer schools; and carrying out the provisions of the law passed in 1922 for more efficient supervision of both town and rural schools. Vocational education was carried on after 1917. All types of instruction which had developed in the national programme, except industrial rehabilitation, were in operation in Maryland. The total enrollment of white pupils in 1925–26 was 214,084; of colored, 49,165; of all pupils, 263,249. In the elementary schools for colored pupils were enrolled 46,264; in the high schools, 2901. Enrollment in all schools, both white and colored, was 237,125 in 1913. The percentage of illiteracy in the State was 8.7 in 1910 and 6.8 in 1920. Among the native white population it decreased from 3.7 to 2.5; among the foreign-born, from 12.3 to 14.3; and among the Negro, from 28.6 to 22.2 per cent.

Finance. State expenditures in the year ending Sept. 30, 1927, as reported by the United States Department of Commerce, were: for maintenance and operation of departments, $18,109,070 (of which $3,512,036 was aid to local education); for conducting public-service enterprises, $143,333; for interest on debt, $1,417,686; for permanent improvements, $5,133,780; total, $24,803,869 (of which $7,793,891 was for highways, $3,398,224 being for maintenance and $3,895,667 for construction). Revenues were $24,439,916; of these, property and special taxes formed 30.4 per cent; departmental earnings, 16.1 per cent; licenses, including gasoline tax, 40.4 per cent. Assessed property valuation was $2,348,840,482; State taxation thereon, $5,906, 464. Net State indebtedness on Sept. 30, 1927, was $23,872,776.

Political and Other Events. Maryland is traditionally Democratic, but has been a debatable State in recent years. In 1914 John Walter Smith, Democrat, was reëlected to the United States Senate; the Democrats elected five members of the House of Representatives and the Republicans, one. In September of that year, the hundredth anniversary of the defeat of the British at North Point in Baltimore and of Francis Scott Key's writing of "The Star-Spangled Banner" during the British bombardment, was celebrated. In November, 1915, Emerson C. Harrington, Democrat, was elected governor. The Democrats won control of the Legislature. In the same election, amendments to the State constitution were adopted, permitting increased home rule for Baltimore and the counties, and instituting the referendum except on sumptuary legislation. President Wilson carried the State in 1916. Dr. Joseph I. France, Republican, was elected United States Senator, and the seats in the House were divided between four Democrats and two Republicans. An amendment to the State constitution was adopted, effecting a drastic budget system for the State government. Special referendums were held on prohibition in local areas, under the local-option system then in force. Baltimore voted heavily against prohibition; most of the smaller areas voting also rejected it. In 1917 the Republicans won the House of Delegates and the Democrats, the State Senate. The Legislature was Republican on joint ballot for the first time in 20 years. In 1918 the Congressional delegation was divided equally.

A new charter was voted by the people of Baltimore, under the home-rule amendment of 1915. In May, 1919, the Republicans won a decided victory in the muncipal elections of Baltimore, William F. Broening, Republican, defeating George Weems Williams, Democrat, for Mayor. In November, 1919, Albert C. Ritchie, Democrat, was elected governor, defeating Harry W. Nice, Republican, by less than 200 plurality. The Legislature was Democratic. In November, 1920, Warren G. Harding, Republican, swept the State for President, against James M. Cox, Democrat; Ovington E. Weller, Republican, was elected United States Senator; the Republicans won four members of the House. In 1921 the Democrats elected the majority of the Legislature. In 1922 William Cabell Bruce, Democrat, was elected United States Senator; the six seats in the House were divided equally between Democrats and Republicans; and the people adopted constitutional amendments increasing Baltimore's representation in the Legislature and rendering State elections quadrennial, with four-year terms for elected officers including legislators, and legislative sessions in the odd years. In May, 1923, Howard W. Jackson, Democrat, was elected mayor of Baltimore. In November, 1923, Albert C. Ritchie, Democrat, was reëlected governor. The vote for President in 1924 was: Coolidge, 162,414; Davis, 148,072; LaFollette, 47,157. Governor Ritchie was reëlected in 1926, for a four-year term. The vote for President in 1928 was: Hoover, 301,479; Smith, 223,628. Phillips Lee Goldsborough, Republican, was elected senator.

Legislation. Maryland's Legislature met in even years until and including the 1924 session. No regular session occurred thereafter until 1927, when was begun a system of sessions held in the odd years. In 1914 the Legislature enacted a new tax law and established a new tax commission; it also passed a workmen's-compensation law, and a new oyster-planting law. It also submitted to the people the home-rule and referendum amendments to the constitution. In 1916 the Legislature submitted to the people the budget amendment, providing for a budget to be prepared by the governor. A modern school law was enacted and the State departments were partially reorganized. In May and June, 1917, a special war session appropriated an emergency fund, created the State Council of Defense, and passed war measures. In 1918 the Legislature expanded the corporate limits of Baltimore. In 1920 the Legislature instituted the merit system in the civil service of the State. In 1922 it enacted a measure reorganizing the State government into departments, and submitted to the people a proposal for a $9,000,000 soldiers' bonus; the latter was invalidated by the courts. This session also submitted to the people the constitutional amendment increasing Baltimore's representation in the Legislature and an amendment providing one State election every four years instead of every two. Under the terms of the latter, State elections would be held in every other even year, beginning with 1926, and State officials, including legislators, would be elected for four-year terms. Successive Legislatures refused to pass bills for State enforcement of the Eighteenth Amendment. State taxation was imposed, in 1927, for the elimination of grade crossings of highways with railroads.

MARYLAND, UNIVERSITY OF. A State institution at College Park and Baltimore, Md., founded in 1807. The student enrollment increased from 1200 in 1914 to 3391 in the autumn term of 1928, with an additional registration of 626 in the summer session; the number of faculty members increased from 211 to 445; and the library from 25,000 to 52,473 volumes. The annual income increased from $250,000 in 1914 to $2,344,660, including appropriations and other receipts, in 1928. Part of an extensive programme under way in 1923 included a stadium, a gymnasium and armory, a dairy manufacturing laboratory, costing $262,800, a research laboratory for animal pathology, all at College Park; and at Baltimore, a new building which was purchased and equipped at a cost of $40,000 for the schools of dentistry and pharmacy; a new X-ray laboratory, equipped in the university hospital at a cost of $10,000. and a nurses' home. A dining hall and a science building were under construction during 1925, 1926, and 1927, and the campus was landscaped and new roads and walks were laid. In 1923 the Baltimore College of Dentistry, the first dental college to be established in the world, was consolidated with the School of Dentistry of the University of Maryland, and extension courses in commerce were reorganized as the College of Commerce and Business Administration; and the university changed from the trimester to the semester system. President, Raymond A. Pearson, M.S., D.Agr., LL.D.

MARX, märks, WILLIAM (1863–). A German statesman, born in Cologne. He studied law and became well-known as a jurist. He was long active in the Clerical Party or Centre Party, in later years as its chairman, and served in the Prussian Diet. He has been a member of the Reichstag since 1910 and was Chancellor in 1922–25 and 1926–28, attending several of the most important conferences on reparations and other questions, including the conference on the Dawes Plan in London in August, 1924. Largely through his efforts, an agreement was finally obtained on the Dawes Plan. See GERMANY, under *History*.

MASARYK, THOMAS GARRIGUE (1850–). The first President of Czechoslovakia, born in Hodonin, Moravia, and educated in the universities of Vienna and Leipzig. He taught for several years, was professor at the new Bohemian University of Prague (1882), and was head of the Czechoslovak realistic movement in philosophy, literature, and politics, founding several reviews. In 1891 he entered the Parliament of Vienna, resigning two years later to devote himself to the moral education of the Czech nation. Reëlected in 1907, he resisted the encroachments of Germany in Austria and the aggressive policy of the latter in the Balkans. At the outbreak of the World War, he escaped first to Italy and Switzerland, later settling in London, where he became a lecturer at King's College. Throughout the War, he organized the Czechoslovak movement of independence, visited the United States in its behalf, and, at the Armistice, the Czechoslovak National Council of which he was the head, was recognized by the Allies as the provisional government of Czechoslovakia. On the establishment of the Republic, he was elected President in 1918, and reëlected in 1920 and 1927. By a provision of the constitution, he is qualified to hold that office during his entire life. His many books include *On Suicide in Modern Civilization* (1881); *Essay on Concrete Logic* (1886); *The Bohemian Question* (1896); *The Problem of Small Nations in the European Crisis* (1915); *The New Europe* (1918); *The World Revolution* (1925); and *The Making of a State* (1927).

MASE'FIELD, JOHN (1878–). An English poet and dramatist (see VOL. XV). In 1922 he received an honorary D.Litt. from Oxford. His later works include: *The Faithful* (1915); *Gallipoli*, a vivid description of the campaign there, in which he participated (1916); *The Old Front Line* (1918); *Enslaved, and Other Poems* (1919); *Reynard the Fox* (1919); *Right Royal* (1920); *Shakespeare and Spiritual Life* (Romanes lecture, Oxford, 1924); the novels *Sard Harker* (1924) and *Odtaa* (1926); the plays *Trial of Jesus* (1925) and *Tristan and Isolt* (1927); *Sea Life in Nelson's Time* (1925); *Philip the King, and Other Poems* (1926); *The Midnight Folk* (1927); *The Coming of Christ* (1928); *Midsummer Night* (1928); *Collected Poems* (1929); and *The Hawbucks* (1929).

MASON, EDITH (BARNES) (1893–). An American dramatic soprano, born at St. Louis, Mo. After studying with several teachers in New York, Boston, Philadelphia, and Paris, she made her début as Nedda in *Pagliacci* with the Boston Opera Company (Jan. 27, 1912). During the next three years, she sang in Nice, Marseilles, and Paris. In 1915–17 she was a member of the Metropolitan Opera Company. Then followed engagements in Havana, Caracas, and Mexico City, until 1919. In 1919–20 she appeared in Monte Carlo and again in Paris. She was one of the leading singers of the Chicago Opera Association, 1921–22, and the Chicago Civic Opera Company, 1923, and also sang two seasons with the La Scala Opera, Milan. In 1919 she married Giorgio Polacco.

MASON, MAX (1877–). An American mathematician and university president, born at Madison, Wis., and educated at the University of Wisconsin and at Göttingen. In 1903 he became instructor of mathematics at the Massachusetts Institute of Technology and was appointed assistant in that subject at the Sheffield Scientific School of Yale, where he remained until 1908, when he accepted a call to Wisconsin. He was professor of mathematical physics there until 1925, when he was called to the presidency of the University of Chicago. In 1928 he resigned that office and became director of the division of natural sciences of the Rockefeller Foundation, New York. He made important studies on the calculus of variations, and the electromagnetic theory in pure mathematics. In the applied branches, he contributed researches on submarine detection devices and acoustical compensators. During the World War, he was a member of the research staff at the United States Navy Experiment Station at New London and a member of the division of physical sciences of the National Research Council. He is the author of *The New Haven Mathematical Colloquium* (1910).

MASSACHUSETTS. The forty-fourth State in size (8266 square miles) and the sixth in population; capital, Boston. The population increased from 3,366,416 in 1910 to 3,852,356 in 1920, a gain of 14.4 percent; estimated population, 1928, 4,290,000. The white population rose from 3,324,926 (1910) to 3,803,524 (1920); Negro, from 38,055 to 45,466; native-born white, from 2,273,876 to 2,725,990; foreign-born white, from 1,051,050 to 1,077,534. The urban population mounted from 3,125,367 to 3,650,248; the rural decreased from 241,049 to 202,108. The growth of cities was as follows: Boston (q.v.), 670,585 in 1910 and 748,060 in 1920; Worcester (q.v.), 145,986 to 179,754; Springfield (q.v.), 88,926 to 129,614; New Bedford (q.v.), 96,652 to 121,217; and Fall River (q.v.), 119,295, to 120,485.

Agriculture. The number of farms decreased 13.3 per cent, or from 36,917 in 1910 to 32,001 in 1920, but rose thereafter to 33,454 in 1925. The land in farms decreased 13.3 per cent, or from 2,875,941 acres in 1910 to 2,494,477 in 1920 and diminished farther to 2,367,629 in 1925. The improved land in farms totaled 908,834 acres in 1920. The total value of farm property rose from $226,474,025 in 1910 to $300,471,743 in 1920, but fell to $254,602,941 in 1925; the average value per farm was $6135 in 1910, $9389 in 1920, and $8770 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. The total percentage of land used for agricultural purposes in 1910 was 55.9, compared with 48.5 in 1920 and 46.0 in 1925. Of the total number of farms in 1925, 30,870 were operated by owners; 979, by managers; and 1605, by tenants. The comparative figures for 1910 are 32,075; 1863; and 2979. White farmers in 1920 numbered 32,880, compared with 36,793 in 1910. In 1920, 22,950 of these were natives, as compared with 28,431 in 1910. Foreign-born farmers, for the most part from Canada, numbered 8930 in 1920 and 8362 in 1910. Negro farmers numbered 103, both in 1910 and 1920. There were 18 Indian farmers in 1920, compared with 21 in 1910. Farms reported as under mortgage, 12,632 in 1920, decreased to 12,248 in 1925. The number of dairy cows in 1920 was 173,844; 144,898 in 1925; "beef" cows, 5850 in 1920 and 1937 in 1925; sheep, 18,880 in 1920 and 10,114 in 1925. The development in agriculture was in the direction of market gardening and special crops, such as tobacco and onions. The estimated production of the chief farm crops in 1928 was as follows: Corn, 1,890,000 bushels; potatoes, 1,620,000; hay, 732,000 tons; and tobacco, 9,462,000 pounds. Comparative figures for 1913 are corn, 1,944,000 bushels; potatoes, 2,835,000; hay, 575,000 tons; and tobacco, 9,455,000 pounds.

Manufactures. Massachusetts is one of the most important of the industrial States. In 1920 there were 66 cities having more than 10,000 inhabitants, whose combined populations in that year formed 81.6 per cent of the total for the State and in 1919 reported 86.3 per cent of the value of the State's manufactured products. In 1909 there were 11,684 manufacturing establishments in the State; in 1919, 11,906; in 1925, 10,027; and in 1927, 10,037. Wage earners in manufactories numbered 713,836 in 1919; 591,438 in 1925; and 578,068 in 1927. Capital invested amounted to $1,279,686,558 in 1909 and $2,947,108,527 in 1919. The value of the products in 1909 was $1,490,529,386; in 1919, $4,011,181,532; in 1925, $3,426,617,326; and in 1927, $3,317,851,888. The increase in value of the products about 1919 was in great measure due to changes in industrial conditions caused by the World War. An increase in the number of persons engaged in manufactories, on the other hand, clearly indicated a growth. The most important industry in point of value of products is the manufacture of cotton goods, valued in 1909 at $186,462,000; in 1919, at $604,938,000; in 1925, at $345,864,097. The manufacture of boots and shoes attained $236,343,000 in 1909; $573,037,000 in 1919; $240,943,504 in 1925. Woolen, worsted, and felt goods were valued $141,967,000 in 1909; $352,913,000 in 1919; $216,448,325 in 1925. The manufacture of leather amounted in value in 1909 to $40,002,000; in 1914, to $45,265,000; and in 1919, to $129,595,000. The most important manufacturing cities are Boston, Worcester, Fall River, Lawrence, and New Bedford. In Boston in 1909, there were 3195 establishments with a products value at $244,793,000; in 1919, 3077, with $618,922,000; in 1925, products to the value of $585,992,000. In Worcester in 1909, there were 580 with $77,148,000; in 1919, 618 with $208,706,000; in 1925, products of $210,461,000. Fall River had 288 manufacturing establishments, with products valued at $64,146,000 in 1909; in 1919, 293, with $63,246,000; in 1925, products valued at $142,885,000. Similar figures for New Bedford were: 207, with $53,238,000 in 1909; 267, with $210,773,000 in 1919; $143,551,000 in 1925. Other important manufacturing cities are Lowell, Lynn, Somerville, Brockton, Springfield, Cambridge, and Haverhill.

Education. Massachusetts, from its earliest history has devoted its utmost efforts to improvement of the educational facilities and conditions of its inhabitants. The Legislature has passed in recent years many important measures affecting education; among the most notable was an act, in 1919, establishing and maintaining continuation schools and courses of instruction for employed minors. Another act of 1919 raised the minimum educational requirements for leaving school to seek employment from the completion of the fourth to the completion of the sixth grade; a third established special classes for mentally retarded children. In 1921 the provisions of Congress for promotion of vocational rehabilitation were accepted by the State; a measure was passed providing for physical education for pupils in the elementary and secondary schools; a minimum salary of $750 was established for all full-time teachers in the public day schools; and three measures to promote civic education in the public schools were enacted, requiring courses in duties of citizenship, United States history and civics, and the Constitution of the United States. The growth of the school system is indicated by the fact that in 1914 the total school enrollment was 576,510; in 1925–26, 755,832, of which total 138,963 were in secondary schools. The percentage of illiteracy in the State decreased from 6.2 in 1910 to 5.9 in 1920; among the native whites, from 0.4 to 0.3; among the Negroes, from 9.7 to 8.2. Among the foreign-born white population illiteracy increased from 13.1 to 13.5 per cent.

Finances. State expenditures in the year ending Nov. 30, 1928, as reported by the U. S. Department of Commerce, were: for maintenance and operation of departments, $41,533,191 (of which $2,519,987 was for local education); for conducting public-service enterprises, $184,287; for interest on debt, $1,466,824; for permanent improvements, $8,585,695; total, $51,769,991 (of which $12,376,511 was for highways, $6,570,751 being for maintenance and $5,805,760 for construction). Revenues were $59,348,470, of these property and special taxes formed 47.9 per cent; departmental earnings, 7 per cent; licenses, 28.1 per cent. Assessed valuation of property was $7,161,309,871; State taxation thereon, $8,500,000. Net State indebtedness on Nov. 30, 1927, was $20,439,543.

Legislation. In 1914 and 1915 the Legislature submitted a constitutional amendment giving the suffrage to women. It was defeated by a large majority. In 1916 the Legislature amended the laws relating to judicial procedure and also passed a defense act and amended the workmen's-compensation law. In 1919 measures were passed providing for absentee voting, forbidding the red flag, regulating the use of aircraft, and reorganizing the executive and administrative functions of the State. In 1921 a daylight-saving law was passed, a State boxing commission was created, and the workmen's-compensation law was amended. In 1921 the Legislature amended the laws relating to the employment of minors and to automobiles. It also provided for systems of relief for neglected, dangerous, or uncontrollable feeble-minded persons. In 1922 the Legislature created a State commission of administration and finance, revised the State banking laws, and amended the election laws. In 1923 a measure was passed centralizing the personnel and financial side of the Government under a commission of four, in which is a comptroller's bureau, a budget bureau, a purchasing bureau, and a bureau of personnel. A law to render provision against motor-vehicle liability compulsory was enacted in 1926. The poor-debtor law was made more formidable in 1927. State Attorney General Reading was impeached in 1928 for accepting an improper fee, and resigned.

Political and Other Events. Elections for State officers have been held biennially since 1920. Formerly, annual elections were held. In 1914 Governor Walsh, Democratic candidate, was elected, while the Republicans were successful in winning the minor State offices. The Cape Cod Canal was formally opened in July 29, 1914. On June 25, 1914, a fire destroyed a large part of the city of Salem, causing a loss of about $12,000,000. In 1915 Samuel W. McCall, Republican, was elected governor, and Calvin Coolidge was elected lieutenant-governor. A woman-suffrage amendment submitted to the people was defeated by a large majority. In 1916 Governor McCall and Senator Henry Cabot Lodge were reëlected. In the presidential voting, Hughes won 278,765 votes; Wilson, 247,845. Governor McCall was elected for a third term in 1917. In 1918 the Democrats elected former Governor Walsh to the United States Senate. Calvin Coolidge was elected governor. Governor Coolidge was reëlected in 1919 and again in 1920. A strike of the Boston police, in September, 1919, gave rise to disorders. A movement had been carried on for the unionization of the police force. Commissioner of Police Edwin U. Curtis denied the right of the police to join a labor union. He was strongly upheld in this stand by Governor Coolidge. The police abandoned their posts, a night of rioting ensued, and the militia was called out. No striking officer was reinstated. In the presidential election of 1920, Warren G. Harding received 681,153 votes and James M. Cox 276,691, and Governor Coolidge became Vice President. The Republicans in 1921 elected Channing H. Cox governor. Henry Cabot Lodge was reëlected to the Senate, but by a greatly reduced majority. During the summer of 1921, a pageant celebration was held at Plymouth commemorating the Pilgrim Tercentenary. On Apr. 13, 1922, the Supreme Court held that women were eligible for any State office. Governor Cox was reëlected in 1923. The historic Washington elm in Cambridge was cut down on Oct. 27, 1923. A rearrangement of the State constitution was ratified by popular vote in 1919. The vote for President in 1924 was: Coolidge, 703,489; Davis, 280,831. Alvan T. Fuller, Republican, was elected governor in 1924 and in 1926. Several years of textile industrial depression caused hardship in the State. A textile strike of some months occurred in New Bedford in 1928. In 1927 the execution of Sacco and Vanzetti, two radicals charged with robbery and murder, was carried out. In 1928 the presidential vote was: Hoover, 775,566; Smith, 792,758. Frank G. Allen, Republican, was elected governor.

MASSACHUSETTS AGRICULTURAL COLLEGE. A State institution for agricultural training, founded at Amherst, Mass., in 1867. The number of students enrolled in the four-year college course in 1914 was 526, and increased to 600 in 1928–29, whereas the enrollment in short courses decreased from 936 to 242 in the same period. The number of faculty members increased from 56 to 100 in 1928 and there was a summer session in the latter year with an enrollment of 165. The number of volumes in the library increased from 45,000 to 85,000 and the annual State appropriations from $317,746 to $958,000, with an additional Federal appropriation in 1928 of $181,000. The curriculum of the college affords major work in agriculture, horticulture, physical and biological sciences, social science, and home economics. President, Roscoe W. Thatcher, D. Agr., LL.D.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY. A nonsectarian institution for technical education at Cambridge, Mass., founded in 1861. In 1916 it was moved from its old quarters in Boston to a group of new buildings in Cambridge, facing the Charles River and having 800 rooms. The enrollment of students increased rapidly during the period under review, with the exception of the War years, from 1816 students in 1914–15 to 2868 in the autumn of 1928, including in the latter year, 412 graduate and 45 unclassified students. The registration in the summer session of 1928 was 1414. The teaching staff of the Institute was increased during the same period from 268, to 215 faculty members, and 272 others, and the library from 120,000 to 260.000 volumes. Between 1914 and 1923–24, more than $14,000,000 was added to the endowment, which was $3,049,975 in the former year and had risen to $29,800,000 in 1928. The income in 1927–28 was $3,050,000, and the book value of the land and buildings in Boston and Cambridge was $13,453,000. Of the additions to endowment between 1914 and 1928, $6,500,000 was a gift from George Eastman. The School of Naval Architecture was built from funds bequeathed to the Institute by C. H. Platt prior to the War. In 1924–25 the campus was enlarged through the purchase of 30 acres of land adjoining it, while important additions to the plant in 1928 included an infirmary, two dormitories, and the Guggenheim Aëronautical Building. In 1917–18 army and navy schools of aëronautics and a school for aëronautical engineers were maintained for the Federal government; a school for deck officers was opened by the United States Shipping Board; and in 1925–26 regular four-year courses leading to the degree of Bachelor of Science were established in aëronautical engineering, and in building construction. Richard Cockburn Maclaurin, LL.D., was president until his death in 1920, and was succeeded by Ernest Fox Nichols, LL.D., who resigned in the following year, because of ill health. President, Samuel Wesley Stratton, D. Eng., Sc.D., Ph.D., LL.D.

MAS'SEY, THE RT. HON. WILLIAM FERGUSON (1856–1925). A New Zealand statesman and premier (1912–25), born in Limavady, Ulster, Ireland. In 1870 he joined his parents in New Zealand and became a farmer. He was soon active in local political life and in 1894 he entered the New Zealand Parliament as a Conservative. He was leader of the opposition from 1903 to 1912, when he became Prime Minister, and also at various times Minister of Finance, Railways, Lands, Labor, Agriculture, Industries, and Commerce. During the World War, he was a member of the Imperial War Cabinet (1917–18), and organized a system of commandeering and conscription which placed all the resources of the Dominion at the disposal of the Empire. By rigid economy, not always popular, he was able to relieve the post-war depression. He was a delegate to the Peace Conference in Paris, 1919, and to the Imperial conferences in London (1921 and 1923). He wrote various pamphlets on miscellaneous subjects.

MASSEY, VINCENT (1887–). A Canadian diplomat. He was born at Toronto and was educated at St. Andrews College, the University of Toronto, and Balliol College, Oxford (B.A., 1913). For two years (1913–15), he lectured in modern history at the University of Toronto. During the World War, he was in charge of musketry training in Military District No. 2. In 1918 he was associate secretary of the War Committee of the Dominion Cabinet. He was also general secretary and later director of the Repatriation Committee. In 1919 he entered business at Toronto. He joined the Dominion Cabinet as Minister without Portfolio in 1925, and attended the Imperial Conference at London in 1926 with the Canadian delegation. Since 1926 he has been Canadian Minister in Washington. In June, 1929, he received the honorary degree of LL.D. from Columbia University.

MAST, SAMUEL OTTMAR (1871–). An American zoölogist born in Washtenaw County, Mich., and educated at Michigan and Harvard universities. He was professor at Hope College (1899–1908); associate professor and professor at Goucher College (1908–11); and associate professor and professor at Johns Hopkins University (1911–). Professor Mast published numerous articles in journals, mainly on animal reactions, as well as *Structure and Physiology of the Flowering Plants* (1907) and *Light and the Behavior of Organisms* (1911).

MASTERS, EDGAR LEE (1869–). An American writer, born in Garnett, Kan. He was educated at Knox College in Illinois and for a time studied law. His first book of poems was published in 1898 and was followed by several others. He attracted wide attention only after the publication of *Spoon River Anthology* in 1915. This was one of the most sensational books of verse published in many years. He wrote *Songs and Satires* (1916); *The Great Valley* (1916); *Toward the Gulf* (1918); *Starved Rock* (1919); *Mitch Miller*, a novel (1920); *Open Sea* (1921); *The Nuptial Flight* (1923); *New Spoon River Anthology* (1924); *Lee, a Dramatic Poem* (1926); *Jack Kelso* (1928). He was a member of the National Institute of Arts and Letters.

MATERNITY PROTECTION. Alarmed at the lack of safeguards for the protection of expectant mothers and at the high infant and maternal death rates, public health workers had for many years been urging the Federal government to undertake a programme of health education. After three years of intensive effort, the Sheppard-Towner Act was passed in 1921 "to promote the welfare and hygiene of maternity and infancy." The act appropriated annually to each State accepting its provisions the sum of $5000 outright, with an additional $5000 if matched from the State's own funds; while a still further sum was to be apportioned on the basis of population when matched by State appropriations. The administration of the law was placed in the hands of the Children's Bureau.

Before the end of 1921, Delaware, Minnesota, New Hampshire, New Mexico, and Oregon had accepted the provisions of the act; by 1928, 45 States and Hawaii were coöperating by matching Federal grants. (Connecticut, Illinois, and Massachusetts were not participating). The 1922 Federal appropriation for the work was $477,500; by 1928 the appropriation had reached the figure of $919,075.78. Under the guidance of the workers of the Federal Children's Bureau, local and State units were led in a multitude of activities, including the holding of prenatal and child-health conferences, the establishment of permanent health centres, the instruction of midwives and county nurses, the holding of lectures, demonstrations, and clinics, the founding of nursery schools, etc. In Indiana alone, for example, up to June 30, 1927, a total of 800 classes for expectant mothers had been held and every county in the State had been reached.

There is no doubt that this intensive propaganda campaign contributed mightily toward the lowering of the infancy death rate. In 1922, for every 1000 live births, 76 babies died before reaching the age of one year; in 1926 the number of deaths was 73 out of 1000; by 1927 it had dropped to 65. Deaths from puerperal causes have not yet decreased markedly and, in this sense, the United States has a higher death rate than have all the countries for which statistics are available (New Zealand, Australia, Netherlands, Irish Free State, Belgium, Chile, England and Wales, Finland, Hungary, Japan, Northern Ireland, Scotland, and Uruguay). In 1921 the maternal death rate per 10,000 live births was 68.2; in 1925 it was 64.7. The Children's Bureau believed, however, that there was cause for optimism in view of the slowly declining death rate in the rural areas. Nevertheless, in 34 States in 1927, for example, the maternal death rate decreased in 16, as compared with the previous year, when it was stationary in 2 and increased in 12. What are the reasons for high maternal death rates? The Children's Bureau cites these: isolation, untrained midwifery, lack of appreciation of the importance of prenatal care, inadequate hospital facilities, and poor technique in hospitals. Social workers have agreed that it would be a misfortune to have this campaign in health education stop just when its benefits were becoming apparent; but the Senate already has approved the termination of the operations of the Sheppard-Towner Act as of June 30, 1929.

MATHEMATICAL PHILOSOPHY. See Philosophy.

MATHER, Frank Jewett, Jr. (1868–). An American art critic and professor (see Vol. XV). Since 1922 he has been director of the Princeton University Art Museum. His more recent writings include: *Estimates in Art* (1916) *The Portraits of Dante* (1921); *A History of Italian Painting* (1923); *Ulysses in Ithaca* (1926); *Modern Painting* (1927); "The American Spirit in Art," in *The Pageant of America* (1927). He became joint editor of *Art Studies* in 1923.

MATHER, Stephen Tyng (1867–). An American public official. He was born at San Francisco, graduated from the University of California (1887), and for six years was on the staff of the New York *Sun*. From 1894 to 1903, he was Chicago manager of the Pacific Coast Borax Company, later becoming president of the Sterling Borax Company. He served as assistant to the Secretary of the Interior (1915–17) and as director of the National Park Service (1917–29). While administering the Park Service, he actively promoted general knowledge of, and interest in, the national parks. His work in this field was successful and led to the development of the National Parks.

MATHEWS, Arthur Frank (1860–). An American painter and teacher, born in Wisconsin, and educated at the schools of San Francisco and Oakland, Calif. He studied art in Europe for five years, part of the time in Paris under Gustave Boulanger. He also made a study of architecture. His work included the reorganization of the California School of Design, where he was art director from 1890 to 1906. He exhibited in the leading art centres of Europe, including the Paris Exhibition and the Salon, and at leading galleries in the United States; his work appears in permanent collections at the Metropolitan Museum, where he has "California Landscape," at the State Capitol at Sacramento, Calif., the Oakland Library at Oakland, Calif., and the Masonic Temple in San Francisco. He also executed four triptychs for the University of California Library. He was awarded the medal of the American Institute of Arts in 1923 for mural painting.

MATHEWS, John Alexander (1872–). An American metallurgist, born at Washington, Pa., and educated at Washington and Jefferson College, Columbia University, and in London at the Royal School of Mines and as a Carnegie Research Scholar at the British Steel and Iron Institute. He was metallurgist with the Sanderson Brothers Steel Company (1902–08) and thereafter was general manager and president of the Halcomb Steel Company until 1920, when he became president of the Crucible Steel Company of America for three years. Since 1923 he has been vice president and director of research. He is an accepted authority on the metallurgy of iron. He directed his attention to alloy steels, especially electric furnace steel processes. Dr. Mathews received the first award of the Andrew Carnegie Gold Medal for Research in 1902 and was a member of the United States Assay Commission in 1900, 1905, and 1911.

MATISSE, mȧ'tēs', Henri (1869–). A French painter (see Vol. XV). His later works include "Three Women on the Sea" (1914), in the Hague museum; "Sisters" (1916); and "The Odalisque" (1920). See Painting, under France.

MATSUDAIRA, Tsuneo (1877–). A Japanese diplomat, born in Tokyo. He graduated in economics from the Imperial Tokyo University, entered the diplomatic service, and served as legation and then embassy secretary at Peking, London, and Paris. Later, he was Consul General at Tientsin, China, and in charge of the diplomatic affairs of the Siberian Expedition of 1918–19. He then became director of the Europe-America Bureau of the Japanese Foreign Office, represented his country at the Russo-Japanese negotiations at Changchung in 1922, was Vice Minister (1924–25), and served as Ambassador to the United States from 1925 to 1928, when he was transferred to the London Embassy.

MATSUI, Baron Keishiro (1868–). A Japanese diplomat, born at Osaka and educated at the Imperial Tokyo University. He served as secretary of legations and embassies at Seoul, Washington, London, and Peking, and as counselor at Paris and Washington; was Vice Minister of Foreign Affairs (1913); Ambassador to Paris (1914–20), and a Japanese representative at the Paris Peace Conference; Minister of Foreign Affairs in the Kiyoura cabinet, and Ambassador to London (1925–28). He was created a peer in 1920 for his services during the World War, and sat as a Crown member of the House of Peers.

MATTER, Theories of. See Chemistry; Physics.

MAUCLAIR, mō'klâr', Camille (1872–). The pseudonym of Camille Faust, a French poet, critic, and novelist (see Vol. XV). His later works include *Le vertige allemand* (1916); *Les héros de l'orchestre* (1919); *Princes de l'esprit*, essays (2 ed., 1920); *Paul Adam* (1921); *Histoire de la musique européene, 1850–1914* (1921); *Servitude et grandeur littéraires* (2 ed., 1922); *Un peintre hollandais contemporain, Antoon van Welie* (1924); *Claude Monet* (trans., 1924); *Le génie d'Edgar Poe* (1925); *Les musées d'Europe: Le Luxembourg* (1927); *Florence* (trans., 1927); and *Baudelaire* in the *Vie Amoureuse* series (1928). With J. F. Buchor, he wrote *Assise* (1923) and *Versailles* (1926), both illustrated by David Burnand.

MAUGHAM, William Somerset (1874–). A British novelist and playwright, who was educated at King's School, Canterbury, and at Heidelberg. Although he never practiced, he took his M.D. degree at St. Thomas's Hospital, in one of the poorest sections of London. *Liza of Lambeth* (1897), his first novel, was a realistic sketch of some of the inhabitants of this quarter. His novels include *The Making of a Saint* (1898); *Mrs. Craddock* (1902); *The Explorer* (1907); *Of Human Bondage,* the history of a club-footed boy (1916); *The Moon and Sixpence* (1919); and *The Painted Veil* (1925). He also wrote sketches of his travels, such as *The Land of the Blessed Virgin* (1905) and *On a Chinese Screen* (1922). His plays include *A Man of Honor* (1904); *Lady Frederick* (1907); *Caroline* (1916); *The Circle* (1921); *East of Suez* (1922); *Our Betters* (1923); *The Letter* (1927); and *The Constant Wife* (1927). Consult *W. Somerset Maugham, Novelist, Essayist, Dramatist,* by Charles Hanson Towne and Carl and Mark van Doren (1925).

MAURIAC, FRANÇOIS (1885–). A French novelist who made his debut with a volume of religious verse which Barrès and Bourget called a revelation, and then was poetry critic for the *Revue du temps présent* (1910). The character analysis, which established his reputation as a writer, was not visible in his earlier novels, but appeared first in *Le baiser au lépreux* (1922) and *Genitrix* (1924). His other works include *Les mains jointes,* poetry (1910); *L'adieu à l'adolescence* (1911); *L'enfant chargé de chaînes* (1913); *La robe prétexte* (1914); *La chair et le sang* (1920); *Préséances* (1921); *La fleuve de feu* (1923); *Le désert de l'amour* (1925); *Orages,* poems (1925); *La province,* miscellaneous (1926); *Le jeune homme* in the series *Les ages de la vie* (1926); *Thérèse Desqueyroux* (1927); *La vie de Jean Racine* (1928); *Destins* (1928, Eng. tr., 1929); *Essai sur le roman* (1928); and *The Desert of Love* (1929).

MAURITIUS. An island British Crown colony situated in the Indian Ocean 500 miles east of Madagascar. The area of the whole colony, which includes several small islands, is 720 square miles; the population in 1921 was 385,074, of which Indians and Indo-Mauritians numbered 265,884 and Chinese 6820; the estimated population at the end of 1927 was 401,693. The capital and chief port, Port Louis, had 54,114 inhabitants in 1927. Sugar raising continues to engage almost the whole population. The sugar export in 1912 amounted to 206,677 metric tons; in 1919, it reached 302,826 tons; in 1921–22 it was 182,234 tons; in 1926, 233,000 tons. Aloe fibre and copra are the other exports. Total exports for 1913 and 1927 were £2,241,084 and £3,774,203. Total imports for 1913 and 1927 were £2,466,800 and £3,679,042. Imports included, in the order of their value for 1927, cotton goods, machinery, iron and steel manufactures, ammonium sulphate, etc. In 1927, 450 vessels of 1,248,460 tons entered and cleared. In 1910, the tonnage had been 986,000. During the World War, the entire sugar crop was purchased by the British government at the prevailing high prices with the result that prosperity in the island was unexampled. This continued after the War and through the world-wide depression of 1920–21. Revenues for 1913–14 and 1926–27 were £742,846 and £978,854; expenditures, £681,098 and £1,097,404. On June 30, 1926, the colonial debt was £1,756,724. In 1927 the municipal debt of Port Louis, contracted for harbor improvements in 1920, was £63,420. Accounts are kept in rupees, and conversions have been made at the nominal exchange rate of Rs.15 = £1. The colony continues peaceful under British rule. The agitation of the Creoles for the return of the island to France in 1919 was short-lived, the continued prosperity stilling all dissent.

MAUROIS, ANDRÉ (1885–). The pseudonym of Émile Herzog, a French writer who was born at Elbeuf and educated at the Lycée of Rouen. He spent a great deal of time in England, and during the World War was a liaison officer with the British Army, his first books, *Les Silences du Colonel Bramble* (1918) and *Les Discours du Docteur O'Grady* (1920), being sympathetic and amusing accounts of the soldiers he knew during the War. He continued as an interpreter of the English to the French in *Ariel, ou la vie de Shelley* (1923), which made his reputation; *La vie de Disraëli* (1927); and *Études anglaises, essays* (1927). In France, he popularized and remained one of the outstanding writers of the so-called interpretive biography. Nearly all of his books were translated into English. His other works include *Dialogues sur le commandement,* translated as *Captains and Kings* (1925); *Meïpe* (1926); *Bernard Quesnay,* a semi-autobiographical story (1926); *Rouen,* in the Portrait de France series (1927); *Petite histoire de l'espèce humaine* (1927); *The Next Chapter; The War against the Moon,* fictitious accounts of war (1927); *Voyage au pays des Articoles* (1928); two novels, *Ni Ange ni bête* (1928) and *Climats* (1928), and *Aspects of Biography* (1929). In the autumn of 1927, he came to America, lectured on the novel at Princeton University and made a tour as the official speaker of the Alliance Française. In 1928 he delivered a series of lectures on English subjects, which were subsequently published, at Trinity College, Cambridge, England.

MAURRAS, mō̇'rȧ', CHARLES (MARIE PHOTIUS) (1868–). A French critic and journalist (see VOL. XV), codirector, with Léon Daudet, of the Nationalist journal, *Action Française.* His later works include *Les Conditions de la victoire,* collected war articles (4 vols., 1914–16); *L'Étang de Barre* (1915); *La Part du Combattant* (1917); *Athènes antique* (1918); *Les trois Aspects du Président Wilson* (1920); *Pour Psyché,* verse (1920); *Inscriptions,* poems (1921); *Les nuits d'épreuve et la mémoire de l'état* (1923); *La France veut-elle un roi?* (1925); *La musique intérieure,* one of his most important contributions to literature, partly verse and partly autobiographical (1925); *Pour en sortir* (1926); *Le mauvais traité de la victoire à Locarno* (2 vols., 1928); and *Theodore Aubanel* (1928). Consult *Le victorieux XX^e siècle,* by Pierre Moreau (1925) and *Charles Maurras et le nationalisme de l'Action Française,* by Marie, Marquis de Roux (1927).

MAX, mäks, PRINCE OF BADEN (1867–1929). A German stateman, born in Baden Baden. After studying law, he entered the army but retired without having seen active service. He was president of the First Chamber of the Baden Diet from 1907 to 1918. On account of the fact that he was not identified particularly with any prominent party, he was chosen chancellor on Oct. 3, 1918. During the consideration of the armistice proposals made by the Allies on November 9, he issued a formal declaration of the abdication of the Kaiser, and on the following day resigned from office. His memoirs, published in 1927, appeared in English translation, *Memoirs of Prince Max of Baden*, in the following year. See BADEN; GERMANY.

MAXIM, HUDSON (1853–1927). An American mechanical engineer (see VOL. XV). In 1915 and during the World War, he was a member of the United States Navy Consulting Board. In 1929 a tablet, with a large boulder as a base, was unveiled to his memory in the New Jersey State Park. He published *Defenseless America* (1915) and *Dynamite Stories* (1916). *Reminiscences and Comments, as Reported by Clifton Johnson* appeared in 1924. See also *Rise of an American Inventor, Hudson Maxim,* by C. Johnson (1927).

MAXWELL, WILLIAM BABINGTON (1876–). An English novelist (see VOL. XV), chairman of the National Book Council. He served in the army throughout the World War. His later works were *The Mirror and the Lamp* (1918); *The Great Interruption* (1919); *A Man and His Lesson* (1919); *A Remedy against Sin* (1920); *A Little More* (1921); *Spinster of this Parish* (1922); *The Day's Journey* (1923); *Elaine at the Gates* (1924); *Children of the Night* (1925); *Fernande* (1925); *Life: A Study of Self* (1926); *Gabrielle* (1926); *The Case of Bevan Yorke* (1927); *We Forget Because We Must* (1928).

MAYBECK, BERNARD RALPH (1862–). An American architect, born in New York City. He studied architecture in Paris and at the University of California. From 1892 to 1900, he was instructor in drawing, descriptive geometry, and architecture at the University of California. In 1899–1900 he was dean of the department of architecture of that university. He designed buildings for the Panama-Pacific Exposition and other important structures for several towns and cities. He was associated with the United States Shipping Board during the World War and was a founder of the Council of Allied Arts.

MAYNARD, THEODORE (1890–). An American lecturer and author, born at Madras, India, and educated in India, in England, and at the Mt. Hermon School in Massachusetts. From 1909 to 1911, he resided in the United States and studied for the Congregational ministry. In 1911 he removed to England and in 1913 was received into the Roman Catholic Church. From 1921 to 1925, he was professor of English literature in the Dominican College at San Rafael, Calif. For the next two years, he had a similar chair at St. John's College, Brooklyn, N. Y., and later at the Graduate School of Fordham University, New York. He wrote *Drums of Defeat* (1916); *Folly and Other Poems* (1918); *The Last Knight* (1921); *The Divine Adventure* (1921); *Our Best Poets* (1922); *The Book of Modern Catholic Verse* (1926); *The Book of Modern Catholic Prose* (1927); *Exile and Other Poems* (1928). In 1916 he was the winner of the Malory Prize offered in London for the best volume of poetry.

MAYNC, HARRY (1874–). A German writer, born in Berlin, who studied at the universities of Berlin and Leipzig. He was made editor of the German classics published by the Bibliographisches Institut of Leipzig and lectured at the University of Marburg. He later became director of the Seminary of the University of Berne. He is the author of *Uhlands Jugendgedichte* (1899); *Eduard Möricke: Sein Leben und Dichten* (1901); *Die Altdeutschen Fragmente von König Tirol und Fridebrand* (1910); *Wilhelm Meisters Theatralische Sendung* (1910); *Dichtung und Kritik: eine Rechtfertigung der Literaturwissenschaft* (1912); *Liliencron* (1919); *Fontane* (1920); *Immermann: Leben und Werke* (1921); *Die Schweiz im deutschen Geistesleben,* vols. i to x (1922–27); *Sprache und Dichtung,* in 40 vols. (1910–27). He also edited the works of Uhland, Möricke, Goethe, Immermann, Gottfried Keller, Fontane, and Albrecht von Haller.

MAYO, KATHERINE (?–). An American author, born at Ridgeway, Pa., and educated at private schools in Boston and Cambridge, Mass. She wrote *Justice to All,* a history of the Pennsylvania State Police Force (1917); *The Standard Bearers* (1918); *That Damn Y* (1920); *Mounted Justice* (1922); *Isles of Fear* (1925); *Mother India* (1927); and *Slaves of the Gods* (1929).

MAYO, CHARLES HORACE (1865–). See MAYO, WILLIAM JAMES.

MAYO, WILLIAM JAMES (1861–). An American surgeon (see VOL. XV). The most momentous event in the history of the Mayo Clinic at Rochester, Minn., occurred in 1915, when W. J. and C. H. Mayo donated $2,000,000 to establish the Mayo Foundation for Medical Education and Research in affiliation with the University of Minnesota. In 1928 a $3,000,000 clinic was added to the $5,000,000 plant. The Mayo Clinic was then functioning as the graduate organization for the University of Minnesota Medical School and was treating 60,000 patients annually. During the World War, W. J. Mayo was made chief surgical consultant to the Medical Corps, United States Army, with the rank of colonel. C. H. Mayo was made associate consultant in surgery at the same time.

MAYR, mīr, RICHARD (1877–). An Austrian dramatic baritone, born in Henndorf, near Salzburg. While pursuing his medical studies at the University of Vienna, he also studied singing at the Conservatory (1898–1902) and sang in the chorus of the Akademische Gesangverein. The exceptional quality of his voice began to attract attention and he received offers of engagements from several provincial theatres, which he resolutely declined, determined to make his first appearance only in a principal rôle at a principal theatre. His opportunity came in the summer of 1902, when he made his début as Hagen in *Götterdämmerung* at the Bayreuth Festival, with such success that Mahler immediately secured him as a permanent member of the Hofoper at Vienna. Here he disclosed an astonishing versatility, both as a tragedian and comedian of the first rank, equally great as a singer and an actor. Before long, he was recognized also as one of the greatest of living Liedersingers. During 1908–14 he sang every summer at the Bayreuth Festival. He made his London début as Ochs von Lercheau in *Der Rosenkavalier* at Covent Garden (May 23, 1924), and his American début at the Metropolitan Opera House as Pogner in *Die Meistersinger* (Nov. 2, 1927).

MAYRHOFER, mīr′hō′fēr, JOHANNES (1877–). A German Roman Catholic writer of fiction, drama, and travel, born at Hamburg, and educated in philosophy and æsthetics at the universities of Berlin and Münster. He wrote the plays *Der König von Granada* (1902); *Seleukus und Stratonike* (1904); and the novels *S. J., ein Jesuitenroman* (1916); *Der Kaiser des Sonnengottes* (1917); *Dilettanten der Liebe* (1919), and *Konnersreuth* (1926). He also published essays or biographical works on Kant (1911), Schopenhauer (1912), Jens Peter Jacobsen (1914), and translations from Jörgenson and Svensson.

MEAD, Albert Davis (1869–). An American biologist and college executive, born at Swanton, Vt., and educated at Middlebury College and Brown, Clark, and Chicago Universities. He was instructor in comparative anatomy (1895–96), associate professor (1895–1901), and professor of comparative anatomy (1901–09) at Brown University. He became professor of biology in 1909. Since 1925 he has been vice president of the University. Professor Mead published articles on the natural history of marine invertebrates and on the artificial culture of marine food animals.

MEAD, Charles Larew (1868–). An American bishop, of the Methodist Episcopal Church, born at Vienna, N. J., and educated at New York University. In 1895 he was ordained to the Methodist Episcopal Ministry and, from 1895 to 1920, served as pastor in churches in New Jersey, Maryland, New York, and Colorado. He was ordained bishop in 1920. During the World War, he served with the Y. M. C. A. in France.

MEAD, Elwood (1858–). An American engineer and rural sociologist. Born at Patriot, Ind., he was graduated at Purdue University, and held a professorship in Colorado Agricultural College (1883–84 and 1886–88). From 1888 to 1899, he was Territorial and State Engineer of Wyoming. He served as chief of irrigation and drainage investigation for the U. S. Department of Agriculture (1897–1907), was professor of irrigation in the University of California (1898–1907), and then went to Australia as chairman of the Victoria State Rivers and Water Commission (1907–15). He returned to California as professor of rural institutions in the State University (1915), and chairman of the Land Settlement Board. In 1924 he was appointed commissioner of reclamation by President Coolidge. He is also head of the American section of the International Water Commission (United States and Mexico). He strongly advocated the Boulder Canyon Dam project, the construction of which is under his direction. He is the author of *Irrigation Institutions* (1903); *Helping Men Own Farms* (1920); and many official reports on irrigation and allied topics.

MEASLES. Beginning with 1916, studies were prosecuted in several countries which resulted in the possibility of immunizing children against measles. Natural insusceptibility to this disease is as good as nonexistent; and as it destroys 10,000 lives annually in the United States, much salvage of life may result from wholesale immunization. On account of the long incubation period, it is possible to prevent the disease after the child has been exposed, and immunization should of course be practiced as soon after exposure as possible. The immunizing substance is ideally the whole blood or plasma of a person who has recently recovered from measles. About a pint of blood may be taken at a time, and it is possible to preserve it for six months; but in case of epidemics, sufficient blood may be difficult to obtain. It is necessary, as in blood transfusion, to be sure that the blood donor is healthy. The individual immunizing injection is small in amount, about 2.5 cubic centimeters. This is called the immunizing unit. If great haste is expedient and no blood is available, it may be taken from a parent and injected directly into the muscles. Immunization will have three consequences. In a few cases, it will fail and the patient will have typical measles. In other cases, the child will develop modified measles, a very mild form. Finally, and in the majority of cases, it will escape the disease altogether. To show what may be done under favorable circumstances, Zingher of the New York City Health Department secured 90 per cent complete immunity in one large series of cases treated in this way.

The status of our knowledge of the serum treatment of this affection is well covered in an article by A. C. Silverman of Syracuse in the *Journal of the American Medical Association* for Dec. 8, 1928. Great care is necessary in obtaining, preserving, and distributing the serum which should be taken only from otherwise healthy adults with true and uncomplicated measles during the 7–10th day following defervescence. The maximum amount of blood drawn should be about 500 cubic centimeters, and the donor is paid from $10 to $25, depending on the amount taken. Phenol is used as a preservative and the serum is bottled ready for use in 4.5 cubic centimeters doses. Distribution to physicians is free, but these are obliged to send in return blanks properly filled out. In a recent Syracuse epidemic, about 7000 cubic centimeters of serum were obtained from 21 donors at a cost of $430. In about 16,000 cases during the serum period, the total deaths were 48—a mortality of twenty-eight one-hundredths of 1 per cent. The usual death rate is anywhere from thirty-nine one-hundredths of 1 per cent up to more than 11 per cent. The real efficacy of the serum should be in warding off broncho-pneumonia, the chief cause of death, and here other factors must naturally enter.

MEASUREMENTS, Precision. See Physics.

MEAT PRODUCTION. See Live Stock.

MECCA. See Arabia.

MECHANICAL MUSICAL INSTRUMENTS. See Music, under *Mechanical Reproduction.*

MECHANICS. See Physics.

MECHANICS, Celestial. See Astronomy.

MEDICAL PROGRESS. The theory and practice of medicine and surgery have made great advances since the World War, which afforded the widest opportunity for the practice of military surgery and for the prosecution of hygienic and sanitary measures under military conditions. In certain cases, enforced sanitation was practiced among the civil population which came under military authority or where the people generally were governed more directly than usual in the stress of War circumstances. Naturally, there was some relaxation of the efforts of research hospitals and the devotees of experimental medicine in their laboratories; but, after the termination of hostilities, these and other agencies attacked their various problems with redoubled vigor, besides investigating questions raised by the War itself. At no time in the history of the world has medical research been better organized, with more coöperation among the institutions concerned, or with more good will of the general public. For discussions of the fields in which progress has been most notable and results most interesting, see Abortion; Adrenalin; Anæmia; Angina Pectoris; Anthrax; Biochemistry; Birth Control; Blood Pressure; Botulism; Bubonic Plague; Can-

cer; Diabetes; Diet; Diphtheria; Epilepsy; Erysipelas; Gallstone Disease; Goitre; Hay Fever; Heart Disease; Infantile Paralysis; Influenza; Insanity; Insulin; Leprosy; Malaria; Malta Fever; Measles; Pellagra; Pneumonia; Rickets; Scarlet Fever; Scurvy; Secretions, Internal; Sleeping Sickness; Smallpox; Surgery, Reconstructive; Syphilis; Tuberculosis; Tularemia; Typhoid Fever; Typhus Fever; Vitamins; Wounds; Yellow Fever.

MEDINA. See Arabia.

MEDITERRANEAN FRUIT FLY. See Entomology, Economic.

MEEKER, Ezra (1830–1928). An American pioneer and author. He was born at Huntsville, Ohio, and was self-educated. In 1852, with his wife and child, he crossed the plains and mountains with an ox team by the Oregon Trail to the Pacific Northwest. He was a farmer in Washington (Territory and State) for 50 years. In 1906 he returned to Washington, D. C., with an ox team, retracing much of the original route of 1852. He later traveled the same route by automobile and airplane. He was the author of *Washington Territory West of the Cascade Mountains* (1870); *Hop-Growing in the United States* (1883); *Pioneer Reminiscences of Puget Sound* (1905); *The Oregon Trail* (1907); *Eighty-five Years of a Busy Life* (1916); *Seventy Years of Progress in Washington* (1921); *Ox-Team Days* (1922); and *Kate Mulhall* (1926).

MEEKS, Everett Victor (1879–). An American architect and University professor, born in Mt. Vernon, N. Y., and educated at Yale, at the School of Architecture of Columbia, and in Paris. For several years, he was associated with Carrère & Hastings, but after 1914 practiced alone. He was acting professor of architecture at Cornell from 1914 to 1916, and from 1916 he was on the faculty of the School of Fine Arts at Yale as head of the department of architecture. During the World War, he was assistant director of fine arts of the Army Overseas Educational Commission.

MEES, Charles Edward Kenneth (1882–). An American photographic research scientist. He was born at Wellingborough, Eng., and studied at Kingswood School, Harrogate College, St. Dunstan's College, and the University of London (B.Sc., 1903). He was managing director of Wratten and Wainwright, Ltd., Croyden, Eng. (1906–12), and since 1912, when he came to the United States, he has been director of the Research Laboratories of the Eastman Kodak Company, at Rochester, N. Y. He is the author of *Photography of Colored Objects* (1909); *An Atlas of Absorption Spectra* (1909); *The Organization of Industrial Scientific Research* (1920); *The Fundamentals of Photography* (1920); and coauthor of the *Theory of the Photographic Process* (1907).

MEGGERS, William Frederick (1888–). An American physicist, born at Clintonville, Wis. He studied at Ripon College and at Wisconsin and Johns Hopkins universities. He was instructor in physics at Ripon and at Wisconsin, after which he was connected with the Carnegie Institute of Technology (1912–14). In 1914 he became physicist to the Bureau of Standards. Dr. Meggers made special researches on topics connected with spectroscopy, astrophysics, photography, and measurements of standard wave lengths. On all these subjects, he has published articles in technical journals and in the publications of the Bureau.

MEGRUE, Roi Cooper (1883–1927). An American playwright, born in New York City, and educated at Columbia University. He wrote a great many successful plays, including *Under Cover*, with W. Hackett (1913); *It Pays to Advertise* (1914); *Under Fire* (1915); *Potash and Perlmutter in Society*, with Montague Glass (1915); *Seven Chances* (1916); *Under Sentence*, with Irvin S. Cobb (1916); *Where Poppies Bloom* (1918); *Tea for Three* (1918); *Honors are Even* (1920); and *Venice For Two* (from the French of Sacha Guitry, 1925).

MEIGHEN, The Rt. Hon. Arthur (1874–). A Canadian public official, born at St. Mary's in western Ontario, and educated at Toronto University. For a short time he taught school. He then moved to Winnipeg, where in 1903, after studying law, he was admitted to the bar. In 1908 he was elected as a Conservative to the Dominion Parliament and soon gained a reputation as a debater. He was reëlected in 1911 and two years later was appointed Solicitor General. In 1915 he became a member of the Privy Council, and on the reorganization of the Cabinet in 1917, with a coalition membership, he was made Minister of the Interior; this post he retained until his appointment as Premier, in 1920, succeeding Sir Robert Borden. He also held the office of Secretary for External Affairs. He remained in office until the defeat of his Government in 1922. He was again Premier for a brief period in 1926, but was defeated for reëlection to Parliament in that year and became vice president of, and general counsel to, Canadian General Securities, Ltd. In 1918 he was a member of the Imperial War Cabinet. He was made a Privy Councilor in 1920.

MEIKLEJOHN, mĭk′'l-jŏn, Alexander (1872–). An American educator (see Vol. XV). He continued as president of Amherst College until 1924, when because of opposition to his methods on the part of a majority of the faculty and of the older alumni, his resignation was requested and accepted by the trustees. He was called to the University of Wisconsin as professor of philosophy, and in 1927 an experimental college was inaugurated there under his direction. He is the author of *The Liberal College* (1920), and *Freedom and the College* (1923). See Universities and Colleges.

MEILLET, må′yå′, Antoine (1866–). A French Orientalist (see Vol. XV). His later works include *Grammaire du vieux Perse* (1915); *Caractères généraux des langues germaniques* (1917); *Les Langues de l'Europe nouvelle* (1918); *Linguistique historique et Linguistique générale* (1921); *Grammaire de la Langue Polonaise*, with Mme. de Willman-Grabowska (1921); *Introduction à l'Étude Comparative des Langues Indo-Européennes* (5 ed. revised and augmented, 1922); *Grammaire de la langue Serbo-Croate*, with A. Vaillant (1924); *Le slave commun* (1924); *Trois conférences sur les gâthâ de l'Avesta* (1925), and *La méthode comparative en linguistique historique* (1925). With M. Cohen, he edited *Les langues du monde* (1924).

MEINECKE, Friedrich (1861–). A German historian. He was born at Salzwedel, studied at the Universities of Berlin and Bonn, and worked on the Prussian archives (1887–91). He was lecturer at the University of Strassburg (1896–1901), then at Freiburg, and in 1914 at

Berlin again. He is the author of *Von Stein zu Bismarck* (1908); *Das Zeitalter der Deutschen Erhebung, 1795–1815* (1913); *Redwitz und die Deutsche Revolution* (1913); *Die Deutsche Erhebung von 1914: Probleme des Weltkriegs* (1917); *Weltbürgertum und Nationalstaat* (1919); *Nach der Revolution* (1919); *Idee der Staatsraison in der neueren Geschichte* (1925); and *Geschichte des deutschenglishen Bündnissproblems* (1927).

MEINHART, mīn'härdt, Roderich (1892–). An Austrian writer. The son of Adam Müller Guttenbrunn, the novelist, he was born at Vienna, studied history and art at the university there, and became literary adviser to several publishing houses. He is the author of *Nach der Heimat Möcht' Ich wieder* (1920); *Die am Wege Blieben* (1920); *Untergang,* a play (1920); *Wiener Totentanz* (1921); *Die vergessene Stadt* (1921); and *Madonna Einsamkeit* (1924). The last two are novels.

MEISTER, mī'stẽr, Aloysius (1866–1925). A German historian, born at Frankfort, and educated at the University of Strassburg and in Rome. He was appointed lecturer at the University of Bonn and in 1911 became professor at the University of Münster. He wrote *Die Hohenstaufen im Elsass* (1890); *Die Kölner Nuntiatur* (1895); *Die Anfänge der modernen diplomatischen Geheimschrift* (1902); *Grundzüge der historischen Methode* (1913, 3d ed., 1923); *Deutsche Berfassungsgeschichte des Mittelalters* (1907, 3d ed., 1922); *Friedrich der Grosse und das preussische Westfalen* (1912); *Studien zur Geschichte der Wachszinsigkeit* (1914); *Bismarcks Auswärtige Politik im 1871* (1915); and *Der Neue Geschichtsunterricht* (1920).

MELANESIA. See Ethnography.

MELARTIN, Erkki Gustaf (1875–). A Finnish composer, born at Kexholm. He studied with Wegelius at the Helsingfors Conservatory and later under R. Fuchs in Vienna. For some years, he taught theory and composition at the Helsingfors Conservatory. From 1908 to 1911, he was conductor of the symphony orchestra in Viborg and then returned to Helsingfors as director of the Conservatory. He is one of the most important of Finnish composers. His principal works are in opera, *Aino* (Helsingfors, 1907); six symphonies; two symphonic poems, *Siikajoki* and *Traumgesicht;* three orchestral suites; a violin concerto; incidental music to *Prinsessan Törnrosa* and Hauptmann's *Hanneles Himmelfahrt;* four string quartets; and choruses, piano numbers, and songs.

MELBA, mĕl'bȧ, Nellie (1861–). An Australian coloratura soprano (see Vol. XV). For more than 20 years she made extensive tours, appearing chiefly in concert. For distinguished service during the World War, she was made Dame Commander of the Order of the British Empire in 1920. She retired to private life in 1926. She published a volume of souvenirs under the title *Melodies and Memories* (London, 1925).

MELCHETT, Alfred Moritz Mond, First Baron (1868–). A British politician and industrialist, who was born at Farnworth, near Widnes, Lancashire, and educated at Cheltenham College, and Cambridge and Edinburgh universities. He became a barrister of the Inner Temple (1894), and was a judge on the North Wales and Cheshire circuit. He was a Liberal member of Parliament from 1906 to 1923 and from 1924 to 1926, and a Conservative member from 1926 until his entry into the House of Lords (1928). He served in the Cabinet as First Commissioner of Works (1916–21), and as Minister of Health (1921–22). He was chairman or director of many powerful companies in varied industrial fields, including Imperial Chemicals, Ltd., a member of the Royal Institution, a Privy Councilor, president of the British Science Guild (1927–28), and president of the World Power Conference (1928). He visited the United States in 1928 and the same year was created a baron. Besides articles on politics and economics, he wrote *Questions of To-day and To-morrow* (1912); *Why Socialism Must Fail!* (1923); *The Remedy for Unemployment* (1925); and *Industry and Politics* (1927).

MELCHIOR, Lauritz (1890–). A Danish dramatic tenor, born in Copenhagen. After five years of study under Paul Bang, he made his début at the Royal Opera in Copenhagen in 1913 as a baritone, and during 1914–21 was a regular member there. At the same time, he continued to study with Bang, and after a year with Wilhelm Herold, he made his début as a tenor. The years 1921–24 were spent mainly in studying an extensive tenor repertory with Victor Beigel in London. Ernst Grenzebach in Berlin, Anna Bahr-Mildenburg in Munich and Karl Kittel in Bayreuth. In 1924 he sang at Covent Garden and Bayreuth, the following year at the Städtische Oper in Berlin, and in 1926 made his American début at the Metropolitan Opera House as Tannhäuser (Feb. 18). Since 1927 he has been a regular member of the Stadttheater in Hamburg.

MELL, Max (1882–). An Austrian poet and dramatist, born at Marburg. His works include *Jägerhaussage* (1910); *Barbara Naderers Viehstand* (1914); *Gedichte* (1919); *Das Apostelspiel,* a dramatic poem (1923); *Das Schutzengelspiel* (1923); *Das Morgenwege* (1924); and *Das Nachfolge Christi-Spiel* (1927).

MELLON, Andrew William (1855–). An American Secretary of the Treasury, born in Pittsburgh, Pa., and graduated at the University of Pittsburgh in 1873. He at once entered the banking firm of Thomas Mellon and Sons of Pittsburgh, in which he was soon a partner. Later, this firm developed into the Mellon National Bank, of which he became president in 1902, and the Union Trust Company and the Union Savings Bank, of both of which he was made vice president. He was long associated with H. C. Frick in the development of the coal, coke, and iron industries of western Pennsylvania and was an officer or director of many financial and industrial corporations. Mr. Mellon founded the town of Donora, Pa., established a large steel plant there, and built the first independent oil pipe line through Pennsylvania. His philanthropies were numerous, and he had much to do with the founding of Mellon Institute in Pittsburgh. In 1921 he was appointed Secretary of the Treasury by President Harding and retained that office throughout President Coolidge's administration. He was reappointed to the post by President Hoover in 1929. He won an unusually high reputation as an authority on finance. As administrator of the national finances, his chief accomplishments were the refunding of European debts, the reduction of the public debt, and in the steady paring down of federal taxation. In connection with his office, he held the chairmanship of the Federal Reserve Board, the Farm

Loan Board, the War Finance Corporation, and the World War Foreign Debt Commission. Besides his official reports, he wrote *Taxation: the People's Business* (1924).

MELSTED, mĕl′stĕd, Henning Finne von (1875–). A Swedish author (see Vol. XV). Among his later works were *Osämja,* short stories (1915); *Folket i fongenskap,* on Belgium in German captivity (1916); *Sveriges Fara* (1916); *Ensam,* a play (1917); *Gerda* and *Mordbränncrskan,* novels (1918); *Salomos dom,* a play (1919); *Erna* (1923); *Den Stora Karnevalen* (1924), and *Skiljas* (1926), all novels.

MELTZER, Samuel James (1851–1920). An American physiologist (see Vol. XV). During the World War, Dr. Meltzer was a major in the Medical Reserve Corps, and when the American Association for Thoracic Surgery was organized in 1918, he was elected president. Up to the time of his death, he was engaged in research along widely differing lines, notably in resuscitation by pharyngeal insufflation, injections of magnesium sulphate for anæsthesia, experimental pneumonia, etc., and published numerous reports, alone and with collaborators.

MEMEL, mā′mel. This little town, with a population of 41,500 in 1910, at the mouth of the Niemen River in the southeast corner of the Baltic, became, after the World War, an important bone of international contention. As a harbor, before the War, it was comparatively insignificant; most of the trade of the region went by way of either Danzig and Königsberg, or Riga and Libau. During the War, Germany built a railway line north to Polanga, to connect at Prekuln with the Libau-Mitau Railway. By Article 99 of the Treaty of Versailles, the city and a narrow strip of territory to the southwest, containing an area of 945 square miles and a population of 150,000, were cut off from Germany and taken under the control of the Supreme Council. To German protest, the Allies replied that while the city was German, the surrounding territory was undoubtedly Lithuanian, and that possession of the port was necessary to assure Lithuanian economic independence. In view of the unsettled state of Lithuanian affairs, it was deemed advisable to send a French force to take possession of the city early in 1920 and to hold it in trust for Lithuania. The tardiness of the Allies in settling the problem goaded the Lithuanians, chafing already as a result of the loss of Vilna, to take matters into their own hands. On June 10, 1923, therefore, the so-called Committee for the Welfare of the Territory of Memel seized the city, interned the French soldiers, and after a local diet had confirmed the step, had the satisfaction of announcing that Memel had become a part of Lithuania and that the customs lines were abolished. Allied protests were unavailing; the Kovno (Lithuanian) government disclaimed all complicity or even knowledge of the affair. Up to September, 1923, negotiations dragged on between the Lithuanian government and the Council of Ambassadors and eventually ended in a deadlock because of the Lithuanian refusal to accept the machinery proposed in the draft convention for the regulation of international commerce, specifically Polish, by and through the port. Lithuania then proposed the adjudication of the matter by the Permanent Court of International Justice; the Council of Ambassadors decided, however, to submit the controversy to the League Council. Thus requested, the League Council, late in 1923, invited Norman H. Davis, an American, and two others, to act as arbitrators. On Feb. 4, 1924, the commission set to work, and on Mar. 14, 1924, it reported to the League Council. On that day, as a result of the arbitrators' findings, three conventions were signed by Great Britain, France, Italy, Japan, and Lithuania, which, in effect, provided for the transfer of Memel to Lithuania; the establishment of the city and region as an autonomous unit with full legislative, judicial, and administrative rights; the guarantee to foreign nationals of the same rights accorded the people of Memel; the creation of a harbor board of three made up of a representative each of Lithuania, Memel, and the League of Nations; the free transit by sea, water, and rail of all hinterland traffic. In all the negotiations, a marked conciliatory spirit was displayed by the Lithuanians, and, in the opinion of Mr. Davis, they had made the fullest concessions possible. Poland, however, remained disgruntled. See Lithuania; Poland.

MEMPHIS. The commercial metropolis of Tennessee. The population rose from 132,778 in 1910, to 162,351 in 1920, and to 190,200 in 1928, by estimate of the Bureau of the Census. The population of Greater Memphis in 1928 was 265,500. The area was 30.34 square miles. In 1924 the city created a planning commission, which prepared a major and a minor street plan and zoning system. Building activity since 1920 has included the construction of a $3,000,000 municipal auditorium seating 12,500 persons, a new water plant with a pumping capacity of 60,000,000 gallons per day, two municipal river and rail terminals erected at a cost of $2,000,000, the Shelby County Court House, the County Jail and Criminal Courts Building, a long viaduct across the Illinois Central Railroad tracks, a railroad bridge 4500 feet long across the Mississippi, three large hotels, nine office buildings, nine high schools, and 10 modern hospitals ranging in cost from $100,000 to $2,000,000. In 1927, a local estimate gave 26,063 persons employed in the 580 industrial establishments of Memphis with wages of $30,000,000; the value of products manufactured was 180,625,000. Bank clearings in 1927 amounted to $1,191,854,409 and building permits to $15,094,643. The assessed valuation of property in 1927 was $246,606,000; the net debt was $25,462,000.

MENCKEN, H(enry) L(ouis) (1880–). An American author and editor, born at Baltimore, Md. He was graduated at the Baltimore Polytechnic and at once began his journalistic career on the Baltimore *Morning Herald.* Later he came to New York and was connected with the *Evening Sun.* In 1914–23 he was an editor of *Smart Set;* since 1921 he has been a contributing editor of *The Nation.* In 1924 he undertook, with George Jean Nathan, the editorship of the new *American Mercury.* He edited the *Players' Edition of Ibsen's Plays* (1909) and *The Free Lance Books* (1919–) and is the author of *Ventures into Verse* (1901), *George Bernard Shaw, His Plays* (1905); *The Philosophy of Friedrich Nietzche* (1908); *The Artist* (1912); *A Book of Burlesques* (1916); *In Defense of Women* (1917); *The American Language* (1918); *Prejudices* (1919–27); *On Democracy* (1926); *Treatise on the Gods* (1929). See *H. L. Mencken,* by E. A. Boyd, and *The Man Mencken,* by I. Goldberg (1925).

MENDELISM. See Botany; Heredity.

MENDELSSOHN-BARTHOLDY, mĕn′dĕl-sōn-bär-tōl′dĭ, ALBRECHT (1874–). A German international lawyer, born at Karlsruhe. He was professor of international law at Wurzburg (1905–20), and at Hamburg from 1920 to 1923, when he became president of the newly founded Institut für Auswärtige Politik (Institute for Foreign Affairs) in that city. Since 1923 he has also been chief editor of *Europäische Gespräche*, a monthly review of foreign politics. He wrote *Grenzen der Rechtskraft* (1900); *Räumliches Herrschaftsgebiet des Strafgesetzes* (1910); *Völkerbund als Arbeitsgemeinschaft* (1918); *Grosse Politik der Europ. Kabinette* (1924–27), and *Handbuch der Politik* (1921 and 1927).

MENDENHALL, CHARLES ELWOOD (1872–). An American physicist, born at Columbus, Ohio, and educated at Rose Polytechnic Institute and Johns Hopkins University. He was an aide on the United States Coast Survey, and during 1894–95 an assistant in physics at the University of Pennsylvania, after which he was an instructor at Williams. In 1901 he accepted a call to the University of Wisconsin, where in 1905 he became full professor. His researches included studies on the absolute value of gravity, high temperature measurements, luminous efficiencies, and constants of radiation, on which he wrote important papers for various technical publications. During the World War, he was major in the science and research division of the Signal Corps and Air Service (1917–19) and chairman of the division of physical sciences in the National Research Council (1919–20). He also served as scientific attaché to the United States Embassy in London (1919). He was elected to the National Academy of Sciences and in 1923–25 was president of the American Physical Society.

MENENDEZ PIDAL, RAMÓN (1869–). The leading Romance philologist of Spain (see VOL. XV). He is the author of several important works concerning the history and literature of Spain, and mediæval literature and culture in general. He is a member, and since 1925 director, of the Royal Spanish Academy of the Language, and a member of the Royal Academy of History of Madrid. He is also a member, and medalist for Arts and Letters, of the Hispanic Society of America; and has been honored by numerous foreign academies and universities. Among the most important of his later works are *Louis Vélez de Guevara: La Serrana de la Vega* (1916, with his wife); *Antología de prosistas castellanos, Segunda ed., bastante corregida y aumentada* (1917); *"Roncesvalles," un nuevo cantar de gesta español del siglo XIII* (1917); *Crónicas generales de España, 3a. ed. con notables enmiendas, adiciones y mejoras* (1918); *Documentos lingüísticos de España, I: Reino de Castilla* (1919); *El Cid en la historia* (1921); *Poesía popular y poesía tradicional en la literatura española* (1922); *Poesía juglaresca y juglares: aspectos de la historia literaria cultural de España* (1924); *Manuel elemental de gramatica histórica española, 5a ed., corregida y aumentada* (1925); *Orígenes del español: estado lingüístico de la Península Ibérica hasta el siglo XI* (1926); *Rodrigo el último godo* (3 vols., 1925–1927); *El Romancero: teorías e investigaciones* (1927); and *Flor nueva de romances viejos que recogió de la tradición antigua y moderna* (1928).

MENGELBERG, mĕng′el-bĕrg, WILLEM (1871–). A Dutch orchestra conductor (see VOL. XV). In 1921 he made his second visit to the United States and conducted the newly established National Symphony Orchestra of New York for the second half of the season (Jan.–Mar.). His sensational success brought about the amalgamation of the new orchestra with the Philharmonic Society and his permanent engagement as conductor for the second half of the Philharmonic season (Jan.–Apr.). He retained at the same time his post as regular conductor of the Concertgebouw Orchestra in Amsterdam for the summer and fall; during his absence in New York, this orchestra played under guest-conductors. After the amalgamation of the Philharmonic Society with the New York Symphony Orchestra (1928), he shared the conductorship of the new Philharmonic-Symphony Society with Toscanini. In 1929 he resigned his post with the Concertgebouw Orchestra.

MENOHER, CHARLES THOMAS (1862–). An American army officer, born in Johnstown, Pa., and educated there and at the United States Military Academy. He went to France in 1917 in command of the 5th Field Artillery (Regular). He later commanded the school of instruction for field artillery at Saumur in France. He was in command of the 42d (Rainbow) Division and later the 6th Army Corps, participating in the battles of Château Thierry, St. Mihiel, and the Argonne. He was promoted to major general, U. S. Army, in 1921. He was director of the Air Service 1919–21; commanded the Hawaiian Division, 1922–24, the Hawaiian Department, 1924–25, and the 9th Corps Area, 1925. He was retired in 1926. He received the Distinguished Service Medal and was decorated by the governments of France, Belgium, and Italy.

MENSHEVIKS. See RUSSIA, under *History*.

MENTAL MEASUREMENT. The rise of intelligence tests since 1914 constitutes one of the most remarkable chapters in the history of applied science. Significant alike for its bearing on psychological theory and its effect on educational and personnel practice, the development of mental measurements has been attended by bitter controversy and enthusiastic hopes. The very nature of the undertaking, the effort to chart the resources and capacities of the human mind, could scarcely permit the scientific or the lay public to remain either indifferent or uninterested. The peculiar organization of the American school system, its freedom from tradition and from the control of a central authority, and its readiness for pedagogical experimentation, all combined to give impetus to the movement for mental testing. Then, too, the increasing necessity for efficiency and the growing importance of man-power during the World War prepared the way for the acceptance of any devices which would put men where they could do their best work and which would enable them to do that work most efficiently.

If we add to this the preoccupation of the American public with the question of the quality of the immigration during recent years, and the opportunity afforded by the army mobilization for classifying the intellectual fitness of the racial stocks in the United States, we can see the reason for the extraordinary interest in the technique of mental measurement.

The pioneer construction of tests was the work of Cattell, 1890, and Münsterberg, 1891, in America, Binet and Simon in France, 1896, and

Claparede, 1895, in Switzerland. Cattell had interested himself in the measurement of the differences among people, and in 1894 devised tests for the measurement of the mental traits of college students. Münsterberg devised tests for special aptitudes, particularly those having to do with practical life situations. Binet and Simon developed mental tests for children in the public schools and Claparede applied his measurements to pathological cases. Each of these fields has expanded and developed to a surprising degree.

The tests which have grown out of the work of Binet and Simon have become widely known through the Stanford Revision prepared by L. M. Terman (*Measurement of Intelligence*, 1916). These tests were arranged in the nature of a scale in units of one or more years of age, covering the period from the age of three years to the point where intellectual growth should cease. At each year, there were tests of the things that the average child of that year could be expected to do. A child was said to have the intelligence of that age whose tests he could succeed in passing. This "mental age" could then be compared with his chronological age and his intellectual status in relation to others of his age determined. A further step was taken by expressing the difference between the age in years and the standing on the test in years in terms of a ratio, called the intelligence quotient, or I. Q. Thus, a child of eight years who passed the eight-year test would have an I. Q. of 1.00; a child of eight years who passed the 10-year test would have an I. Q. of 1.25; and a child of eight years who could pass only the six-year test would have an I. Q. of .75. The intelligence of a child of three years, for instance, is estimated in terms of his ability to point to eyes, nose, mouth; his ability to repeat digits, etc.; while the tests of the later years deal more and more with abstract symbols. The retests of children at Stanford University and elsewhere seem to confirm the view that the I. Q. is relatively constant, successive determinations varying not more than 10 per cent.

Another test for the measurement of intelligence is the Yerkes-Bridges point scale (Yerkes, Bridges, Hardwick, *A Point Scale for Measuring Mental Ability*, 1915) in which, as the name implies, the score is in terms of points instead of years of age. The score made by any individual may then be compared with the average score made by children of the same age. The resulting ratio is known as the coefficient of mental ability.

As the use of these tests increased, the need arose for tests extending below the age of three years and above the age of sixteen years. As an illustration of the former, see Kuhlmann test (F. Kuhlmann, *A Handbook of Mental Tests*, 1922), which is usable for children as young as 3 months; and for the latter, see A. Otis, *Self Administering Tests of Intelligence*, which may be used for adults of any age.

On account of the fact that such tests as those mentioned above use words and abstract ideas, serious difficulties arose in testing foreign, illiterate, blind, and deaf children. To offset this difficulty, the so-called performance tests and non-language tests have been devised, such as the Pintner-Patterson performance test (R. Pintner and D. Patterson, *A Scale of Performance Tests*, 1917), and the Pintner non-language test (*Journal of Applied Psychology*, 1919). The tasks in these tests are in the nature of puzzle blocks, form boards, etc. Scoring is by the point-scale method. Many attempts have been made to provide norms by which scores on a performance test may be translated into scores on an abstract symbol test, but none has been entirely successful.

When the United States entered the World War, the psychologists were called upon to prepare an intelligence-measuring test for the classification of recruits. Instruments for measuring one individual at a time were not feasible for handling such a great task; consequently, the so-called group tests (Army Alpha, and Army Beta, see *United States Army Tests*) were devised, with which as many as 500 men could be examined at one time (see Yerkes and Yoakum, *Army Mental Tests*, 1920). These tests differed from the individual tests mainly in the fact that there was a time limit for each portion of the test and the measure of the intelligence was the amount that could be done correctly within the time limit. Stencils were used in scoring the finished tests, so that the work could be done by ordinary clerks after a few simple instructions.

The success of the group tests in the rapid classification of soldiers according to intelligence led to the development of a great number of similar tests for many purposes, such as the classification of school children, college students, office workers, etc. Among the best known of these are the E. L. Thorndike "Intelligence Examination for High-school Graduates," A. S. Otis, "Group Intelligence Scale," L. M. Terman, "Group Test of Mental Ability." There are tests of this character suitable for any age group. See T. L. Kelley, *Interpretation of Educational Measurements*, 1927.

The rapid development and extended use of these tests have been accompanied by a controversy as to the proper definition of intelligence, as to just what the tests really measure, as to the age at which intellectual maturity is reached, as to whether learning or native endowment is the more potent factor in determining test score, as to the influence of literacy and illiteracy, of foreign birth, foreign parentage, social status, etc., upon the test score. Many of these questions, theoretical and practical, are still unanswered. For articles concerning these matters, see, particularly, *Journal of Educational Psychology;* also, *Twenty-Seventh Year-Book of the National Society for the Study of Education* (1928).

In addition to general intelligence, whose measurement has just been discussed, every individual is believed to possess special capacities, whether few or many is not definitely known. Among these are mathematical, musical, and artistic capacity (see C. E. Seashore, *The Psychology of Musical Talent*, 1919). There are also many other more highly specialized aptitudes required for the successful handling of special tasks, such as one meets in business and industry. For a good account of such aptitudes and the technique of measuring them, see C. L. Hull, *Aptitude Testing*, 1928.

The last 10 years have produced many tests of another side of mental life, namely, character, temperament, or personality. As in the case of the intellectual traits, there are assumed to be general and special character or personality traits, each requiring a test or a battery of tests to measure them. The most ambitious of the general character tests is the Downey Will-Temperament Test (1921), which aims to measure the amount of energy available for action and the ease or difficulty with which it can be transformed into action. The most highly developed test of a special personality trait is the measure of trustworthiness or deceit (M. A. May and H. Hartshorne, *The Measurement of Deceit*, 1928).

Finally, there are many important mental traits for which no adequate tests have been constructed. Some evaluation of them, however, is essential for practical purposes, and special methods for *judging* the extent of their presence and for increasing the validity of the judgments have been devised. The most common of these instruments is known as the rating scale (see A. T. Poffenberger, *Applied Psychology*, chap. 15, for a brief discussion of judgment and rating scales).

In the construction, standardization, and validation of mentality measuring devices, elaborate mathematical and statistical procedures have been devised, among them the measures of relationship built upon the conception of Francis Galton by Karl Pearson and others. The techniques of correlation, partial correlation, multiple correlation, regression equations, etc., have become the common tools of the testing laboratory. See C. L. Hull, *Aptitude Testing*, 1928; H. E. Garrett, *Statistics for Students of Psychology and Education*, 1926; and, for more advanced treatment, T. L. Kelley, *Statistical Method*, 1923.

United States Army Tests, 1917–1919. For the rapid classification of the immense numbers of army recruits, a new form of intelligence test was required, one that could be used for testing large groups of men simultaneously in a short time, and with a very simple method of scoring. A committee of psychologists was drafted to prepare such a measuring instrument. After a series of preliminary trials in several army camps, tests known as Army Alpha and Army Beta were evolved, the former resembling the individual intelligence examination of the abstract sort, and the latter resembling the performance or non-language sort, being administered by means of a kind of pantomime demonstration. In addition to these two instruments for group testing, the Stanford Revision of the Binet Test and the Pintner-Patterson Performance Test were used for doubtful cases. The test procedure was somewhat as follows: A group of 200 to 500 men would be called for examination. Those who could read and write English were given the Alpha test, those who were illiterate or foreigners, or who failed to pass the Alpha test, were given the Beta test. Those who failed to pass the Beta were given one or the other of the individual examinations.

Altogether, there were examined in this fashion 1,726,966 men, including 42,000 officers, individual examinations being given to 82,500 men. The printed report of this psychological work appears in *Memoirs of the National Academy of Sciences*, vol. xv, covering 900 pages of text and tabular matter. This material has been worked over by a number of investigators interested in such matters as the intellectual status of the different racial groups making up the population of the United States, the relative intelligence of the Negro and white populations of the draft, the relative intellectual status of the draft from different sections of the country and from the different States. Inferences have been drawn from these studies, many of them unjustified, which have added fuel to the controversies already being waged concerning the nature of intelligence, racial differences, etc. Particularly active has been the dispute concerning the relative intellectual standing of different racial stocks, such as the Nordic, as infered from their samplings appearing in the United States Army. See C. C. Brigham, *American Intelligence* (1923).

The results of the tests have been offered as evidence of heavy environmental influence upon intelligence scores, or of heavy hereditary influence upon the same. Involved in this controversy are such factors as the influence of knowledge of the English language, of certain habits of thought, of social status, and of less tangible environmental forces. There is no doubt at all that the native white draft made a better record than the recent immigrants from southern and eastern Europe, and the Northern and Southern American Negro. Just what these differences really mean must be left for future researches to determine.

Bibliography. Books on intelligence testing, are legion. Pintner's *Intelligence Testing, Methods and Results* (1923) may be recommended to the elementary student. Terman's *Measurement of Intelligence* (1916) and *The Intelligence of School Children* (1919) give the point of view of the leader of the Stanford school. *Memoirs of the National Academy of Sciences*, vol. xv, entitled "Psychological Examining in the United States Army" (1921), is an indispensable work of reference. A good controversial discussion of the subject, induced by Walter Lippman's attack on the army tests, may be found in the 1922 and 1923 volumes of the *New Republic*, and more scientific discussions in the psychological periodicals, particularly the *Journal of Educational Psychology*, beginning with vol. xiii. An excellent collection of studies concerning factors which influence intelligence-test and achievement-test scores will be found in the 27th *Yearbook of the National Society for the Study of Education*, 1928. For a discussion of tests particularly adapted for business and industry, consult H. E. Burtt, *Principles of Employment Psychology* (1926); and for tests to be used in the clinical and psychopathological laboratory, see F. L. Wells, *Mental Tests in Clinical Practice* (1927) and S. I. Franz, *Handbook of Mental Examination Methods* (1919). See EDUCATION, under *Intelligence Testing*.

MENUHIN, Yehudi (1917–). A Russian-American violinist, born in Palestine. Soon after his birth, his parents settled in San Francisco, where the boy received his instruction on the violin from Louis Persinger. So rapid was his progress that on Mar. 30, 1925, he gave his first public recital in San Francisco, and on Jan. 17, 1926, was heard with orchestra in New York, attracting but passing attention on either occasion. His parents then took him to Paris, where he continued his studies under Georges Enesco, and in the fall of 1927 gave a recital at the Salle Gaveau which created a sensation. A few days later, he played the Tchaikovsky concerto as soloist with the Lamoureux Orchestra and the critics unanimously acclaimed him a master of the first rank. A few weeks later, the New York critics concurred in this verdict, when the boy played the colossal Beethoven concerto with the New York Symphony Orchestra under Fritz Busch (Nov. 25, 1927). The parents wisely refused innumerable offers from managers and returned to San Francisco, where the young artist continued serious study with his first teacher, Mr. Persinger. Early in 1929, he played again in three concerts in New York, receiving veritable ovations, and proceeded to fill a limited number of engagements in Germany, repeating his French and American triumphs. On the occasion of his twelfth birthday (Feb. 1, 1929), some American admirers presented him with a magnificent Stradivarius of 1733, valued at $60,000.

MENZEL, Adolf (1857–). An Austrian jurist, born in Reichenberg. Concentrating upon civil and public law, he became professor of these subjects at the University of Vienna and vice president of the Austrian Administrative Court. His numerous works include *Protagoras* (1910); *Kallikles* (1923); and *Umwelt und Personlichkeit in der Staatslehre* (1926).

MENZIES, Alan Wilfrid Cranbrook (1877–). An American chemist, born at Edinburgh, Scotland. He was graduated from Edinburgh University and later studied at Aberdeen, Leipzig, and the University of Chicago. He was assistant professor of chemistry at Henriot-Watt College in Edinburgh and professor of chemistry at Mungo's College at Glasgow. In 1908 he came to the United States and became connected with the chemistry department of the University of Chicago (1908–12), and during 1912–14 he was professor and head of the department of chemistry at Oberlin. He resigned from Oberlin in 1914 to accept a call to the chair of chemistry at Princeton. He was also associate chemist with the Bureau of Standards in Washington (1918–19). His original researches were chiefly concerned with matters of physical chemistry, such as vapor pressure and vapor density, molecular weights, ebullioscopy, and hygrometry.

MERCHANT MARINE. See Shipping; Shipbuilding; etc.

MERCIER, mâr'syā', Désiré Joseph, Cardinal (1851–1926). Belgian primate of the Roman Catholic Church (see Vol. XV). During the World War, he was uncompromising in his opposition to the hardships imposed on the Belgian people by their German rulers and unceasing in his demands for the betterment of conditions. His Christmas pastoral letter, an eloquent exposition of the civic and national rights of Belgium, resulted in his arrest in January, 1915. Soon released, although commanded not to leave his residence, he remained throughout the German occupation a thorn in the side of the German officials and administration. After the War, he worked unceasingly for the unification of the various denominations of the Christian churches. In 1919 he published *War Memories.* He also wrote several books on philosophy, including *A Manual of Modern Scholastic Philosophy* (1917). In 1919 he visited the United States. Consult the following biographies: *Le grand Cardinal belge, Désiré Joseph Mercier, 1851–1926,* by G. Ræmackers (1926); *The Life of Cardinal Mercier,* by Henry Dubly (1928), and *Cardinal Mercier* by Monsignor A. Laveille (trans. 1928).

MERCURY. See Quicksilver.

MERCURY BOILER. See Boilers under *Mercury Boiler.*

MEREDITH, Edwin Thomas (1876–1928). An American agriculturalist and public official, born at Avoca, Iowa, and educated at the Highland Park College in Des Moines, Iowa. For several years, he edited the *Farmers' Tribune,* at Des Moines, and in 1902 he established *Successful Farming.* He served as a member of the Board of Excess Profit Advisers, by appointment of Secretary of the Treasury McAdoo in 1914, and as a member of the Industrial Conference, by appointment of President Wilson in 1919. He was also a member of several other boards engaged in agricultural investigations. In 1920–21 he was Secretary of Agriculture in the cabinet of President Wilson. He was considered in 1924 and 1928 as a possible Democratic candidate for the Presidency.

MERRIAM, John Campbell (1869–). An American palæontologist (see Vol. XV). In 1919 he was chairman of the National Research Council, and in 1920 he became president of the Carnegie Institution of Washington, D. C. He was a member of many scientific organizations and wrote: *The Research Spirit in the Everyday Life of the Average Man* (1920); *Common Aims of Culture and Research in the University* (1922); *The Place of Education in a Research Institution* (1925); *International Coöperation in Historical Research* (1926); and other papers.

MERRICK, Leonard (1864–). A British novelist and short-story writer, born Miller, who was educated at Brighton College and private schools. He was an actor for two years before turning to writing. In 1918 a collected edition of his work, with introductions by many of the most famous authors of the day, was published. His writings include *Mr. Bazalgette's Agent* (1888); *Cynthia, a Daughter of the Philistines* (2 vols. 1896); *The Actor-Manager* (1898); *The Worldlings* (1900); *Conrad in Quest of his Youth* (1903); *The House of Lynch* (1907); *The Man Who Understood Women* (1908); *All the World Wondered* (1911); *While Paris Laughed* (1918); *A Chair on the Boulevard* (1921), and *To Tell You the Truth* (1922). He also wrote a number of plays.

MERRILL, Elmer Drew (1876–). An American botanist, born at East Auburn, Me., and educated at the University of Maine and George Washington University. After serving on the faculty of the University of Maine and with the Department of Agriculture in Washington, he was appointed botanist by the Bureau of Agriculture at Manila, P. I., in 1902. In 1912 he was appointed associate professor of botany and head of the department at the University of the Philippines, where he became full professor in 1916. In 1919 he became director of the Bureau of Science in Manila; in 1923, dean of the College of Agriculture and director of the agricultural experiment station at the University of California. Professor Merrill carried on many investigations in the Philippines and elsewhere and described more than 2500 new specimens of plants. He was a member of many scientific societies and the author of *A Flora of Manila* (1912); *Enumeration of Bornean Plants* (1921); *Enumeration of Philippine Plants* (1922–23); and many articles on the botany of North America, China, the Philippines and Malaya.

MERRILL, George Perkins (1854–1929). An American geologist (see Vol. XV). He continued as head curator of the department of geology in the U. S. National Museum until his death. He was the author of *Handbook of Gems and Precious Stones* (with others, 1922), and *The First Hundred Years of American Geology* (1924), and was a contributor to various encyclopædias.

MERRILL, Paul Willard (1887–). An American astronomer. He was born at Minneapolis, Minn., and graduated at Stanford University (1908). For five years, he was fellow and assistant at Lick Observatory, Calif., while securing his Ph.D. degree at the University of California (1913). He was instructor in astronomy at the University of Michigan (1913–16), and assistant and associate physicist of the U. S. Bureau of Standards at Washington, D. C. (1916–18). Since 1919 he has been astronomer at the Mt. Wilson Observatory of the Carnegie Institution. In 1929 he was elected to the National Academy of Sciences.

MESOPOTAMIA. See Iraq.

MESSNER, Josef (1893–). A Swiss composer and organist, born in Schwaz, Tyrol. He received his musical education at the Akademie der Tonkunst in Munich, and became organist at the Metropolitankirche there in 1922. In 1926 he settled in Salzburg as organist at the Cathedral. He was the composer of a biblical opera, *Hadassa* (Aix-la-Chapelle, 1925); two symphonies, C minor and F minor; *Sinfonietta*, in D minor; *Das Leben*, for chorus and orchestra; *Marienlegenden* for voice, strings, harp and horn; Mass in D; *Missa poetica;* and many sacred compositions in smaller forms.

MEŠTROVIĆ, Ivan (1883–). A Jugoslav sculptor, who was trained at the Academy of Art in Vienna. He exhibited at London (1906, 1915, 1917), Paris (1907–08), Rome (1911), Venice (1914), and in other cities before becoming rector of the Art Academy at Zagreb. His principal works are a memorial chapel to the Racic family at Cavtat, Ragusa; a seated memorial figure of Bishop Strosmajer, Croat patriot; a portrait of President Masaryk of Czechoslovakia; wood carvings on biblical subjects, and several portraits made in England and America. His "The Archangel Gabriel" is owned by the Brooklyn Museum (New York). See Sculpture.

METALLURGY. See Chemistry, Applied; Cottrell Process; Electric Furnaces.

METCHNIKOFF, mĕch'nĭ-kŏf, Elie (1845–1916). A biologist of Russian birth and French citizenship (see Vol. XV). He drank his artificially soured milk faithfully each day for 19 years and considered that his doctrines of survival had been upheld in his own case as none of his near relatives lived over 55 years. He died when 71 years old. His widow, Olga Metchnikoff, wrote his biography.

METEOROLOGY. The period after 1914 witnessed a great expansion of the meteorologist's activities through increased emphasis on meteorology in military operations, civil and commercial aviation, agriculture, weather insurance, and numerous industrial fields. A prodigious advance was made in the organized collection and dissemination of weather information over land and sea by telegraph, cable, and radio. Daily synoptic charts now cover the larger part of the northern hemisphere, including the ocean areas and the far north; and the systematic exploration of the upper air by kites and pilot balloons has increased markedly.

To provide a solid basis for the improvement of day-to-day weather predictions, for the extension of forecasts over longer periods of time, and for the development of the mathematical theory of atmospheric phenomena, we need an adequate body of both surface and free-air observational data from land and sea, together with a skillful coördination of these facts of observation by the mathematician and physicist. While the time seems remote indeed when forecasting can wholly cease to be an empirical art, nevertheless every advance, however small, in our theoretical understanding of the physical processes going on in the atmosphere provides increased insight which cannot fail sooner or later to react on meteorological practice and to lead to improvement in forecasting.

Moreover, there is no indication whatever that to reduce atmospheric phenomena to order it is necessary to discover new physical laws at present unthought of, or, despite the unfounded claims of some investigators, to seek the solution in some vague, hitherto unrecognized cosmic or electromagnetic influence.

Statistical Meteorology. To understand fully the weather of any given locality, and to anticipate its changes to any great extent in advance, it is necessary to take a world-wide view. Cold waves, periods of drought, abnormal seasons, etc., are intimately connected with the prevailing distribution of barometric pressure, and the resulting general circulation, over an entire hemisphere. Profound modifications of the pressure distribution are often first indicated in polar regions. Loss of heat from these regions results in the accumulation of great volumes of cold air which sooner or later must break out over lower latitudes and cause great periodical readjustments of pressure distribution over the hemisphere; and these in turn determine the winds, storm paths, and weather conditions in general.

So many factors are operating simultaneously and in such a complex manner to determine exactly what sequence of phenomena shall take place that it is hopeless to attempt to work out the relations involved *a priori* from theoretical considerations. Our immediate efforts must be directed toward ascertaining these relations empirically; the methods of mathematical statistics have come into extensive use for this purpose. The method of correlation has been used in the hope of empirically discovering relations which would be of value in long-range forecasting, but in general the correlation coefficients obtained are too small to render this method highly successful; prediction requires highly correlated variables. The present position of long-range forecasting in general is not at all hopeful; widespread public interest and expectations have been aroused from time to time by the announcement of the alleged discovery of new methods of forecasting, some based on apparent cycles or periods in weather conditions, others on the influence of sunspots or of the greater or less fluctuations in the intensity of solar radiation, but it is agreed by competent meteorologists that the results so far obtained in such studies cannot be used to forecast, with any confidence, even the general nature of future weather and that no sound and reliable basis for scientific long-range forecasts has yet been established. It is true, however, as Hildebrandsson, Exner, Walker, and others have shown, that the general character of the weather conditions at any given place is to a surprising extent related to the antecedent conditions over a large part of the rest of the globe, and the statistical coördination and correlation of the succession of seasons in all parts of the world holds some promise of partially solving the problem of long-range forecasting for tropical countries; fair success has attended G. W. Walker's forecasts of the monsoon rainfall of India by the use of the correlation coefficients between the amount of this rainfall and sundry meteorological conditions over various parts of the globe in the spring of the same year or earlier.

If correlation is resorted to only for the purpose of discovering relations between different phenomena, a small coefficient, if sufficiently larger than its probable error, is just as likely to give valuable information as a large one, although the interpretation of the coefficients frequently is difficult and uncertain, and the physical reasons for their existence impossible to assign.

Dynamical Meteorology. It is well known that all but a negligible fraction of the energy involved in meteorological phenomena is derived ultimately from the solar radiation that is intercepted by the earth. The atmosphere acts like a gigantic heat engine, transforming radiant energy into the energy of weather processes; and the phenomena take place in accordance with established laws of dynamics and thermodynamics. The comparatively simple conceptions formerly entertained as to the mechanism by which the transformations of energy are accomplished and the observed phenomena produced have, however, been found to need radical revision, and much remains that is as yet very imperfectly understood.

The primary cause of all meteorological phenomena is the heating in the tropical regions and the cooling in the polar regions; the temperature contrast thus set up induces the general atmospheric and oceanic circulations. In the long run, the total amount of heat lost by the earth as a whole, through outgoing terrestrial radiation, must be just equal to the total heat gained through incoming effective solar radiation (since no part of the earth is growing steadily warmer or colder), but at any one place this is not in general true; the equatorial regions receive more radiation than they emit, the excess energy being transported by the circulations of the ocean and the atmosphere to higher latitudes, where more radiation is given out than is received. The transport of heat by the circulations tends to eliminate the temperature difference between lower and higher latitudes, and a steady state is reached when a balance is struck between the two opposing tendencies. Extratropical cyclones and anticyclones are secondary circulations incident to the general planetary circulation, and may be shown to be necessary consequences of the physical conditions under which the latter takes place, but the details of their origin and mechanism are still imperfectly known.

Atmospheric Circulations. At first sight it might seem natural that the motion of air should be directly from regions where barometric pressure is high to regions where it is low, but the most casual examination of a weather map shows that this is not the case; it is indeed the primary tendency, but this tendency is almost completely checked by the effect of the earth's rotation, and we get instead a circulation practically *parallel to the isobars.* The only forces acting on a particular volume of air are gravity, hydrostatic pressure arising from the action of gravity on the rest of the earth's atmosphere, and friction, including internal friction due to viscosity and turbulence. The acceleration of the air under these forces is composed of two parts, acceleration relative to the surface of the earth, which is observable, and acceleration common to this surface itself, the latter giving rise to the so-called deflecting force of the earth's rotation. After a steady state has been attained, which takes but a brief time, *in the absence of friction* the direction of the wind is *along* the isobars, and the velocity is so adjusted that the force arising from the pressure gradient, tending to push the air in toward the region of low pressure, is just balanced by the tendency of the moving air to turn to the right, in the Northern Hemisphere, because of the earth's rotation, together with the outward tendency due to the centrifugal force arising from the curvature of the path. This resulting wind is known as the *gradient wind.* In the strata near the ground, the retardation due to friction causes the air to lose some of the velocity necessary to maintain the balance, and the wind direction is more or less inclined away from the isobars toward the lower pressure.

If, as in lower latitudes, the influence of the earth's rotation is relatively small and friction is negligible, the pressure differences between points at the same level in the atmosphere are mainly occupied in producing acceleration relative to the ground in accordance with the ordinary laws of hydrodynamics; that component of the gradient wind determined by the centrifugal force, known as the cyclostrophic component, is alone important as soon as the wind reaches a very moderate velocity. Such winds, which have been called Eulerian by Jeffreys, are exemplified in the tropical cyclone. If, as is generally the case in the comparatively slow-moving extratropical cyclone, the cyclostrophic component is negligible, the pressure differences are mainly occupied, in the absence of friction, in guiding the air under the influence of the earth's rotation; the resulting winds are known as geostrophic. If, as in land and sea breezes, friction is the main thing which the pressure differences have to overcome, the winds blow in the direction of the gradient, but without acceleration, and have been styled by Jeffreys antitriptic winds.

In the absence of direct observation, the gradient wind indicated by the surface pressure chart is the best estimate which can be given of the actual wind at an elevation of 1500 feet. For much greater heights, the surface map may fail to give a correct idea of the pressure distribution there. The law of approach from the surface wind to the undisturbed gradient flow above is very complex; a number of empirical formulas have been devised to express the variation of velocity with height in the lower levels, but the greatest insight into the motion of the air in the lowest strata has been given by the mathematical theory worked out since 1914 by G. I. Taylor, L. F. Richardson, F. J. W. Whipple, and others:

Friction and surface irregularities put the lower air into a very turbulent state; whirls and eddies of varying sizes are constantly being formed, and reveal their presence in the gustiness of the wind and in the dispersion of the smoke from a chimney. While the spin of an eddy is maintained, the mass of air composing it is endowed with a special forced motion, but presently the eddy disintegrates, and the air which has been forcibly transported in the eddy mixes with its new surroundings. The result, even in the lightest wind, is the mixing of adjacent layers of air; the air transported by the eddies carries with it its momentum, heat, and water vapor, and thus the eddy motion causes a gradual diffusion of these in accordance with laws identical in form with those governing the diffusion caused by molecular motions. The lower layers gain in momentum and generally in heat, at the expense of the upper; the effect is to endow the lower atmosphere with a virtual or pseudo viscosity many thousand times greater than the ordinary molecular viscosity, and with a correspondingly great eddy conductivity for heat and for water vapor. The values of these coefficients of eddy conductivity and eddy viscosity depend on the configuration and nature of the ground surface, the temperature of this surface, the time of day, season, cloudiness, etc. Above the first one or two kilometers, the influence of surface turbulence may generally be regarded as eliminated. Eddy motion or atmospheric turbulence has been found to play an important part in the diurnal and seasonal variations of wind velocity, in the formation of clouds and fog, and in numerous other phenomena; and in recent years, the study of turbulence and its effects has become a distinct branch of meteorology, with a large and growing literature.

Vertical motions in the atmosphere, because of their effects on the water vapor present, are of extreme importance; however, under ordinary circumstances, the magnitude of the vertical component is exceedingly small: The temperature of the air falls at an *average* rate, nearly the same in all parts of the world, of about 6°C. per kilometer increase of height up to an altitude which, according to latitude, season, and surface barometric pressure, varies from about 9 to 16 kilometers, beyond which the temperature ceases to fall in a vertical direction. This upper layer of zerolapse rate is called the stratosphere or isothermal layer; the lower region is known as the troposphere. The lapse rates, or vertical temperature gradients, over the globe are such that, under normal conditions, if a mass of dry air be displaced upward or downward it tends to return to its former level, since the adiabatic heating or cooling due to the vertical motion causes the temperature of the mass to change with height more rapidly than that of the surrounding atmosphere; the lapse rates thus introduce a physical constraint that tends to prevent air from moving in any but an almost horizontal direction. Mere surface heating, even when aided by the latent heat set free by the condensation of water vapor, usually is unable to cause air to ascend through the environment to very great heights; particularly in the polar regions, the atmosphere is in a very stable condition. However, if the air is exceptionally hot and humid (as it is in the tropics), or if the lapse rate happens to be greater than usual, or both (as in the case of thunderstorms), surface heating aided by condensation may send air upward to great heights. Since there is no process corresponding to condensation that will extract heat during descent (except possibly radiation), air seldom is able to descend locally through its environment to any great extent, but comes down by gradual settling over a large area. In addition to local penetrative *thermal* convection, however, requiring high temperatures and humidities, there also occurs *mechanical* or forced convection, such as is responsible for the large scale upward movements in the rain area of a cyclone.

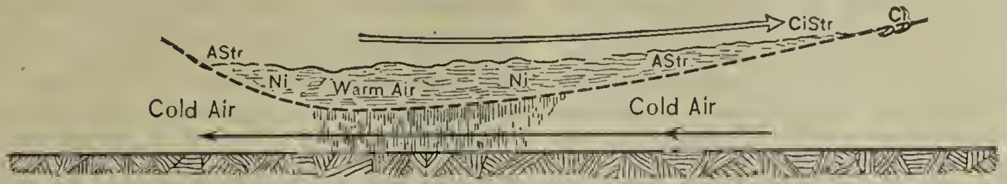
Cyclones. The instantaneous picture provided by the synoptic chart gives no indication of the true trajectories of moving air; when these trajectories are worked out by special investigations, it is found that the cyclone is not composed of the same air circulating round and round the centre as the storm travels. Also, the maps show no signs of the distribution of temperature, wind, etc. which the existence of a vortex would imply; hence, for some time the old vortex theory of extratropical cyclones has been in disfavor. Nevertheless, a vortex theory can be made to account for many facts of observation, and it may be shown that under the actual circumstances of the case it would be difficult or impossible to recognize the presence of a vortex, particularly from the surface map, even if one existed.

We know that the air is full of imperfect whirls or eddies of all sizes; and Fujiwhara has recently shown that under suitable circumstances large vortices are built up through the absorption of the energy of the numerous small whirls into whirls of the next larger size, and so on, and similarly a large vortex dissipates by successively developing series of vortices of the next lower order. Rayleigh in 1917 showed that, provided there were already some vorticity in the atmosphere, all that was necessary to effect the development of a single large vortex was the removal of air from the region that would form the core. Thus the initial step of adding energy to the existing small imperfect vortices which we know to be in the air could be effected by removing a part of what would be the central portion of the resulting cyclonic vortex.

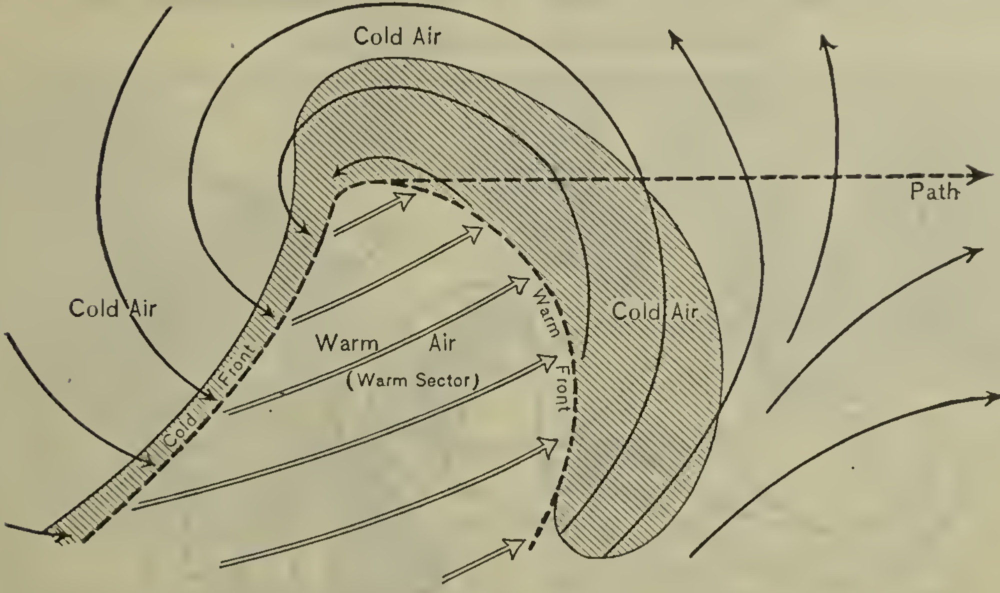
The old thermal convection theory of cyclones, however, which postulated the ascent of a large body of air as a coherent mass, is untenable in the light of present knowledge. Sir Napier Shaw has suggested instead, as the process of the required removal of air, its *eviction* by a scouring action in the layers through which penetrative convection passes. The rising air drags up with itself a surprisingly large portion of these layers through eddy mixing; this might account for the development of a cyclonic vortex attended by a reduction of pressure and a consequent lowering of the temperature. Shaw's theory seems quite applicable to tropical cyclones, and appears capable of accounting for some at least of the extratropical ones.

On the other hand, the meteorologists of the Meteorological Institute at Bergen, Norway, have brought to light details of cyclonic phenomena, not known before, which have led them to quite another conception of the nature of an extratropical cyclone. Deprived of weather telegrams from the greater part of Europe during the War, the Norwegian meteorologists found their isobaric charts, which covered only a very limited area, of comparatively little use for forecasting, and they were led to a serious attempt to use in practice a method of forecasting which V. Bjerknes had originally evolved from theoretical considerations. Detailed reports from a very close network of stations revealed the existence in the normal cyclone of two lines of discontinu-

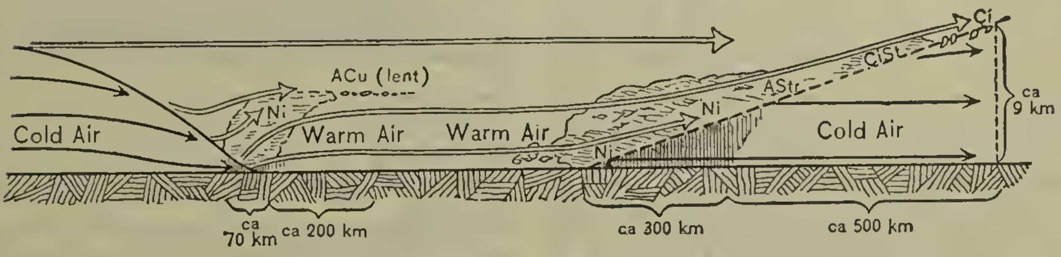
THE STRUCTURE OF THE NORMAL CYCLONE ACCORDING TO V. BJERKNES



Vertical Section to North of Center



Horizontal Plan at Surface



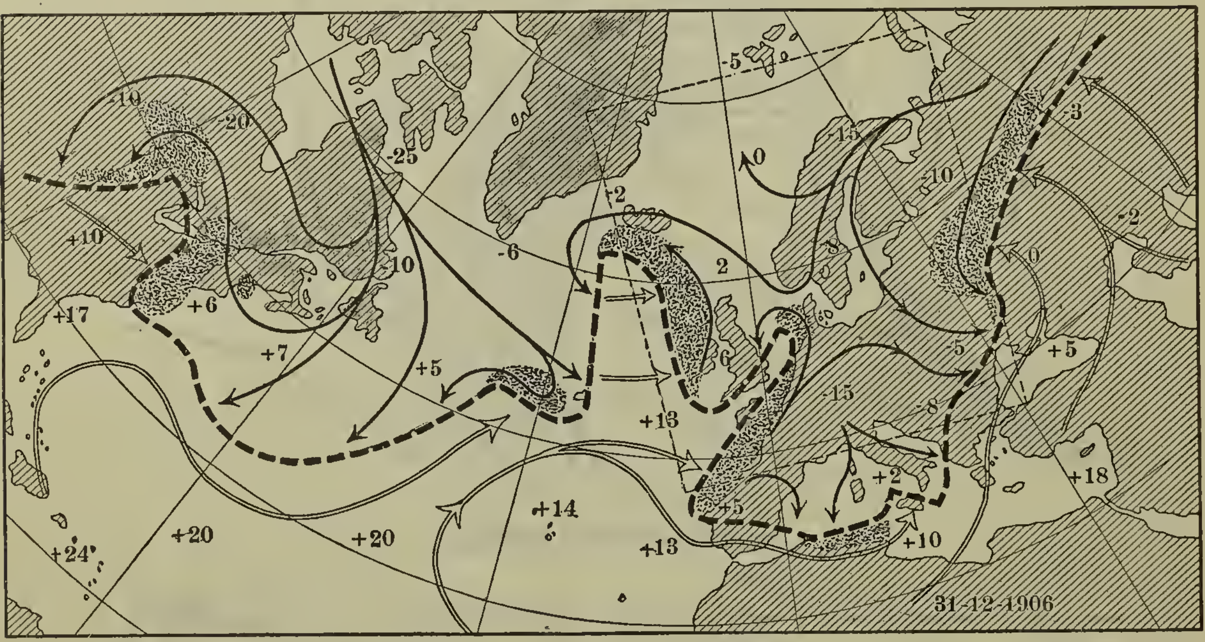
Vertical Section to South of Center

ity, meeting at the centre and dividing the cyclonic area into quite unequal portions. These two lines mark the boundary of a projection of warm air, generally from the southward, into a region of cold air. The line running from the centre toward the eastern or advancing side is called the steering line, or more recently the warm front; under normal conditions it is marked by a rise of temperature, preceded by a considerable and prolonged fall of rain. The other line, running from the centre in a southwesterly direction, is called the squall line, or cold front; it is marked by a sudden fall of temperature accompanied by a brief shower of rain.

The cyclone is thus divided into a warm sector and the cold remainder. The lines of discontinuity have been explained as delineating the ground plan of a complicated *surface* of discontinuity which extends up into the free air and separates cold air of northern origin from warm air of southern origin. The rain in advance of the warm front is attributed to the general ascent of the warm air from the south up over the bank of cold air to the north, along a gentle slope; and the rain of the cold front is attributed to the undercutting of the warm air by the cold air in its rear with a somewhat steeper surface of separation. Rainfall in regions outside the two which are associated with the two fronts, apart from wet fog or drizzle, is attributed to the local instability of air passing over warmer sea or land; it is particularly prominent over the land in summer and over the sea in winter.

Detailed maps show that the line of discontinuity formed by the warm and cold fronts together extends continuously from cyclone to cyclone. After extensive experience with detailed maps, it becomes possible to recognize the line on less detailed ones; it is then found that the line completely surrounds the entire polar regions, and the name Polar Front has been given to it; the air on the northern side is of polar origin, that on the southern side of tropical origin. Heavy cold air flows out along the ground from polar regions, separated from the overlying warm air by a surface of discontinuity. The Polar Front has a wavy form, cold and warm tongues of air alternately extending toward equator and pole, and is in continuous undulating motion, sweeping the whole temperate zone from west to east, and producing the weather changes of temperate latitudes. At the northern ends of the warm tongues are the centres of the cyclones; the broad tongues formed by the expulsion of great masses of accumulated polar air are the anticyclones between. If a tongue of warm air extends too far, and a portion of equatorial air gets completely surrounded at the ground by colder air, the cyclone fills up and expires, and a secondary may develop at the point of overlapping of the two cold fronts. The poles are not of course the only possible sources of a discontinuity; the northern slopes of the Asiatic continent are an effective substitute, both winter and summer.

FRONT OF POLAR AIR, DEC. 31, 1906.



The rainstorm which is occurring near the Great Lakes arrived at the coast of Norway on Jan. 5, 1907.

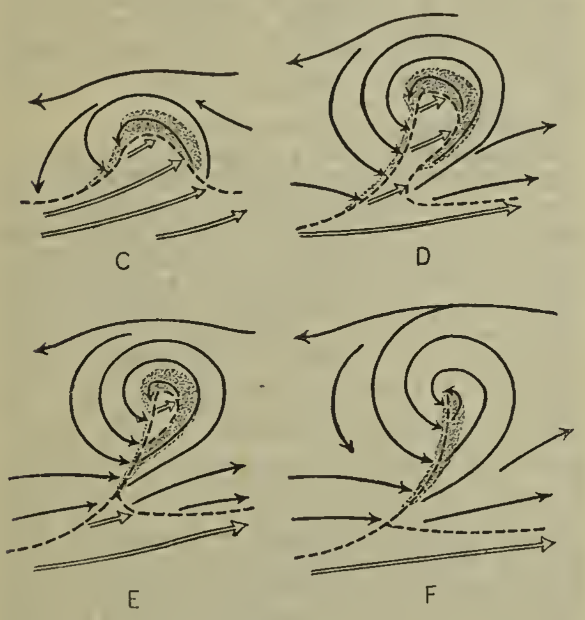
The above empirical representations of the facts of the synoptic charts have already proved of quite material assistance to forecasting in Norway. Bjerknes has, in addition, sought to give them a dynamic interpretation. He holds that the synoptic maps can be simulated by wave motion on either side of the surface of discontinuity. The discontinuity is considered a natural consequence of the dynamic conditions of an atmosphere on a rotating globe. The cyclonic depressions of middle latitudes begin as convolutions of the surface of discontinuity due to the instability of adjacent warm and cold air in relative motion. At sea level, they appear as collections of approximately circular isobars because the surface of discontinuity is not vertical but tends toward parallelism with the axis of the earth or even less inclined to the surface than this. The successive cyclones of the temperate zones are thus regarded as waves on the boundary surface between the cap of polar air and the surrounding warm air masses. The corresponding boundary line at the ground, the Polar Front, traverses the centres of depressions all the way around the earth. The extreme northern ends of the warm waves coincide with the centres of low pressure, and the cold waves of polar air between them constitute the moving wedges of high pressure. The examination of depressions individually, from their formation to their disappearance, shows that young depressions correspond to slight waves with small excursions from the equilibrium state; later, the amplitudes increase simultaneously with a deepening of the depression. The ascending currents starting from the warm wave gradually diminish the area of the warm sector of the cyclone. The tongues of polar air on both sides of it accordingly approach each other and finally close together, so that air of cold origin surrounds the cyclonic centre on all sides. The potential energy of the system of adjacent cold and warm air masses is then lost, and the cyclone begins to fill up. The missing asymmetry of structure makes the cyclone during its last stages slow-moving or stationary.

The warm, cold, and occluded fronts are now shown on the Norwegian weather maps, and forecasts are made in accordance with the principles of the Polar Front theory. In spite of its great successes in correlating many of the facts of cyclonic phenomena, the theory has not been completely confirmed by such observations as are available to test it, nor is it altogether free from theoretical difficulties. Other theories are held by many meteorologists, notably by the Austrian school under the leadership of F. M. Exner.

Complete daily weather maps of the entire northern hemisphere for the first four months of 1925, prepared by C. L. Mitchell of the U. S. Weather Bureau from all available data for that period, including the meteorological observations taken by Sverdrup on the S. S. *Maude* off the Siberian coast, have shown that during the colder months the principal region for the development of cyclones is apparently to the southwest of Japan, mainly over the China Sea, while among the principal regions of dissipation is western Siberia. Outbursts of polar air from the Arctic, leading to anticyclones, often of very great magnitude, are more frequent southeastward over the Mackenzie Basin, and in the vicinity of Nova Zembla.

Climatic Changes. Some investigators hold that the earth is undergoing a gradual desiccation, but the consensus of the most expert meteorological judgment is that there is not as yet sufficient unimpeachable evidence to justify a belief in any *progressive* change of climate within historic times in any part of the world. Small and more or less periodic fluctuations, such as those accompanying the sunspot cycle, now exist, and can be traced back into the past through the evidence afforded by growth rings in large trees and other things; and the existence of well-marked local fluctuations of climate in the past is also well established.

LIFE CYCLE OF A CYCLONE ACCORDING TO V. BJERKNES



So far as climatic changes during *geologic* time are concerned, there is a decided tendency to seek their explanation in purely terrestrial causes, with a lessened appeal to astronomical factors. The work of Humphreys and others has shown that dust veils in the very high atmosphere due to great volcanic explosions are effective in somewhat diminishing earth temperatures and may have been a contributing cause to the ice ages. C. E. P. Brooks, in particular, has sought to show that, under the right conditions, profound effects may follow a very slight initial change in temperature. For example, if the temperature in the polar regions happened at any time to be just above the freezing point of sea water, and if then, by a change in the distribution of land and water, the mean annual temperature in high latitudes were decreased by only two degrees, the ocean would freeze at the pole, cold water would flow away at the bottom until the entire ocean was cooled down, and an ice sheet would begin to form, and would automatically accelerate its own growth through its powerful and ever-increasing cooling effect until it ultimately extended to perhaps latitude 65°; the temperature at the pole might meanwhile have been lowered by as much as 45°. Conversely, a slight rise in the general temperature would suffice to cause the ultimate disappearance of the whole ice sheet; at the present time, a very small rise would clear the Arctic of ice, and there is evidence that the Arctic actually was clear of ice from about 500 A.D. to 1000 A.D.

G. C. Simpson, however, maintains that no redistribution of land and water, or of ocean currents, could have produced a much higher or lower mean annual temperature over any limited region of the earth than can today be found somewhere on the same parallel of latitude.

Meteorological Physics. The aurora polaris presents a number of interesting problems, the solution of which may shed a great deal of light on conditions existing in the high atmosphere. In the ordinary polar aurora, the gases of the upper air are caused to emit the characteristic auroral radiations through the energy supplied by the impact of electrons coming from the sun. The so-called "negative" bands of nitrogen, due to ionized nitrogen molecules, so prominent in the auroral spectrum, require for their excitation an amount of energy equivalent to that possessed by electrons which have fallen through a potential difference of 20 volts; the "positive" bands, due to the normal nitrogen molecule, faintly present in the aurora, require less energy, but the line spectrum of the nitrogen atom, totally absent, requires considerably more. Hence the electrons which excite the auroral radiation must strike the upper atmosphere with about 20 volts energy.

The famous and enigmatical green line in the auroral spectrum was discovered by McLennan and Shrum to be due to oxygen; it is emitted during a transition of the dissociated oxygen atom between two "metastable" states. As Campbell, Rayleigh, Slipher, and others have shown, the whole night sky is always glowing faintly with this green light; the green glow of the night sky probably is not due to electrons from the sun, and it has been suggested that ultra-violet solar radiation is the responsible agent—molecular oxygen is dissociated into atoms, transformed to ozone, and then turned back to molecular oxygen again under the action of short-wave-length light.

Auroral streamers extending to altitudes of several hundred kilometers have been observed by Störmer. A diffuse aurora reaching 1000 kilometers was photographed in Norway on Sept. 8, 1926. Störmer has found that auroral rays situated more than 400 kilometers above the earth are always in regions then exposed to sunlight, while 96 per cent of those below 400 kilometers are in darkness; sunlight apparently has some action on the very high atmosphere that renders auroras visible to much greater heights than otherwise.

In developing further his theory of thunderstorms, Simpson has shown that lightning discharges always start from a positively electrified region, and progress outward from it, although the current is carried mostly by electrons that move in the opposite direction; the branches are directed away from the positive region. The majority of discharges start in the forward part of the thunderstorm cloud, where there is an accumulation of positively charged raindrops held up by the strong ascending air currents there: the flashes which branch upward are mostly hidden by the cloud, while many of those which branch downward fail to reach as far as the surface of the earth. Discharges from the earth to the cloud are less frequent; and when they occur, they usually appear thick and intense, the branches (directed upward) usually being hidden in the cloud.

Weather. For several years the American press gave considerable publicity to certain ill-founded predictions that the weather of 1927 would be so abnormal as to constitute a return of the "summerless" year 1816, and so adverse to agriculture as to menace the nations' food supply. In no particular, however, did the weather of 1927 display abnormalities other than such as have occurred in the past and are to be expected somewhere every year; the summer as a whole was unusually cool over most of the country, August being especially abnormal, but no more so than has before been recorded, and the yields of most of the principal crops (with the exception of certain fruits) were close to, or above, normal, not only in the United States, but for the world as a whole.

An unusual amount of destruction was occasioned by West Indian hurricanes in 1926; one of them, first observed about 200 miles northeast of St. Kitts, W. I., on September 14, subsequently developed into one of the most severe tropical storms ever known to reach the coast of the United States; its centre, with the attendant temporary calm, passed directly over Miami the morning of September 18, the barometer sinking to 27.61 inches, and enormous damage and loss of life resulted. Again in 1928, great loss of life, damage to property, and destruction of crops were occasioned by hurricanes; two swept in from the West Indies over Florida, Georgia, and South Carolina in August, accompanied by high winds, torrential rains, and floods; while in September, one of the greatest hurricanes of record appeared: The force of this last storm, the most destructive since the Galveston hurricane of 1900, was felt during September 10th to 20th, over Martinique and Guadeloupe, the Virgin Islands, Porto Rico, the southern Bahamas, central Florida, and northward up the Atlantic coast to New Jersey and beyond, before it finally merged with an extra-tropical cyclone. The loss of life exceeded 3000, and about $100,000,000 damage was caused; close to the centre, the wind velocity was probably about 200 miles an hour; the barometer reading at West Palm Beach, 27.43 inches, was the lowest sea-level pressure ever recorded in the United States during a hurricane.

Tornadoes sweeping eastward over Missouri, Illinois, Indiana, Kentucky, and Tennessee on Mar. 18, 1925, created a new record for the destruction of life and property by such storms; seven distinct tornadoes were reported, and resulted in the deaths of 792 people, the injury of 3033, and the destruction of $18,000,000 in property.

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METEORS. See ASTRONOMY.

METHANOL. See CHEMISTRY, APPLIED.

METHODIST EPISCOPAL CHURCH. In 1928, throughout the world, there were about 19 different divisions of Methodists, aggregating about 11,629,950 members. The Methodist Episcopal Church of America was the largest branch. In the United States, the number of its members increased, according to the Federal Census, from 3,717,785 in 1916 to 4,080,777 in 1926, of whom, in the latter year, 2,212,180 lived in cities, and 1,868,597 in rural communities. On Nov. 1, 1928, the *Methodist Year Book* reported a membership of 4,152,177 in the United States, and a smaller representation in Africa, Asia, Europe, and Latin America. Much of the foreign work was carried on by the Board of Foreign Missions and the Women's Foreign Missionary Societies. In the United States, the church had 77 hospitals, and in 1926–27 it cared for 218,453 persons. There were, in 1928, 44 homes for the aged and 43 for children. One of the greatest agencies of the church, the Board of Pensions and Relief, had under its immediate care in 1927, 8530 retired ministers, ministers' widows, and ministers' orphans under 16 years of age. The annuity claim of this organization was $4,413,915 in 1927. At the quadrennial General Conference, 1928, $2,000,000 was raised for the work of the World Service, the benevolent organization of the Church. In the United States by 1928, there were 44 colleges and universities for white persons, and three junior colleges, with a total of 80,218 students; in the 29 secondary schools, there were 5606 scholars; and in nine theological seminaries, 1366. The church also supported, in 1928, three profesisonal schools, nine colleges, four junior colleges, and four secondary schools for Negroes; the total enrollment of these institutions was 5891. Outside the United States, in the mission fields, were schools of all kinds, aggregating approximately 3000, with 146,000 pupils. The publishing interests of the Methodist Episcopal Church were conducted by the Methodist Book Concern, established in 1804. Average sales were about $5,000,000 a year.

After many years' effort to unite the Methodist Episcopal Church and the Methodist Episcopal Church, South, the General Conference of the Methodist Episcopal Church voted in favor of union in 1924, but the following year the Southern church rejected the measure, and the union was not accomplished. Plans for union with the Methodist Episcopal Church, South, the divided Presbyterian Churches, and the Congregational Church were discussed at the conference of 1928, without positive results.

In Canada the Methodist Church formed one of the component bodies which united in the United Church of Canada in 1925. See CANADA, THE UNITED CHURCH OF.

METHODIST EPISCOPAL CHURCH, COLORED. The Colored Methodist Episcopal Church was organized in 1870 as a separate body under the oversight and care of the Southern church. According to statistics published by the denomination, the membership increased from 275,000 in 1914 to 333,002 in 1928; the number of preachers in 1914 was about 3000, compared with 2633 ministers in 1928. The number of pupils in the Sunday schools increased from 79,876 in 1917 to 192,800 in 1928; Sunday schools fell from 4007 to 2543. Churches increased from 3000 to 3579. The denomination supported six colleges and four high schools in 1926. In coöperation with the Methodist Episcopal Church, South, it maintained, in 1928, social service houses in four cities. The church published three periodicals.

METHODIST EPISCOPAL CHURCH, SOUTH. This branch of the denomination came into existence in 1845 through a division of the original Methodist Episcopal Church by General Conference action in 1844, when it became evident that the church could not find a policy on slavery acceptable to both sections of the country. The executive body is the College of Bishops which in 1928 had 13 members who hold office for life. It is the second largest branch of the church. The number of communicants increased from 1,996,877 in 1914 to 2,631,570 in 1928; the number of churches from 17,006 to 17,403; and the number of traveling preachers from 7203 to 8321. The number of Sunday-school pupils rose from 1,479,977 to 1,971,157; and members of the Epworth League from 133,380 to 263,884. The denomination maintained 248 educational institutions, chiefly in the South, including 32 universities and colleges, 23 junior colleges, 1 Bible and Missionary Training School, 21 academies, and 46 mission schools. Its Board of Missions superintended missionary work in Belgium, Brazil, Mexico, China, Czechoslovakia, Japan, Cuba, Korea, Siberia, and the Congo. Through the Centenary Movement projected in 1918, $50,000,000 was raised for missionary work, and through the Christian Education Movement, inaugurated in 1920, $20,000,000 was raised for educational work. In 1927 the contributions for all purposes amounted to $43,026,473.

METHODISTS, Wesleyan. The Mother Church of the denomination and the principal branch in Great Britain and Ireland. It was founded in 1729, the first society was formed in 1739, and the first conference held in London in 1744. The church in 1928 was composed of five main conferences: Great Britain, Ireland, Foreign Missions, France, and South Africa. The membership figures of the denomination showed an increase from 922,796 in 1915 to 1,020,128 in 1928; the number of churches grew from 17,671 to 19,291, and the number of lay preachers from 30,221 to 37,882. The Sunday schools increased from 10,794 to 11,710, but the number of pupils dropped from 1,121,682 to 1,050,183, and the number of officers and teachers from 143,182 to 135,747. A publishing house was maintained in London.

Primitive Methodist Church. Known in England at first as the Camp Meeting Methodists. Church membership increased from 206,812 in 1915 to 222,744 in 1928, but the number of churches fell from 4903 to 4539, the number of ministers from 1149 to 1090, and the number of lay preachers from 15,537 to 13,284, and the Sunday schools from 4204 with an enrollment of 447,050, to 3960 with an enrollment of 386,412.

United Methodist Church. A body formed in England in 1907. Membership in this denomination fell from 185,769 in 1915 to 146,802 in 1928, the number of churches from 3013 to 2208, the number of lay preachers from 6156 to 4724, the ministers from 848 to 545, and the Sunday schools from 2286 with 294,039 pupils and 40,744 officers and teachers, to 2062, with 237,269 scholars and 37,777 officers and teachers.

Wesleyan Reform Union. The membership of this denomination, which separated in 1850 from the Wesleyan Methodists was 8526 in 1915, and remained fairly stationary for several years, but by 1928 had increased to 10,875; the number of churches also increased from 206 in 1915, to 222 in 1928. The ministers numbered 25 in 1914, and 26 in 1928, and the lay preachers, 500 and 471, respectively, and the Sunday schools, 195 in the earlier year, and 224 in the later.

Independent Methodist Churches. Membership of this group which dated in Great Britain from 1796 increased from 9215 in 1915 to 10,825 in 1928, and the number of churches from 163 to 166, while the number of ministers decreased from 411 to 392.

Australasian Methodist Church. This denomination increased in membership from 149,878 in 1915 to 181,832 in 1928. During the same period, the number of churches dropped from 5147 to 4849, and the number of lay preachers from 8634 to 5689.

New Zealand Methodist Church. The strength of this denomination remained on the whole fairly even during the years between 1915 and 1928. Its membership shifted only from 24,218 to 24,624; the number of ministers decreased from 198 to 181, and the lay preachers from 928 to 749; the Sunday schools, however, increased from 411 with 29,917 scholars, to 438 with 30,570, and the number of churches rose from 459 to 910.

Japan Methodist Church. Church membership increased from 13,838 in 1915 to 29,420 in 1928, but the number of churches decreased from 245 to 162, and the ministers from 232 to 158.

METROPOLITAN OPERA HOUSE. See MUSIC, under *Opera*.

METZLER, WILLIAM HENRY (1863–). An American mathematician, born at Odessa, Ont., and educated at Toronto and Clark universities. From 1892 to 1894, he was instructor in mathematics at the Massachusetts Institute of Technology and then accepted a call to Syracuse, where in 1896 he became Francis H. Root professor of mathematics and head of the department. During 1911–17 he served as dean of the Graduate School and in 1921–23 as dean of the College of Liberal Arts. Since 1923 he has been dean of the New York State College for Teachers at Albany. Professor Metzler's original investigations, on which he published important results, included studies on symmetric functions, vanishing aggregates, and compound determinates. He served as editor of *The Mathematics Teacher* and the *Journal of Pedagogy*.

MEXICAN BEAN BEETLE. See ENTOMOLOGY, ECONOMIC.

MEXICAN IMMIGRATION. See IMMIGRATION; RACE PROBLEMS IN THE UNITED STATES.

MEXICO. A republic of North America with an area of 767,168 square miles, almost equal to the combined areas of Great Britain and Ireland, France, Germany, and Austria. Its total population, estimated at 14,889,905 in 1927, is 30 per cent less than the combined populations of New York and the New England States. In 1928 the total Indian population of Mexico was estimated at 4,179,472. Mexico City is the most important centre, with a population in 1923 of 633,367. It is the capital of the Republic and the chief centre of manufacturing, trade, and banking interests. Other important cities are Guadalajara, 143,376, a railway, manufacturing, and agricultural centre of the west coast; Puebla, 95,535; Tampico, 44,822, the most important oil centre and second port of the country; Monterey, 88,458; San Luis Potosi, 57,353; Vera Cruz, the chief port, 54,225; Merida, capital of Yucatan, 79,225; and Chihuahua, 37,078.

Industries. Mexico is known principally for its enormous mineral resources, but a very noticeable movement from the rural to the urban centres is apparent, and Mexico is becoming more and more a manufacturing nation. Before the outbreak of the revolutions, which began in 1910, Mexico was the leading industrial nation in the Western Hemisphere, south of the United States.

Petroleum.—Prior to 1910, mineral oil was a very small factor in the economic life of Mexico. In that year, the total oil production was 3,634,080 barrels. By 1914 it had jumped to 26,235,403 barrels, an increase of over 700 per cent. Despite political disturbances, which damaged all other industrial enterprises, petroleum production increased steadily from 1914 to 1921, when the peak of production was reached with an output of 193,397,587 barrels, valued at $182,936,817. Because of exhaustion of old wells and the uncertainty of property ownership, production in the next two years was less. The 1922 production was 182,278,457 barrels ($167,397,872); 1923, 149,529,088 ($142,916,885); 1927, 64,121,000 barrels, and 1928, 50,150,610 barrels. The fact that the 1927 production was 29 per cent less than the 1926 production and that the output dropped 22 per cent in 1928 strengthens the belief that Mexico is pretty nearly through as an oil producer. She has already lost her position as ranking second to the United States in world production. The great decline in production is due to the encroachment of salt water and to the decreased drilling resulting from the refusal of the Government to grant permits to oil companies that had not complied with the law. See below under *History.*

Mining. The mineral resources of Mexico are enormous. Except for a short time during the most disturbed period of the revolution, Mexico was the leading silver producing country in the world. The Spaniards worked the silver mines in the early part of the sixteenth century, and the natives before them. The principal minerals are silver, gold, copper, lead, iron, and zinc, although there are also deposits of coal, platinum, mercury, manganese, antimony, sulphur, bismuth, and graphite. The five most important minerals produced in Mexico are silver, gold, copper, lead, and zinc. In 1914 production in general was at an extremely low ebb. After that year there was a very noticeable revival of production, but the 1928 output was valued at 699,308 pesos less than that for 1927. Legal restrictions and labor disputes were given as the principal reasons for slackening production.

MINERAL AND METAL PRODUCTION

Product		1913	1923	1928
Gold	1000 troy ounces	830	777	702
Silver	"	55,488	90,813	108,440
Copper [a]	metric tons	52,800	53,372	65,103
Lead [a]	"	62,000	167,144	234,725
Zinc [a]	"	6,800	18,481	162,023
Antimony [a]	"	2,340	490	3,342
Arsenic (white)	"	.....	1,402	......
Graphite (amorphous)	"	4,435	5,489	4,972
Mercury [a]	"	166	45	84
Petroleum, crude	1000 barrels	25,696	149,585	50,150

[a] Metallic content of ore extracted

Agriculture. About 6 per cent of Mexico's total area is available for agricultural purposes. Cultivated lands total 30,027,500 acres; pastoral lands, 120,444,200 acres; and forest lands, 43,933,200 acres. Public and confiscated lands totaling 10,680,000 acres had been distributed to 500,000 families under the agrarian laws up to Dec. 31, 1927. Of the area under cultivation in 1927, about 8,020,000 acres were devoted to corn, 1,227,000 acres to wheat, and 306,000 acres to cotton.

PRODUCTION OF PRINCIPAL CROPS

(Thousands of units, bushels except as indicated)

Crop	1910	1925	1926	1927
Wheat	9,266	9,550	10,333	11,519
Barley	5,198	3,802	4,302	4,574
Corn	81,069	75,102	86,578	81,165
Rice	3,593	3,190	3,523	3,410
Beans	6,469	5,739	7,851	7,153
Coffee	56,853 [a]	60,163 [a]	63,676 [a]	60,295 [a]
Cotton	89,302 [a]	96,673 [a]	171,995 [a]	74,567 [a]
Sugar	356,268 [a]	429,236 [a]	405,646 [a]	425,436 [a]
Henequen	113 [b]	102 [b]	......	133 [b]
Chick-peas	38 [b]	61 [b]	82 [b]	80 [b]

[a] Unit, pound

[b] Unit, metric ton

Cotton production in 1928 was 60,376 metric tons (132,826,320 pounds), the wheat yield was 300,211 metric tons (660,463,656 pounds), and the tomato production, 88,831 metric tons (195,427,388 pounds). In 1926 there were 5,584,892 cattle, 1,035,782 horses, 686,213 mules, 850,041 donkeys, 2,697,688 sheep, 5,423,959 goats and 2,902,949 pigs.

Manufacturing. Manufacturing in Mexico is limited but growing. The textile industry was, in 1929, the most important. In 1926 the 145 cotton textile manufactories had 30,500 looms, 780,000 spindles, consumed 41,500 metric tons of cotton and employed 43,199 workers. In 1929 there were 173 factories, employing 49,628 workers, and producing 39,554,000 kilograms of material annually. Other important manufacturing industries are boots and shoes, with an average annual production of 8,000,000 pairs from 771 plants; lumber works; flour mills, of which there were 197 producing 41,208,000 pesos' worth annually; hat factories, producing annually 11,000,000 pieces; many chemical industrial establishments. Five cement factories have a total annual capacity of 310,000 metric tons. Various difficulties kept native production down, and large amounts had to be imported annually. Sugar production was estimated at 180,000 metric tons during the 1927–28 season, as compared with 184,000 tons in 1926–27.

Commerce. The last year for which official figures were available was 1927. Imports then were valued at 346,588,000 pesos, and exports, including petroleum, at 624,364,000 pesos. (Two pesos equal one dollar.) In 1913, imports were valued at 192,292,462 pesos and exports at 300,405,552 pesos. It is significant that, despite disturbed political conditions, Mexico's trade was maintained throughout the long period of revolutions. The year 1915 marked the lowest level; imports were 52,821,306 pesos and exports 251,202,988 pesos. The highest trade totals were registered in 1921, when imports were 508,074,097 pesos and exports 728,227,156. Principal Mexican imports are textiles, foodstuffs, iron and steel products, and various manufactures. The leading sources of imports are the United States, Great Britain, France, and Germany. Principal exports are crude petroleum, raw minerals, henequen (sisal), coffee, vanilla, and cotton. The chief countries of destination are the United States, France, Great Britain, and Germany. In 1913, Mexican imports were divided as follows: the United States, 50 per cent; Germany, 13 per cent; Great Britain, 14 per cent; France, 9 per cent; all others, 14 per cent. In 1926 these percentages were: the United States, 70.5 per cent; Germany, 7.4 per cent; Great Britain, 7.4 per cent; France, 4.6 per cent. In the same year Mexico's exports were divided as follows: the United States, 71 per cent; Great Britain, 7.1 per cent; Germany, 4.5 per cent; France, 2.3 per cent.

Communications. Beginning with the creation of the National Railways of Mexico in 1907, by which means the Mexican government acquired 55 per cent of the stock of many of the most important lines, government control was gradually extended until in 1924 practically all important lines in Mexico were merged into one system, controlled and operated by the Government. On Jan. 1, 1926, the railways were returned to private management under Government supervision. In 1927 Mexico had a total of 19,086 miles of railway lines. Direct rail service between the west coast and Mexico City and from Guadalajara to the Arizona border was provided with the completion of the Southern Pacific lines between Tepic, Nayarit, and La Quemada in 1927. Statistics for the National Railways are given in the accompanying table. There are in Mexico 84,292 miles of telegraph wires and 130,265 miles of telephone wires. In 1926, 57,563 telephones were in service.

STATISTICS OF THE NATIONAL RAILWAYS OF MEXICO

		1913	1923	1926
Length of line	miles	6,089	8,440	8,473
Locomotives	number	729	1,172	1,982
Passenger cars	"	553	573	528
Freight cars	"	19,774	14,431	13,477
Freight carried	1000 met. tons	5,931	6,504	9,232
Freight ton-miles	millions	1,247	1,393	......
Gross receipts	1000 Mexican dollars	57,370 [a]	105,581 [a]	116,963
Passenger service	1000 Mexican dollars	12,941	31,892	39,315
Freight service	"	40,369	55,648	77,648
Gross receipts, equivalent	$1,000	28,043 [a]	51,281 [a]	57,183

[a] Including miscellaneous receipts not shown separately.

Finance. Government revenues for 1927 were 306,872,517 pesos and for 1928, 300,506,615 pesos, as compared to estimated revenues for the two years of 334,342,229 pesos and 290,000,000 pesos. Expenditures in 1927 were estimated at 326,000,000 pesos and in 1928 at 296,000,000 pesos. The estimates for 1929 were: revenue, 288,428,600 pesos; expenditure, 288,013,392 pesos. Receipts from import duties mounted from 64,983,871 pesos in 1927 to 73,822,291 in 1928 and the income tax returns rose from 17,460,825 pesos in 1927 to 19,273,036 in 1928. The 1928 tax on petroleum production brought only 6,780,307 pesos, as compared to 13,053,403 in 1927.

During January, 1927, the Mexican government twice borrowed from the International Committee of Bankers of Mexico to complete payments on its foreign debt service and the year closed with the Government in arrears on the scheduled payments. The Secretary of the Treasury also announced the impossibility of meeting interest on the public debt in 1928. According to the International Committee, the funded debt, in default since 1914 except for 75,000,000 pesos paid between 1923 and 1927, was 1,091,429 pesos on Jan. 1, 1928. Of this, the Republic owed 872,913,327 and the National Railways, guaranteed by the Government, owed 263,435,903 pesos. The floating debt was 161,500,500 pesos, in addition to which there were outstanding Agrarian bonds of 220,000,000 pesos and damage claims by foreigners of 270,000,000, making a total of nearly 2,000,000,000 pesos.

Education. The school system in Mexico is largely under government control. From 1896, earnest attempts were repeatedly made to better the general standard; lack of funds and disturbed political conditions interfered seriously with projected improvements after 1910. The Constitution of 1917 made school attendance compulsory for all children under 15 years of age. This same document forbade the establishment or direction of primary schools by religious bodies of any denomination, but there remained a comparatively large number of such schools established throughout the country. In recent years, states passed individual laws aimed at religious schools, but these were not rigidly enforced. See below under *History*.

In 1928, the Secretary of Education published the following statistics, somewhat incomplete, on the status of the schools throughout the Republic on October, 1927: Total number of schools was 15,479, divided as follows: Kindergartens, 378; rural schools, 10,136; other elementary schools, 4467; secondary and preparatory schools, 67; normal schools, 65; professional schools, 57; schools of fine arts, 23; and technical, industrial, commercial, and vocational schools, 278. Schools supported by the Federal government were attended by 252,988 boys and 161,276 girls, while in those supported by the states and municipalities, there were 402,616 boys and 348,525 girls. Pupils in private schools numbered 17,298. The total for the nation was therefore 1,183,333. On July 1, 1928, the university enrollment was 9379. See IMMIGRATION.

HISTORY

From the accession of Gen. Victoriano Huerta as provisional president on Feb. 18, 1913, until the defeat and flight of Adolfo de la Huerta in 1924, Mexico passed through a series of revolutionary disturbances in which foreign economic interests, especially those of the United States, were so significantly involved as almost to overshadow the domestic issues. From the outset, the Huerta government was in ill favor with the Washington administration, partly because Huerta was considered to have been responsible for the killing of the deposed President Madero, on Feb. 23, 1913; partly because President Wilson believed Huerta's rule to be an obnoxious "military despotism"; and partly, as the letters of

Walter Hines Page disclose, because a strong suspicion prevailed at Washington that Huerta was merely the tool of Lord Cowdray, the British oil magnate. By refusing to recognize Huerta, President Wilson had made it almost impossible for the provisional government to borrow money. By lifting the embargo on arms, on Feb. 3, 1914, the American government gave valuable assistance to the rebels, for they controlled the north and alone could purchase munitions in the United States.

It is doubtful whether the ensuing struggle between Huerta's Federalist forces and Carranza's Constitutionalists was plainly between despotism and democracy. The conflict was really due to a complexity of interacting causes, in which could be discerned the ambitions of military leaders, the meddling of foreign interests whose great property rights made Mexico a peculiar concern, etc. President Wilson's "watchful waiting" policy materially influenced the outcome. Huerta was soon beset by enemies on the north, the west, and the south. The *coup de grace* was struck when American suspicious aloofness turned into direct interference. The arrest of American marines bound on a peaceful errand at Tampico on April 9 was immediately apologized for, but Admiral Mayo's insistence that a salute be rendered to the flag, in which he was reluctantly supported by Wilson, and Huerta's refusal unless the Mexican flag be similarly saluted, led to the break.

On April 21, American marines landed at Vera Cruz and seized the customhouse, 18 being killed and 70 wounded in the ensuing fighting. The storm of resentment was universal in Mexico. Carranza might have joined Huerta in defying the United States had it not been for the cooler counsels of Villa. Mediation by Argentina, Brazil, and Chile failed to find a solution, and in July Carranza's generals met and decided to continue fighting Huerta. This turn of affairs hastened Huerta's fall; he resigned on July 15. His successor, Francisco Carbajal, remained in office less than a month. On August 13, a protocol was signed arranging for the peaceful capitulation of Mexico City. On August 15, General Obregon rode into the capital at the head of 15,000 men and on August 20, Carranza made his triumphal entry.

Carranza's accession failed to inaugurate the peaceful reign of democracy. The bandit Zapata continued his lawless activities and different generals headed separate revolts. Villa, who declared war on September 23, was the most formidable. When the fighting showed no decisive results, Carranza called a convention of military delegates, who at Aguascalientes on October 30 decreed the retirement of both Carranza and Villa and elected Gen. E. Gutierrez provisional President. Carranza refused to heed the decree, established himself at Puebla, abandoned the capital to Zapata and Villa, and occupied Vera Cruz, which the Americans had evacuated.

For the next two years, the history of the country is the story of the varying fortunes of Villa and Carranza, of Constitutionalists and "Conventionists." A third party, for a brief time, was injected into the squabble when Gutierrez, who had been unseated on Jan. 17, 1915, gathered a force and established headquarters at Pachuca. Although, in February, Villa defeated both Gutierrez and Carranza at San Luis Potosi in separate battles, his star soon began to decline. In three disastrous attempts to capture Celaya from General Obregon, he lost more than 20,000, killed and wounded. In May, he had to give up Monterey and suffer defeat at Paredon and Trinidad Station.

In all these forays, Mexico City was always the focal point, being taken and retaken by the opposing forces, to the serious injury of the population, native and foreign. The plight of the city and foreign protests over destruction of life and property caused President Wilson to issue a declaration of policy in which he held out a promise of aid to any party capable of winning a decisive victory. On invitation of the United States, the representatives at Washington of Argentina, Brazil, Chile, Bolivia, Guatemala, and Uruguay assembled in a conference for the consideration of Mexican affairs, and on August 11 called on the warring factions to get together to discuss their differences. Villa consented, but Carranza refused. The conferees met again in New York on September 18 and decided that recognition would be accorded that group which could give evidence of power to protect life and property. Three weeks later, they accorded *de facto* recognition of Carranza, Colombia and Nicaragua joining a little later. Immediately after, 200 of Zapata's officers laid down their arms, and Gutierrez likewise surrendered. Villa alone remained. His next move was startling and could be interpreted only as the result of a desire to force American intervention. On Jan. 11, 1916, a band of Villaists stopped a train near Santa Ysabel, removed a party of 19 engineers on their way to open a group of mines, and in cold blood killed all but one.

Indignation in the United States reached fever heat. Resolutions were immediately introduced in Congress demanding intervention; the President's "watchful waiting" policy was strongly attacked. Only calmer counsels prevented the passage of the resolutions and the forcing of the President's hand. Information divulged by Secretary Lansing indicated how precarious was the position of Americans in Mexico and on the border. Figures showed that 76 Americans had been killed in the three years preceding Jan. 1, 1916. Of these, 24 had been killed from causes arising directly out of revolution; 44 by bandits, Indians, and civilians; and 8 in a railroad accident which was a result of the disorders. Between 1913 and 1915, 20 American civilians, 16 American soldiers, and 62 Mexicans were killed on the American side of the border.

Two months later the events occurred which led the United States to intervene directly. On March 9, the border town of Columbus, N. M., was suddenly raided at night by some 1500 Villistas, and 11 civilians and 9 troopers were killed. With the almost unanimous consent of Congress, the President dispatched a punitive expedition under General Pershing across the border in hot pursuit of Villa. Carranza's conduct throughout the preceding discussions had been extremely ungracious. Conditions laid down by him, though onerous, were accepted; the pursuing forces were not to cross the line within six miles of any town on the border or to occupy any city or town; railroads could be used only in case trains were not guarded. From Casas Grandes, three divisions of troops radiated in different directions. Near Guerrero, a clash took place which resulted in the rout of Villa and his men. The most important conflict, during the chase, ironically enough, took place between Americans and official Mexican troops. On April 12, a detachment of cavalry, about to encamp outside the city of Parral, was suddenly attacked in the rear and both flanks and compelled to retire to a nearby village for shelter. Only the arrival of reënforcements at nightfall prevented the occurrence of what might well have been a tragedy.

Villa, however, was not heard from, though the American occupation continued. In May, Generals Scott and Funston met with Generals Obregon and Trevino, but without result. On May 22, Carranza, in a long note in which he questioned the sincerity of American purposes, demanded the immediate withdrawal of the American troops. The American reply was the sending of all available regulars to the border and the calling out of the militia of Texas, Arizona, and New Mexico. On June 18, the entire organized militia and national guard of all the other States were called into the service. By July 31, 112,000 militia troops were transported to the border. Border raids continued from time to time, and small detachments occasionally crossed the boundary line in pursuit. On June 20, Secretary Lansing replied to Carranza and bluntly refused the withdrawal of the American troops. On the same day, American troops were attacked at Carrizal by Mexicans and after a hot fight were compelled to retreat. The Americans killed and wounded numbered 16; the captured, 24. A few days later, the prisoners were released. During the following month, the American troops gradually withdrew northward. On July 4, in a note to the State Department, Carranza suggested mediation on the part of Latin-American countries as a way out of the difficulties. From Sept. 15, 1916, to Jan. 15, 1917, a commission assembled in the United States; but it was made up of only American and Mexican delegates. While the commissioners sat, civil war again broke out. In October and November, 1916, Villaists were active in the neighborhood of Chihuahua. During the prolonged sittings of the commission, it became evident that the only real question under discussion was the right of the United States to send punitive expeditions into Mexico. On November 24, a protocol was signed by all the delegates which called for American withdrawal in 40 days, though the United States reserved the right to pursue bandits who had invaded American territory. It was not clear in 1917 just what had been accomplished. Mexico refused to accept the protocol; the problem of guarding the American border was left unsolved; and those larger questions of international relations which had been the peculiar concern of President Wilson were not touched on. On Feb. 5, 1917, the withdrawal of troops from Mexico was complete, and the militia on the frontier was rapidly being reduced about the same time that Henry P. Fletcher, American Ambassador, left for Mexico.

On Oct. 22, 1916, delegates had been elected to the Constitutional Assembly. This body, representing only adherents of a *de facto* government, met at Queretaro on December 1, and by Jan. 31, 1917, it had completed a new fundamental law. The document contained many advanced provisions; the presidency could be held for only a single term; suffrage was to be universal without distinction of sex; a radical labor code provided for an eight-hour day, the minimum wage, compulsory profit sharing, and a free employment bureau; the religious orders were expropriated, their churches, schools, and hospitals confiscated, and the schools secularized. The most famous provision, Article 27, restored communal lands to Indian villages; authorized each state or territory to fix the maximum area which any person might own and to subdivide excess holdings; deprived religious organizations of the right to own land; and, probably most important of all, declared ownership of all minerals and petroleum resources to be vested "in the nation." Only Mexicans by birth or naturalization were to have the right to acquire ownership of lands or to obtain mineral and oil concessions; foreigners could receive such rights only by agreeing to renounce their rights of appeal to their home governments.

On Mar. 11, 1917, Carranza was elected President. Most of the events of the next three years hinged on Article 27. It had been incorporated in the constitution against Carranza's wishes and as a result of the agitation of the more radical followers of Obregon. Immediately on its promulgation, state after state formed agrarian commissions which proceeded to confiscate and redistribute the land in the interest of the Indian peons. Carranza, in order to check these local commissions, found it necessary to appoint a National Agrarian Commission for the administration of the matter on a more scientific basis. It thus became evident that something like an agrarian revolution had been started. International complications soon arose to thwart this attempt at putting the Mexican house in order. The nationalization of the subsoil struck at the foreign ownership of the very rich oil fields in Mexico.

On Feb. 19, 1918, the Mexican government proceeded to inaugurate this policy by imposing area taxes and ground taxes on foreign concessions. Other decrees of a similar purport followed during the year. Protest, of course, was inevitable, and, as events proved, unavailing. On April 2, Mr. Fletcher, on behalf of the American government, filed a note declaring that "the seizure of property at the will of the sovereign without legal process equitably administered and without provision for just compensation has always been regarded as a denial of justice and a cause for diplomatic representation." The refusal of foreign operators to conform with the governmental decree was followed by a refusal to issue drill permits. The lower Mexican courts upheld the Government; not until much later was the air cleared. Appeal taken to the Supreme Court finally brought in 1922 the decision that while under Article 27 the right of ownership by the state to all subsoil resources could not be questioned, nevertheless all individuals and companies who had purchased properties for the express purpose of exploiting their mineral and oil deposits were to be protected in their private rights. The retroactive character of the article was therefore disclaimed. On this basis, drilling permits were once more issued in 1922, and partial operations were inaugurated after a four-year cessation of activities.

The ensuing years of Carranza's administration could hardly be characterized as fulfilling the high democratic hopes entertained for the Constitutionalist movement. Peace, of course, Mexico never enjoyed. Banditry continued to operate in defiance of the Mexican soldiery, though possibly with their connivance, too. In reprisal for Mexican outrages, American border troops often found it necessary to cross the frontier in pursuit of raiders. During 1919 alone, more than 300 serious outbreaks were reported to the Senate Committee on Foreign Relations. A particularly flagrant act was the capture and holding for ransom of William Jenkins, a United States consular agent, on October 19. Despite the strong protests of the State Department, the Mexican government refused to release Jenkins on the ground that he was implicated in his own abduction. On December 4, however, he was suddenly set free. While commerce increased under Carranza and taxes were being collected more widely than before, anarchy in government was conspicuous. Official corruption flourished; dissension among the leaders added to the prevailing unrest; the constitution, with its radical pretensions, was flagrantly disregarded. How unstable affairs were, the events of 1920 indicated. As the presidential election campaign progressed through 1919 and 1920, it became evident that Obregon, with the support of the army, the radicals, and the foreign interests, was going to win over Carranza's nominee. Carranza's action was typical. Obregon was summoned to Mexico City under arrest. Meanwhile the state of Sonora had broken out into open revolt because of Carranza's attempt to control it. By the end of April, the West and North were under arms. In the interim, Obregon had made his way safely from Mexico City to the insurgents' camp and was in the field. On April 23, the revolutionists proclaimed a new provisional government with Adolfo de la Huerta as President. On May 7, after the city of Vera Cruz had capitulated to the insurgents, Carranza fled from the capital and made for the seacoast, ostensibly to escape the country. His flight was impeded at almost every step. On May 21, after having surrendered himself to the troops of General Herrera, he was treacherously shot and killed while asleep in a hut near the village of Tlaxcalantongo in Puebla.

On May 24, 1920, the Mexican Congress chose Adolfo de la Huerta as provisional President; in the September election, Obregon was victorious, meeting with only a nominal opposition. He was inaugurated on December 1. Obregon's administration was marked by steady progress. His sympathies with labor and the agrarian elements were indicated in legislation designed to further their prosperity through the enforcement of the labor code and the agrarian articles of the constitution. The restoration of lands formerly held by villages and tribes, which had been expropriated by individuals, steadily proceeded, and so did the partitioning of the great estates. During the first half of 1923 alone, over 600,000 acres were restored and 1,500,000 acres turned over to peasants by the Mexican Agrarian Commission. Federal lands, including water rights, were thrown open to homesteaders. No attempt was made to interfere with the Socialist régime of Governor Corrillo in Yucatan. From 1921, the rehabilitation of the railways made a continuous advance; even building was undertaken on a large scale. The army was reduced to 50,000 men, and the pay of the official bureaucracy was cut.

A consistently friendly attitude was displayed toward foreign nations and their nationals. On July 13, 1921, President Obregon invited all interested countries to send representatives to constitute a permanent Mexican Claims Commission; in November, France, Great Britain, Italy, Spain, and the Netherlands accepted. Steps were taken to clear up the tangle of the national debt. In September, 1921, Thomas W. Lamont of J. P. Morgan & Co. arrived in Mexico for the purpose of effecting arrangements for the funding of the bonds held by Americans, British, French, Dutch, and Belgians. The accrued interest on Mexican external bonds now amounted to some $200,000,000. In September, 1922, an agreement was reached with the international bankers by which the Mexican government pledged itself to set aside annually for the service of the debt the entire proceeds of the oil export tax, 10 per cent of the gross revenues of the national railways, and all the net operating revenues of these railways. Late in 1922, the first interest payment on the bonded indebtedness was deposited in New York. Nothing exhibited better the honest purposes of the administration than the attitude adopted toward Article 27.

In spite of an active interventionist propaganda carried on in the United States by oil interests, to which Senators King and Fall lent their influence, Obregon refused to be turned from his course. He declined to formulate a treaty with the United States, based on the recognition of American property rights, before his own government was recognized. In 1922 he signed a decree declaring that Article 27, in accordance with the decision of the Mexican Supreme Court, was not retroactive; but further concessions he would not make. The responsibility for nonrecognition now shifted to the United States, for Mexico had met all foreign demands relative to the external debt, the outstanding claims, and the retroactive character of the offensive constitutional article. The United States delayed until the spring of 1923, when two American commissioners were dispatched to Mexico City to treat with the Government. During the course of the ensuing negotiations, the Mexican government evinced a conciliatory disposition by enacting a new petroleum law on April 26; it confirmed the validity of concessions obtained before May 1, 1917, but required concessionaires to revalidate their claims within three years.

Likewise, Obregon endeavored to facilitate a settlement of the land problem by increasing the size of estates permitted to individual owners and by granting immunity from expropriation to large irrigation companies having colonization contracts with the Federal government. A provision for indemnification, in public bonds, of landowners who had suffered from confiscatory measures between 1913 and 1917, failed to satisfy the American commissioners, who demanded payment in money. Not until August 15 was a final agreement reached.

In regard to oil and minerals, the subsoil rights acquired and exploited by American companies before May 1, 1917, were validated, but the provisions of the constitution were to be applied after that date. The same understanding was applied to agrarian lands, so that all titles acquired after 1917 were subject to the agrarian reform laws. To this agreement were appended conventions calling for the creation of two mixed-claims commissions, one for the settlement of American claims arising from disorders of the revolutionary period, the other to deal with all other claims of nationals of either country against the other.

In accordance with this agreement, the United States formally recognized the Obregon government on Aug. 31, 1923. France quickly followed suit, but the British Foreign Office continued to withhold recognition, perhaps because of uncertainty regarding the security of British oil interests. On its part, the Mexican government carried out the agreement in regard to oil rights by a decree dated Nov. 10, 1923; subsoil rights acquired and exercised, or about to be exercised, prior to the promulgation of the constitution in 1917, were respected, but henceforth in all titles to land included in the national domain, the nation's ownership of subsoil resources was to be expressly reserved. The land agreement did not prevent energetic continuation of Obregon's programme of land reforms. On the contrary, almost 300,000 hectares were distributed between August 4 and November 20, under a decree permitting landless citizens to claim homesteads on public land.

The agreement with the United States was undoubtedly the outstanding event of the year 1923, but notable also were the adoption of a budget allotting $15,000,000 for payment on the international debt account, the assassination of the once prominent revolutionary leader, Francisco Villa, on July 20, the expulsion of the papal representative, Mgr. Filippi, and the beginning of a momentous electoral campaign. The two last-mentioned occurrences require further notice. Mgr. Filippi incurred the displeasure of the Government by participating in an open-air religious ceremony to celebrate the laying of the cornerstone of a shrine in defiance of the orders of the governor of the state (Guanajuato). The Federal government promptly supported the governor in his prohibition of Catholic ceremonies out-of-doors, and Mgr. Filippi was compelled to leave Mexico at once.

This episode evoked protests not only from the Vatican but from Roman Catholic organizations in Mexico itself and in other countries, but it was only one of numerous anti-clerical measures. The law passed by the Durango State Legislature later in the same year, limiting to 25 the number of clergy for each religious denomination in the state, which at that time had over 200 priests, was a typical manifestation of the anti-Catholic feeling prevalent among many of the local politicians. Such interferences with religious liberty alienated many of Obregon's supporters and were in some measure responsible for the organization of a counter-movement, modeled on the plan of the Italian Fascisti, to defend, among other things, the interests of the Catholic Church.

The presidential campaign, in anticipation of the elections scheduled for July 6, 1924, was begun quite early in 1923 and soon overshadowed all other interests. President Obregon himself was debarred from becoming a candidate for reelection under the terms of the constitution of 1917, but two members of his cabinet appeared as candidates for nomination by the government party, the Coöperatists. General Plutarco Calles, resigning his post as Minister of the Interior, appeared first in the field, in September, and anticipated an easy victory as President Obregon's personal choice; but a majority of the Coöperatista Party, it developed, preferred the Finance Minister, Adolfo de la Huerta, who had played a conspicuous rôle in the recent negotiations with the United States. After seemly hesitation, de la Huerta yielded to the promptings of his friends, resigned from the ministry, and in October entered the lists against Calles. President Obregon now hastened to support his protégé, Calles. Through the new Finance Minister, Alberto Pani, Obregon accused de la Huerta of gross extravagance and responsibility for Mexico's virtually bankrupt condition. Nevertheless, the Coöperatista Party, assembling in convention at Mexico City, defiantly nominated de la Huerta as its candidate, and the latter promised to stand on the Coöperatista platform of promoting coöperative enterprises, indemnification of landowners for estates divided among the peasants, and protection of municipal home rule.

The Social Reform Party, the National Independent Party, and several other organizations likewise rallied to de la Huerta's standard, in support of what might be called liberal conservatism, i.e., agrarian reform of a moderate type. General Calles, on the other hand, was nominated by the National Agrarian Party, and pledged himself not only to maintain the constitution but also to carry out the agrarian reform in a thoroughgoing fashion and to champion the interests of the workingmen. A minor candidate was General Flores, nominated by the Reformed Revolutionary Party. Meanwhile excitement had been raised to an extraordinary height by various provincial elections, important because each faction was eager to control the local governmental machinery and thus to secure victory in the coming national contest. In several of these local contests, blood was shed. Claiming that the Federal administration was interfering in the state elections and violating state sovereignty, the de la Huerta faction resorted to desperate measures. On Dec. 5, 1923, they issued the Plan de Vera Cruz, a plan for a new insurrection, and at once the military forces in the states of Vera Cruz, Chihuahua, Michoacan, Tamaulipas, and San Luis Potosí accepted the call to rebellion. Once more the country fell a prey to civil war, with all its accompaniments of banditry, confiscation, and "executions." The rebels soon gained other states, Yucatan, Oaxaca, Guerrero, Guanajuato, Jalisco, Colima. Their armies moved against the capital. In the provinces, the movement clearly revealed its conservative character; its energy was directed hardly less against "reds" and labor unions than against the Obregon government. Ostensibly, however, the aims of the rebels were declared by de la Huerta to be the respect of life and property, legislation regarding the rights of labor and capital, indemnification for expropriated landowners, respect of elections, abolition of the death penalty, woman suffrage, and educational reform.

Other reasons for the rebellion were later divulged, or alleged, by President Obregon. Officials of the Aguila Oil Company, it was charged, had aided the de la Huerta forces, although on the other hand, Doheny, American oil operator, admitted lending the Obregon government $5,000,000 to suppress the rising; there was some ground for suspecting, therefore, that this new civil war, like some of its predecessors, was at least tainted with oil. Yet another cause of the break between Obregon and his former lieutenant was disclosed by the President; during the Lamont negotiations of 1922, de la Huerta had obtained Obregon's consent to an otherwise unacceptable debt settlement by telegraphing to him the news, subsequently revealed to be untrue, that Lamont had guaranteed the basis of a new bank to aid in the financial reconstruction of Mexico. Without this bank, the debt settlement had proved unduly burdensome. In the light of this charge, it seemed almost paradoxical that the United States government should have favored Obregon against de la Huerta; yet such was the case. The United States government sold arms to Obregon, refused arms to the rebels, and threatened a naval demonstration against the latter in January, 1924.

Thanks in part to the benevolence of Washington and also to the loyalty of large elements in the Mexican population, notably of organized labor, Obregon emerged victorious. Although several notable successes were achieved by the Huertista forces under their able commander, General Estrada, in December, 1923, the tide soon turned. The Federal forces recaptured the important railway centre of Puebla on December 22 and began to press back the lines which had been closing in on the capital. Throughout January, 1924, the opposing armies were deadlocked. Early in February, Obregon's troops took the seaports of Vera Cruz and Tuxpan; soon afterward Guadalajara fell; the states of Michoacan, Guanajuato, Jalisco, and Colima were reclaimed; several of the insurgent armies were dispersed, and their commanders captured or put to flight. By the end of March, the rebels had lost all except portions of Yucatan, Campeche, Tabasco, and Chiapas, and the outcome had become sufficiently clear to warrant Charles B. Warren in presenting his credentials on March 31 as Ambassador from the United States. In April, Yucatan and Chiapas were cleared of rebels. De la Huerta himself fled from Mexico. Rounding up the remnants of the once imposing Huertista army was a slow process, but it had been virtually completed by the date set for the presidential elections, July 6.

One unfortunate aftermath of the Huerta rebellion was the failure of the Mexican government to meet the payments due on June 30 under the Lamont-de la Huerta agreement. Not only had the civil war made heavy drains on the Treasury, but, President Obregon explained, he had been unable to obtain a foreign loan; moreover, the obligations incurred by the agreement were accepted on the basis of de la Huerta's "false" statement that he had obtained the promise of a loan for irrigation works and for the establishment of a central bank of issue. Failing this loan, it had been impossible, even by the most drastic economies and sacrifices, to fulfill the bargain of 1922.

With de la Huerta eliminated, General Calles was able to enter the elections without formidable opposition. Calles himself had suspended his political campaign to serve in Obregon's army against the insurgents and resumed his candidacy only in the last week of March, 1924, after the danger had been averted. More distinctly than ever he was now stamped as the approved candidate of the Obregon government; and more than ever, in view of the Huertistas' attacks on labor radicalism, he was supported by the working classes as well as by peons hungry for land and by the middle-class liberals. He openly indorsed the radical land-reform policy of Emiliano Zapata, thus winning favor with the peasantry. He voiced a wish that wages in Mexico might be as high as in the United States, a wish that was not less effective politically because it was utopian. Yet, he took pains to dissociate himself from Bolshevism or "red" Socialism. His opponent, General Flores, stood on a platform of "progress, order, and honesty," and was generally supposed to enjoy the support of conservative business and landed interests, the moderate wing of the working class, the moderates, and Catholics of clerical tendency. The election was held on July 6 in what for Mexico may be considered an exceptionally peaceful manner. It resulted in an easy victory for Calles. During the five months' period before he assumed office, the President-elect went on a tour of Europe and the United States. In addresses made on this tour, he expressed his admiration for the United States and his good will toward Americans, especially the laboring classes. He proclaimed that his principal task as President would be to "raise the social conditions of the laboring classes to a higher plane."

During the latter part of 1924, relations between Mexico and the United States considerably improved, as evidenced by the arrangement of a postal convention between the two countries, discussion of a commercial treaty, etc.; but with Great Britain, a highly strained situation which had arisen out of the Mexican government's demands in May and June for the withdrawal of the British representative, Mr. H. A. C. Cummins, became worse. Mr. Cummins was charged with addressing insulting letters to the Mexican government relating to attacks by brigands on an Englishwoman, Mrs. Rosalie Evans, on her property in the state of Puebla. The British government finally recalled Mr. Cummins and broke off diplomatic relations, and President Obregon closed the Mexican consulates in London, Liverpool, and Glasgow. With Japan, cordial relations were signalized by the signing of a treaty of friendship and commerce on October 8, and with Russia, by the presentation of credentials by S. Petskovsky, new Russian Soviet Minister to Mexico, on November 16.

Inaugurated President on Nov. 30, 1924, General Calles indeed faced a situation filled with difficulties. Here and there, the fires of revolt were still smoldering. The agrarians, made arrogantly assertive by the division of the great estates, were guilty of frequent excesses. The Treasury was empty, salaries of government employees were months in arrears, service on the foreign debt was suspended. Although the United States had faithfully supported Obregon in the revolution, its conservative government was waiting with reserve to see what course his reputedly more radical successor would take. President Calles addressed himself to his task with a characteristic vigor and forthrightness which at once stamped his administration with a strongly positive character and raised up enemies in so many directions that for a while his position was highly precarious. His announced programme included first of all a restoration and maintenance of public order, then the rehabilitation of the country's finances, and finally the furtherance of social reforms, including especially the continued division of the land and especial attention to the education of the Indians and all the poor. Scattered bands of rebels and bandits in the outlying districts were followed up and brought under federal control.

The new policy of retrenchment in government expenditures quickly became operative. Hundreds of superfluous employees were dismissed, the expensive officer list of the army was drastically cut, the number of troops reduced, and waste in many other directions eliminated. As a result, government finances showed a rapid and progressive improvement. Civil employees were paid in full in February. By the end of March, a Treasury surplus of 18,000,000 pesos was shown and by September 1, the President was able to report a reduction in the deficit from 41,600,000 pesos to 14,300,000 pesos through the payment of back salaries and other old debts, and a net surplus of 25,500,000 pesos.

While the administration was distinctly a labor government, it took a firm stand against the more radical labor tendencies. On May 5, President

Calles vigorously denied a statement by M. Tchitcherin, Soviet Foreign Minister, that the recognition of Russia by Mexico had made the latter country a base for communist propaganda. The threat of a general strike in May in sympathy with an oil-workers' strike in Tampico brought from him the statement that he would use all the force at his command to prevent disorder. On the other hand, the Government supported several strikes, including a number against foreign-owned companies. It was one such strike which initiated a long period of conflict with the United States. In April, the state of Vera Cruz seized the plant of the American-owned light and power company of Jalapa, where the employees were on strike, and the Federal government, replying to a note of protest from Ambassador Sheffield, upheld the action. Mr. Sheffield went to Washington to confer with the President and the Secretary of State. On June 12, Mr. Kellogg announced that conditions in Mexico were unsatisfactory and that the United States would continue to support the Calles government "only so long as it protects American interests and lives and complies with its international engagements and obligations." He further mentioned reports of revolution in such a manner as to imply possible American support. The statement brought an immediate and spirited response from President Calles to the effect that American property was being protected and that Mexico "does not accord to any foreign country the right to intervene in her domestic affairs."

In May and June, the new administration faced serious domestic difficulties. Agrarian radicals were seizing land illegally and had to be sternly suppressed. Rebel plots, including one to assassinate the President, were uncovered. The Roman Catholic Church was alienated by the Government's reported support of a strong separatist movement; but the administration maintained its position stoutly against these various perils, and the midsummer crisis was safely passed. Diplomatic relations with Great Britain were resumed in September.

In the closing months of 1925 a controversy with the United States developed which, during the following year, was to become extremely acute. This was a dispute over two laws relating, respectively, to ownership of land and oil in Mexico, by foreigners, which were passed in December to bring into operation provisions of Article 27 of the 1917 constitution. The land law prohibited all ownership of land and water by aliens within 100 kilometers of an international boundary or 50 kilometers of the coast, as well as possession of stock in any company owning land in those zones. Elsewhere, aliens might hold stock in companies owning land, mining concessions, etc., provided they would regard themselves as Mexican citizens insofar as this ownership was concerned and renounce the right of protection by their own governments; but aliens might be only minority stockholders where land was used for agricultural purposes, and they were required to reduce their holdings to 49 per cent or less in such companies within ten years.

The petroleum law reaffirmed the Government's ownership of all oil in its natural deposits and required owners of petroleum properties to apply for confirmation of their titles, the understanding being that full ownership rights would be replaced by concessions to run fifty years from the time exploitation had begun. Through Ambassador Sheffield, the United States at once protested (January, 1926) that the laws were retroactive and confiscatory and conflicted with the guarantees given when the Obregon government was recognized in 1923. A long series of notes followed, the controversy finally reaching the stage where Secretary Kellogg, on October 30, stated that he wanted to point out so clearly as to leave no room for misunderstanding the extremely critical situation affecting the relations between the two countries.

The petroleum law went into effect on Jan. 1, 1927, and the land law on January 21. The latter was generally complied with, and controversy over it died out. Under the former, however, President Calles revoked the drilling permits of a number of companies which had not applied for confirmation of their titles. A temporary court injunction kept them in operation for a while, and the Government showed no great zeal in pressing its policy. A spirit of conciliation in the attitude of the American government brought a quick response from Mexico. The cause of the controversy was finally removed entirely when the Mexican Supreme Court, in November, 1927, declared certain provisions of the law unconstitutional and the Mexican Congress in December repealed them.

Early in 1926, the Government was confronted with another controversy which quickly took on major proportions. This was the conflict which arose with the Roman Catholic Church in January and February of 1926, when the Episcopate repudiated Articles 3, 5, 27, and 130 of the constitution making all church buildings the property of the state, prohibiting religious schools, and barring alien ministers of religion. The Government responded by announcing that these provisions would be immediately put into effect. Church property was declared to be nationalized and foreign priests and nuns were ordered to leave the country. All private schools were ordered to register with the Government and to cut all connections with religious organizations. A great storm of protest arose throughout the whole Roman Catholic world. In the United States, strong pressure was brought on the Government to intervene, but without avail.

On July 3, the Mexican government issued a decree setting forth in detail the manner in which the constitutional provisions were to be applied, and it was announced that all churches which did not conform would be closed after July 31. Protests poured in from Roman Catholic organizations abroad and the Pope remonstrated directly with President Calles. A lay organization of Roman Catholics in Mexico called for an economic boycott. The heads of the church, with the Pope's approval, announced that all religious services of the church throughout Mexico would be discontinued after July 31; but the Government adhered to its policy. Several thousand churches were closed and everything connected with religion was taken out of the schools. The hearty support of labor was evinced in a parade of 50,000 in Mexico City on August 1. Church officials held several conferences with the President in August, and presented a petition to Congress for a modification of the constitution, but it was rejected in the Chamber by an almost unanimous vote. Mexico thereupon entered on a long period of dissension, with affairs hovering always close to the line of organized violence. The church constantly accused the President of Bolshevist motives and the Government continually charged the churchmen with inciting rebellion. Armed clashes occurred here and there, the most serious in 1926 being the uprising of the Yaqui Indians in September, which was long-drawn-out but did not reach alarming proportions.

Toward the close of 1926, yet another controversy stirred for a while the troubled waters of Mexican political life. In Nicaragua, Mexico recognized the Liberal Sacasa as President, while the United States recognized Diaz. In January, 1927, President Coolidge in a message to Congress charged Mexico with aiding the Sacasa cause with military supplies and aiming at the control of the Nicaraguan government to the detriment of American interest. This, President Calles promptly denied. For a while, the irritation of the United States over this matter, coming as it did when the situation was particularly strained from other causes, threatened an armed conflict; but the Nicaraguan situation gradually adjusted itself and the crisis passed.

The state of suppressed warfare between church and state in Mexico continued throughout 1927. On April 19, a bloody massacre occurred at Limon, when a band of rebels stopped a passenger train, murdered nearly all the 52 soldiers of its escort, and fired the train, killing and wounding a large number of passengers. The Government laid the outrage as well as many less serious outbreaks at the door of the Catholic Episcopate, which vigorously denied any connection with plots of violence. Six church dignitaries were deported following the Limon affair, and many others later. By some it was believed that the long series of kidnapings, murders, and other crimes were inspired by powerful interests working to embroil Mexico with the United States and bring intervention. Some color was lent to this theory in March and April, when it was disclosed that a large number of military documents had apparently been stolen from United States archives, skillfully altered to include threats against Mexico, and placed in the hands of the Mexican government. This plot linked itself with the publication in certain American papers toward the close of the year of a number of alleged official Mexican documents purporting to show actions by Mexico in Nicaragua, etc., unfriendly to the United States. A Congressional investigation in the United States left practically no doubt that they were forgeries. Continued disorders in Mexico culminated finally in a short-lived but threatening revolt in October arising out of the political situation. By an amendment to the constitution adopted in December, 1926, providing that a man might be elected to more than one term as President if the terms were not successive, the way had been paved for the return of General Obregon to power. Opposing him were Generals Francisco Serrano and Arnulfo Gomez. All three represented much the same political ideas; but the two latter, regarding their chances as hopeless in view of the attitude of the Government, joined hands in precipitating revolution. It was soon suppressed and both leaders were executed, as well as a large number of their followers.

In the late months of 1927, relations with the United States underwent a surprising and gratifying transformation. Ambassador Sheffield, who favored a much more assertive policy toward Mexico than the Coolidge administration had adopted, resigned in June. He was succeeded in October by Dwight W. Morrow, who quickly endeared himself to the Mexican people and government by his fair and sympathetic attitude. A non-stop flight by Lindbergh from Washington to Mexico City also had its influence in creating a more cordial feeling for Americans. With the removal of the chief cause of the differences when the oil law was repealed, the feeling between the two countries presently came to be marked by an almost cordial good will.

Although the resistance of the Roman Catholic Church continued and arrests for fomenting disturbances were numerous, that difficulty also seemed to be approaching a settlement through compromise early in 1928. In July, however, the country was thrown into a fresh ferment by the assassination on July 17 of General Obregon, who had been elected President without opposition on July 1. The assassin was a young student named José de Toral. For the moment, it seemed that the crime would precipitate civil war. Obregon's party, the Agrarians, charged the Labor Party, led by Luis Morones, with responsibility for the murder and Morones was forced to resign from the cabinet and go into hiding. President Calles, however, acted quickly to avert a clash. He placed an Obregon leader in the position of Chief of Police of Mexico City, and three days after the murder, publicly accused the Catholics of having instigated it. The crisis was thus passed without an armed clash between the two factions. Toral's confession showed a fanatical religious motive and he insisted that he was alone in perpetrating the crime. His trial was delayed until November 2. He was condemned to death and was executed on Feb. 10, 1929. A nun, Mother Superior Maria Concepcion, was tried with him as the "intellectual author" of the crime and was sentenced to 20 years imprisonment. A remarkable demonstration on the day of Toral's funeral showed that the fires of religious revolt still burned hotly.

On September 25, the Mexican Congress selected a civilian, Emilio Portes Gil, as provisional President to serve from Dec. 1, 1928, to Feb. 5, 1930. He had been Governor of the State of Tamaulipas and when elected was Minister of the Interior. President Calles, declaring that he would never again be a candidate for public office, retired to private life at the end of his term; but he was not long to remain in retirement. On Mar. 3, 1929, the most formidable revolutionary movement since the Huerta revolution of 1924 broke out. It was headed by General Jesus Maria Aguirre, military commander of Vera Cruz, and other military and political leaders. The movement was soon shown to be merely a drive for power by ambitious military chieftains, and was not inspired or particularly supported by Catholic organizations. President Gil immediately appointed General Calles Secretary of War and he at once took charge of the campaign. At the outset, the revolt enjoyed some successes, notably the capture of the port of Vera Cruz; but its fate was practically decided when the newly inaugurated Hoover administration in the United States promptly threw its support to the Mexican government and war supplies came pouring in from the north. Vera Cruz was recaptured on March 11 and the Federal forces turned to the northwest, where in western Coahuila and southeastern Chihuahua, they continued their successes. Rebel forces concentrated at Torreon, but General Escobar, their leader, was forced to evacuate the city on March 18 on the approach of Calles' army. A decisive engagement occurred near Jiminez on April 1 and 2 and resulted in a complete rout for the revolutionists. By the first of May, the rebellion had completely collapsed, and General Calles returned in triumph to Mexico City on May 12.

On June 21, 1929, the Government announced the settlement of the long controversy with the Roman Catholic Church. The agreement was the result of a number of conferences between President Gil and the Roman Catholic prelates, headed by Archbishop Ruiz, the papal delegate, and Bishop Pascual Diaz. Ambassador Morrow also was credited with effective influence in the settlement. The agreement left the church properties in the hands of the Government, provided for religious instruction only within the churches themselves, and permitted the church to designate the priests who should register in accordance with Mexican law, thus acknowledging, it was claimed, the corporate rights of the church. The settlement was hailed with delight throughout Mexico, and services were soon resumed after the long three-year suspension.

In the summer of 1929, President Gil took action to secure the adoption of an advanced labor code. He requested the assent of state legislatures to a change in the constitution to permit the Federal Congress to pass such a code, and on July 26, Congress met in extra session at his call. The code requires every able-bodied citizen to learn a trade or profession, provides for obligatory employee insurance; establishes an eight-hour day and a six-day week; recognizes the right to strike, without violence; sets up labor courts; provides for a minimum wage, etc. The proposed laws met with vigorous opposition on the part of organized commercial and business interests.

MEXICO, CULTURE OF. See ETHNOGRAPHY.

MEYER, mī'ĕr, ADOLF (1866–). A Swiss neurologist, born near Zurich. He studied at many universities in Europe and in 1892 came to the United States, where he was on the staff of the University of Chicago and of several hospitals. From 1902 to 1910, he was director of the Pathological Institute for the New York State Hospitals and after 1910 professor of psychiatry and director of the Henry Phipps Psychiatric Clinic at Johns Hopkins Hospital. He is a member of many medical and scientific societies and wrote much on neurology, pathology, and psychiatry.

MEYER, EDUARD (1855–). A German historian (see VOL. XV). He was a professor in the University of Berlin from 1902 to 1927. Among his later works are *Die Aufgaben der Höheren Schule und die Gestaltung des Geschichtsunterrichts* (1918); *Cäsars Monarchie und das Prinzipät des Pompeius* (1919); *Preussen und Athen* (1919); *Ursprung und Anfang des Christentums* (1920–22); *Die Entwicklung des Judentums und Jesus von Nazareth* (1921).

MEYER, HERMAN HENRY BERNARD (1864–). An American bibliographer, born in New York City. He studied at Columbia University and at Pratt Institute Library School and was for several years engaged in the profession of engineering. After 1905 he was on the staff of the Library of Congress (as chief bibliographer, 1908–23, and as director of legislative reference service since 1921). He has collected a private library of over 10,000 volumes on fine printing in America, first editions, etc. He compiled many bibliographies, including *Inland Waterways of Europe* (1910); *Employer's Liability and Workman's Compensation* (1911); *Capital Punishment* (1912); *Europe and International Policies* (1914); *Divorce* (1915); *Monroe Doctrine* (1919); *Scientific Management* (1920); *Treaty-Making Power* (1920); and *Income Tax* (1921); and published *A Brief Guide to the Literature of Shakespeare* (1915).

MEYERHOF, OTTO (1884–). A German physiologist, born in Hanover. He was educated at the Wilhelm Gymnasium, Berlin, and received the degree of M.D. from Heidelberg University in 1909. He taught physiology in various positions in the University of Kiel, until 1924, and in 1923 was awarded the Nobel Prize in medicine jointly with A. V. Hill (q.v.) for his work in the physiology of muscle. He became director of the Kaiser Wilhelm Institute of Physiology of the University of Heidelberg in 1929. He is credited with no major work, but since 1909 he has made many contributions on physiological subjects to periodical literature.

MIAMI CONSERVANCY FLOOD PROTECTION. See FLOODS AND FLOOD PROTECTION.

MIAMI UNIVERSITY. A coeducational institution at Oxford, Ohio, founded in 1809. The student enrollment increased from 651 in 1914–15 to 1783 in 1927–28 (exclusive of summer session); and the enrollment in the summer session of 1928 was 717; the faculty membership in the autumn of 1928 was 130, as compared with 51 in 1914–15; and the number of volumes in the library had increased from 47,000 to 96,000. The value of 250 acres of campus, 25 buildings and equipment, was $3,304,000, and the income from the State of Ohio for maintenance, from gifts, fees, and income on investments for 1927–28 was $709,115. Oxford College for women, an institution founded in 1830, was merged with Miami in 1928; a school of business administration was opened in the autumn of 1928; Ogden Hall, for men, was completed at a cost of $350,000 in 1925 and in the same year, East Wing, of McGuffey Hall, Industrial Education Building, and an observatory with full equipment, were erected; a girls field house was erected in 1926; Oxford Retreat was converted into a men's dormitory in 1927; and Irviu Hall, a recitation building, and steel stands on the athletic fields, were added to the plant in 1928. Alfred Horatio Upham, A.M., Ph.D., a Miami alumnus and since 1921 president of the University of Idaho, was inaugurated as president of the university in October, 1928.

MIASKOWSKY, NIKOLAI JAKOVLEVITCH (1881–). A Russian composer, born in Novogeorgievsk. He began his musical education under Glière and Kryzhanovsky, and then attended the St. Petersburg Conservatory (1906–11), where his teachers were Liadov and Rimsky-Korsakov. In 1914–20 he served in the Russian Army. In 1921 he settled in Moscow as professor of composition at the Conservatory there. In Russia, he is regarded as the most important living composer next to Glazunov. He wrote eight symphonies (C m., C♯ m., A m., E m., D, E♭, B m., A); two symphonic poems, *Nevermore* (after Poe) and *Alastor* (after Shelley); *Sinfonietta*, in A; an overture; two string quartets; four piano sonatas, and a 'cello sonata.

MICHAEL I, (1921–). King of Rumania, ruling during his minority through a Council of Regency composed of his uncle, Prince Nicholas; George Buzdugan, former president of the High Court of Cassation; and M. Cristea, Patriarch of Rumania. He was born at the chateau of Pelischor, Sinaïa, the son of Prince Carol and Princess Helen, and succeeded to the throne upon the death of his grandfather, King Ferdinand I, July 20, 1927. Prince Carol had previously renounced his right to the throne.

MICHAËLIS, mĭ-kä-ā'lis, SOPHUS (1865–). A Danish author (see VOL. XV). His later publications include: *Hellener og Barbaren*, a novel of the Persian wars (1914); *Digte*, poems (1919); *Dommeren* and *Himmelskibet*, two novels (1921); *Manden fra Elba*, a play (1921); *Romersk foraar og andre digte*, poems (1921); *Solblomster*, poems (1926); *Abailard og Héloïse*, a play (1926); and *Portugisiske og brasilianske Sonetter* with Ferreira d'Almeida (1927). From 1925 to 1927, he was joint editor of *Danmarks Nationallitteratur*.

MICHELSON, ALBERT ABRAHAM (1852–). An American physicist (see VOL. XV). He was made a foreign associate of the French Academy in 1920, served as president of the National Academy of Sciences in 1923, and in 1925 became "distinguished service" professor at the University of Chicago. He has continued his researches on the velocity of light at the Mount Wilson Observatory of the Carnegie Institution of Washington. See PHYSICS.

MICHIGAN. The twenty-second State in size (57,980 square miles) and the seventh in population; capital, Lansing. The population increased from 2,810,173 in 1910 to 3,668,412 in 1920, a gain of 30.5 per cent; estimated population, 1928, 4,591,000. The white population rose from 2,785,274 (1910) to 3,601,627 (1920); Negro, from 17,115 to 66,082; native white, from 2,189,723 to 2,874,992; and foreign-born white, from 595,524 to 726,635. The urban population of the State increased from 1,327,044 to 2,241,560; the rural decreased from 1,483,129 to 1,426,852. The growth of the principal cities was as follows: Detroit (q.v.), 1910, 465,766; 1920, 993,678; Grand Rapids (q.v.), 112,571 to 137,634; Flint (q.v.), 38,550 to 91,599; Saginaw, 50,510 to 61,903; Lansing, 31,229 to 57,327. The phenomenal growth of Detroit was due to its extraordinary industrial development, chiefly in the manufacture of automobiles and their accessories.

Agriculture. Michigan is one of the most important agricultural States. Conditions have reflected the fluctuations of production and value during the period following the War. The general situation is discussed in the article AGRICULTURE and in separate articles on the chief agricultural products. The number of farms decreased from 206,960 in 1910 to 196,447 in 1920 and to 192,327 in 1925. The area of land in farms, after a slight increase in 1920, decreased by 5.3 per cent or to 18,035,290 in 1925. The improved land in farms totaled 12,925,521 acres in 1920. Crop land acreage (1925) was 9,671,381. The total value of farm property rose from $1,088,858,379 in 1910, to $1,763,334,778 in 1920 and declined to $1,523,976,902 in 1925. The average value per farm was $5261 in 1910, $8976 in 1920, and $7924 in 1925. The prices of farm land increased materially while stimulated by war prices for farm products. In interpreting these values, the inflation of the currency incident to the World War is to be taken into consideration. The percentage of land used for agricultural purposes in 1910 was 51.5; in 1920, 51.7; in 1925, 49.0. Of the total number of farms in 1925, 161,974 were operated by owners; 1234, by managers; and 29,119, by tenants. The corresponding figures for 1910 are 172,310; 1961; and 32,689. White farmers in 1920 numbered 195,714, compared with 206,014 in 1910; colored, 733, compared with 946. Farms reported as under mortgage, 78,758 in 1920, diminished to 70,853 in 1925. The total number of cattle in 1920 was 1,586,042; in 1925, 1,406,467. Dairy cows numbered 1,256,141 in 1920; 806,201 in 1925; sheep, 1,209,191 in 1920 and 1,066,217 in 1925; swine, 1,106,066 in 1920 and 855,368 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 51,135,000 bushels; wheat, 14,202,000; oats, 58,461,000; rye, 2,366,000; barley, 8,100,000; potatoes, 35,802,000; hay, 4,327,000 tons; and sugar beets, 428,000 short tons. Comparative figures for 1913 are corn, 56,112,000 bushels; wheat, 12,776,000; oats, 45,000,000; rye, 5,362,000; barley, 2,108,000; potatoes, 33,600,000; and hay, 2,520,000 tons.

Mining. Michigan is an important producer of two minerals, iron ore and copper, the relative production of which, in the period starting with 1914 is indicated by the following figures: For iron ore, the production in 1914 was 10,796,200 long tons; 1916, 18,071,016; 1918, 16,899,341; 1919, 15,438,930; 1920, 17,510,742; 1921, 7,283,492; 1922, 12,457,856; 1926, 16,699,984. Of copper, there was produced in 1914, 164,344,058 pounds; in 1915, 265,283,378; 1916, 273,692,525; 1917, 255,710,128; 1918, 226,794,139; 1920, 154,695,073; 1921, 86,370,028; 1922, 121,712,365; 1926, 175,381,565. The decrease in output of both iron and copper ores in the period around 1920 was due chiefly to the general business depression whose results were shown in diminished use of iron and copper. There are also produced manganiferous ore, salt, sand and gravel, and stone. In the production of salt, Michigan was first among the States in 1926. Production of cement in 1926 totaled $19,499,788. The coal production in 1928 was 617,342 tons valued at $2,631,000. The total value of the mineral products of the State in 1926 was $130,860,609, compared with $166,338,818 in 1920; $122,973,774 in 1919; $158,312,121 in 1918; and $57,743,555 in 1914.

Manufactures. Michigan is one of the most important manufacturing States. It ranks first in the automobile industry, which has acquired great importance in Detroit and other cities. In 1920 there were 28 cities of more than 10,000 inhabitants, forming 51.6 per cent of the total population of the State; and in 1919 these reported 81.8 per cent of the total value of the State's products. In 1909 there were 9159 manufacturing establishments in the State; 8305 in 1919; 5598 in 1925; and 5800 in 1927. Wage earners in manufactories numbered 471,242 in 1919; 508,573 in 1925; and 488,856 in 1927. Capital invested amounted to $583,946,965 in 1909 and $2,340,954,312 in 1919. The value of the products in 1909 amounted to $685,109,169; in 1919, $3,466,188,483; in 1925, $4,372,996,324; and in 1927, $4,244,941,132. The extraordinary increase in the value of the products about 1919 was due largely to the change in industrial conditions brought about by the War, and cannot properly be used to measure the normal growth of manufactures. Increase in the number of persons engaged in manufactories, however, clearly indicates a decided growth in the manufactures of the State. The most important industry in point of value of product is the manufacture of automobiles, the output of which in 1909 was valued at $96,651,000; in 1914, $398,289,000; and in 1919, $1,620,383,000; in 1925, $1,520,296,128 not counting bodies and parts to a total of $921,901,337. Foundry and machine-shop products were valued in 1909 at $45,399,000; in 1919, $324,354,000. The manufacture of steam, gas, and water engines, which developed chiefly after 1914, attained in 1919 a value of $101,989,440. Shipbuilding had a product valued in 1909 at $5,034,000 and in 1919 at $85,155,000. The chief manufacturing city of the State is Detroit, having 2036 manufacturing establishments in 1909, with a product valued at 252,939,000; in 1919, 2176, with $1,234,520,000; in 1925 its product was $1,599,340,000. Detroit is the chief city in the country in the manufacture of automobiles and parts. Grand Rapids, the city of great furniture-manufacturing establishments, in 1909 had 524 factories whose total production was valued at $42,231,000; in 1919, 611, with $109,135,000; in 1925, products valued at $145,706,000. Other important manufacturing cities are Flint, Lansing, and Saginaw.

Education. Educational progress in Michigan has been steady and marked. In relation to the other States of the Union, according to the reports of the Russell Sage Foundation, Michigan rose from nineteenth place in 1910 to tenth in 1918. Only nine States made a more rapid growth in the period 1890–1918. Legislation enacted in recent years includes laws providing for a minimum term of nine months, for one year of professional work above a four-year high-school course for teachers, and State supervision of private, parochial, and denominational schools; a consolidated school law under which 43 rural high schools had been organized at the end of 1923; a tuition law which furnished high-school advantages to the students of inaccessible communities; and State-aid measures for partially impoverished districts and for classes for various types of handicapped children. There has been conspicuous growth of the normal schools and teachers' colleges and a sweeping increase in enrollment, together with much new building, in the normal schools, the university, and the land-grant college. The school population of the State, the total number of minors of 5 to 17 years, inclusive, was 992,785 in 1925–26, and the enrollment in the public schools was 871,083, as against 595,725 in 1913. Expenditure in the public day schools in 1925–26 was: current, $76,554,655; outlays, $22,892,664. The percentage of illiteracy in Michigan decreased from 4.2 in 1910 to 3.9 in 1920. Among the native white population, it decreased from 1.3 to 0.8; and among the Negro, from 6.9 to 4.9. Among the foreign-born, there was an increase of from 9.6 to 10.5.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $52,610,366 (of which $16,473.879 was aid to local education); for conducting public services, $107,503; for interest on debt, $4,310,218; for permanent improvements, $20,993,112; total, $78.021,199 (of which $22,658,709 was for highways, $6,918,611 being for maintenance and $15,740,098 for construction). Revenues were $77,455,784. Of this, property and special taxes formed 49.5 per cent, departmental earnings and charges for officials' services 8.7 per cent, and sales of licenses and gasoline tax proceeds 32.7 per cent. Property valuation was $8,106,019,642; State taxation thereon, $29,334,245. Net State funded debt on June 30, 1927, was $74,909,093. There were outstanding $50,000,000 of highway bonds.

Legislation. A war loan of $5,000,000 was authorized for carrying on recruiting service and for caring for the dependents of enlisted men. The Legislature of 1919 authorized the creation of a State police force. It also created an Industrial Relations Commission and a State public utilities commission. Statutes defining and punishing criminal syndicalism and sabotage were passed. In 1921 the Legislature approved a constitutional amendment authorizing a bond issue of $30,000,000 for the soldiers' bonus. This amendment was ratified at an election in April of the same year. Bills were passed consolidating 33 departments, commissions, and bureaus into five departments, and a State administration board was created. A special session in this year was held to put into effect the soldiers' bonus. A second special session was held as a result of a deficiency in the State appropriations. The Legislature of 1923 passed a measure punishing bribery of public employees; enacted a measure making it unlawful to publish or to accept wagers on races, games, or uncertain events; passed a uniform flag law; made the sale of narcotics a felony; amended the child-labor laws, and gave to the State Prison Commission the management of industrial plans for prisoners. A special session of the Legislature was held in September, 1923, to rearrange the State senatorial districts and to reapportion the congressional districts, as constitutionally required; but a deadlock prevented enactment. In 1923 Governor Groesbeck inaugurated a system for building State concrete roads on State account with prison labor. A State tax department under three commissioners was created in 1925, provision made for commercial forest reserves with exemption from annual property taxation. A two-cent gasoline tax was imposed in 1925; it was raised to three cents in 1927; fourth offenders were rendered liable to life imprisonment, and flogging for robbery with arms was legalized.

Political and Other Events. Henry Ford, the automobile manufacturer, was for a time, after 1914, a political figure in the State and nation. Elections were held in 1914 for governor and other State officers and for a Congressman. The Democrats reëlected Woodbridge N. Ferris as governor, but the remainder of the State ticket elected was Republican. The Republicans also carried the Legislature. A "blue sky" law passed by the Legislature of 1913 was declared invalid in 1914 by the Federal Court of the eastern district of Michigan. The 1915 Legislature reënacted the law in valid form. At the presidential preference primary election in April, 1916, Henry Ford received a plurality of the Republican votes, and the State delegation voted for him on the first ballot at the national convention, but later swung to Hughes. In 1916, Albert E. Sleeper, Republican, was elected governor; Charles E. Townsend, Republican, was reëlected United States Senator. In the presidential voting, Hughes received 339,097 votes; President Wilson, 286,775. At this election, a constitutional amendment providing for State-wide prohibition was adopted. In 1917 all candidates on the Republican State ticket were elected. On Dec. 22, 1917, four Germans were convicted of attempts to destroy the Welland Canal and several bridges. As candidates for the Senate, Truman H. Newberry, Republican, and Henry Ford, Democrat, were nominated in 1918. Newberry was elected by a plurality of 7567. Shortly after the election, charges of having expended an excessive sum in the primaries were made against him. A protest was filed with the Senate Committee on Elections against Newberry's right to a seat, but it was not sustained. Albert E. Sleeper, Republican, was reëlected governor, and the Republicans elected all the members of the Legislature except two. At the State elections in April, 1919, women for the first time exercised full suffrage rights in Michigan. A State woman-suffrage constitutional amendment was ratified at the general election in November, 1918, after rejection in 1912 and again in 1913.

A proposed amendment to the liquor law, permitting the sale of light wines and beers, was defeated at this election. In October 1919, the Federal Department of Justice began grand-jury proceedings in the western Michigan Federal court district to investigate charges of excessive expenditures by Truman H. Newberry in his election to the Senate. This body, on Nov. 29, 1919, returned indictments against 135 persons on the charge of violating the Federal laws. Those indicted included Senator Newberry, his brother, John S. Newberry, and many others prominent professionally, industrially, and politically. Senator Newberry and 15 others were found guilty. An appeal was taken to the United States Supreme Court, and the convictions were reversed on the ground that the act under which they were convicted was invalid in that it applied to elections and not to primary nominations. At the State election in April, 1919, an amendment was ratified authorizing the issue of $50,000,000 for State highway improvements. At this election, the entire Republican State ticket was elected.

At the general election in 1920, by the largest majority in the history of the State, Alexander J. Groesbeck, Republican, was elected governor. The Republicans carried all 13 congressional districts and elected every member of both Houses of the Legislature. For President, Harding received 762,865 votes; Cox, 233,460. A proposed amendment to abolish parochial schools was defeated. Senator Townsend, who had defended Senator Newberry during the Senate investigation and the campaign, was defeated for reelection in 1922; Woodbridge N. Ferris, Democrat, was elected. He was the first Democrat sent to the United States Senate for Michigan in 70 years. The Republicans, however, reelected Governor Groesbeck and the rest of the State ticket, carried 12 of the 13 congressional districts, and elected all but five of the 132 members of the Legislature.

Several months before the general election of 1922, a Supreme Court decision reversing the conviction of Senator Newberry and his political associates was handed down. About the same time, a resolution to unseat him was rejected by the Senate. However, directly following the election, Newberry resigned as Senator, and Governor Groesbeck appointed James Couzens, mayor of Detroit, to succeed him. In the State election of April, 1923, the Republicans elected their entire State ticket. Henry Ford defeated Senator Ferris in the Democratic primaries of 1924 in which he had been entered without his consent, after having given notice that he would support President Coolidge. The State delegation to the national convention in New York therefore disregarded the plurality for him in the primaries and presented Senator Ferris to the convention as Michigan's choice for the presidential nomination.

The presidential vote in 1924 was: Coolidge, 874,631; Davis, 152,238; LaFollette, 122,014. Groesbeck was reëlected governor, and Couzens was returned as U. S. Senator. Moves made from time to time to unionize the automobile industry of Detroit failed of result. Fred W. Green, Republican, was elected governor in 1926. On taking office in 1927, he undertook the retrenchment of State projects of public building. In 1928 the presidential vote was: Hoover, 965,396; Smith, 396,762. Green was reëlected governor, and A. H. Vandenberg, Republican and Senator by appointment, was reëlected.

MICHIGAN, University of. An institution for the higher education of men and women at Ann Arbor, founded in 1837. The enrollment increased from 6258 in 1913–14 to 13,593 in 1927–28, of whom approximately 35 per cent were women, while 64 per cent were inhabitants of the State of Michigan, and the remaining 36 per cent, with the exception of 280 foreign students, from all parts of the United States. The University comprises colleges of engineering and architecture, schools of medicine, business administration, a nurses' training school, and a graduate school. The teaching staff increased during the period under review from 535 to 742 members, the University libraries from 350,000 to 681,025 volumes, and the income, from the State mill tax and appropriation, from $1,029,060 to $4,600,000, for current expenses, and about $4,000,000 from other sources. A large number of buildings were erected during the period, including: Two women's dormitories built in 1915, and a third completed in 1920; a natural science building in 1915; the general library and Michigan Union in 1918; a new university hospital begun in 1919, and opened in 1925. New engineering shops and laboratories, the teachers' training school building, the William L. Clements Library of American History building (the gift, with the library collection itself, of Regent Clements), and the first unit of the new physical science building were completed in 1923; an addition to the Dental College in 1922 doubled its accommodations for students; the first unit of the literary building, the first unit of the new medical building, and the first unit of a large group of new buildings for the law school were begun in 1923; the first unit of the law club and library was finished during 1924, the gift of an alumnus of the university, W. W. Cook, of New York; in 1925 the Nurses' Home, a gift of Senator James Couzens, was opened for occupation, and the medical school building in 1925–26. A building for the Thomas Henry Simpson Memorial Institute of Medical Research, the gift of Mrs. T. H. Simpson of Detroit, was in process of erection in the same year, and completed in 1926, when construction was begun on an architecture building and a stadium with a seating capacity of 70,000. In the following year, the university museum was completed and construction begun on the Michigan League Building for Women, to cost $750,000, and to have an endowment of $250,000. The outstanding addition to the plant in 1927–28 was a new building for intramural sports, which was practically completed at the end of the year.

From July 1, 1917, to June 30, 1925, the special appropriations from the State for new buildings, lands, and equipment, amounted to $9,950,000; Senator Couzens's gift was for $600,000, and an anonymous donor gave the new group of law buildings, while another anonymous donor gave $150,000 for a research expedition to the Near East. The dental course of the university was lengthened to four years in 1918. In 1921–23 the Honorary Fellowship in Creative Art was held by Robert Frost, in 1923–24 and 1924–25 by Robert Bridges, Poet Laureate of England, while Mr. Frost returned to the permanent fellowship in literature in 1925–26. The holder of the former fellowship resides at the university and conducts frequent conferences with interested students. It was held in 1925–26 by Jesse Lynch Williams, novelist and dramatist. Marion LeRoy Burton, Ph.D., LL.D., who succeeded Harry Burns Hutchins as president in 1920, died in 1925, and Clarence Cook Little, Sc.D., LL.D., became president, resigning in 1929.

MIDDLEBURY COLLEGE. A nonsectarian institution of higher learning for men and women at Middlebury, Vt., founded in 1800. The College grew steadily in size from 1914 to 1928, with an enrollment for the earlier year of 340 students, 626 in the autumn of 1928, and 517 in the summer session. The faculty increased from 31 to 59 members; the library, from 45,000 to 60,000 volumes; and productive funds from $600,000 to $3,330.598 (1927–28). Income in the latter year totaled $299,783 and gifts received, $126.219. Gifts in the preceding year amounted to $113,991, and those in 1923–24 totaled $545,440. In 1915 the Mead Memorial Chapel was given to the College by John A. Mead, and new buildings in 1924 included: The French Chateau, music practice house, and Porter Hospital. Exercises were held in November, 1928, commemorating the opening of the college in 1800, five days after the General Assembly of Vermont granted it a charter. During its lifetime through 1928, the College had graduated 2331 men and 949 women. Special summer schools of French, Spanish, and English are conducted at the college. Paul Dwight Moody, D.D., succeeded John Martin Thomas, D.D., LL.D., as president in 1921.

MIDDLETON, George (1880–). An American dramatist (see Vol. XV). He was president of the Dramatists' Guild of the Author's League of America (1927–). Among his later plays are *Collusion* (1916); *The Road Together* (1916); *Polly with a Past* (with Guy Bolton, 1917); *The Cave Girl* (1919): *Adam and Eva* (1919); *The Light of the World* (1920); *Masks* (1920); *Cercle* (produced in Paris, 1922); *The Unknown Lady* (with Nazimova, 1923); *Accused* (with E. H. Sothern, 1925); *Blood Money* (1927); and many one-act plays for little theatres.

MIDDLETON, St. John Brodrick, First Earl of. See Brodrick, William St. John F.

MIERS, Sir Henry (Alexander) (1858–). A British mineralogist. He was born at Rio de Janeiro and trained at Eton College and Trinity College, Oxford. From 1882 to 1895, he was assistant in the British Museum, at the same time giving instruction in crystallography at the Central Technical College, South Kensington. Later, he was professor of mineralogy at Oxford (1895–1908), principal of the University of London (1908–15), and vice chancellor of the University of Manchester and professor of crystallography (1915–26). From 1891 to 1900, he edited the *Mineralogical Magazine.* In 1905 he was president of the Geological Section of the British Association. He wrote *A Visit to the Yukon Gold Fields* (1901); *Report on Public Museums* (1928); and many scientific papers. He was knighted in 1912.

MIKKELSEN, mĭk′kel-sĕn, Ejnar (1880–). A Danish explorer (see Vol. XV). In 1924 he led a colonizing expedition to Scoresby Sound, and in the following year was in command of an experimental fishing cruise to West Greenland. Among his publications are *Tre Aar par Gronlands Ostkyst* (1914); *Norden for Lov og Ret.* a story (1920), translated as *Frozen Justice* (1922); *John Dale,* a novel (1921); *Notes on the Sea-ice along the East Coast of Greenland* (1922); *With Greenland to Scoresby Sound* (1925); and *Nach barn des Nordpols* (1927).

MIKLAS, Wilhelm (1872–). Second President of the Austrian Republic. Born at Krems and educated at the University of Vienna, he became a director of high schools in a number of Austrian cities. As one of the leaders of the Christian-Socialist Party, he was a member of the Austrian Parliament almost continuously from 1907 until his election as President of the Republic in December, 1928. From 1923 to 1928, he was president of Parliament and previously he served as Minister of Education and in other important offices. He was known as an opponent of union between Austria and Germany.

MILAN, mĭl′an or mĭ-lăn′. The most important industrial centre of Italy and the second largest city in point of population. The number of inhabitants was estimated to be 941,070 in 1928. Of all the Italian cities that have been carrying out a programme of renovation under the auspices of the Fascist government, Milan has probably seen the greatest change. Blocks of old buildings have been torn down to make room for new construction. Beautiful commercial buildings, hotels, and mansions line such modern thoroughfares as the Foro Bonaparte, the Via Dante, the Corso Vittorio Emanuele, and the Piazza of St. Mark, formerly the Cathedral Square. Considerable progress also has been made in improving housing conditions in the closely packed industrial quarters of the city. This renovation has been directed by the Podestà, the head of the municipal government who, among other duties, directs the planning of any extensions of the city, as well as administering the water and transit service, and has absolute and uncontrolled management of the money of the taxpayers.

In 1927 the construction of an underground railway, the first in any Italian city, and of a canal connecting Milan with Venice by way of the Ticino and Po rivers was undertaken. Milan also is building an airport and a harbor which will be adequately equipped to handle large trade. In 1918 the Palazzo Reale, or Royal Palace, was presented to the municipality by King Victor Emmanuel. Among its sumptuous apartments, the most remarkable are the rooms decorated by Hayez and the Salone delle Cariatidi with monochrome paintings by Appiani. The Castel Sforzesco has been transformed into a museum of Roman and mediæval antiquities, and Leonardo da Vinci's *Cenacolo,* or tempera painting of "The Last Supper" in the refectory of Santa Maria delle Grazie, has been successfully restored. In 1924 the University of Milan was opened. Two other educational institutions, the

Literary Academy and the Higher Technical Institute, are of university rank.

MILHAUD, mē'yō', Darius (1892–). A French composer, born at Aix-en-Provence. After graduation from the Paris Conservatoire, he settled in Paris as composer and lecturer. One of the most aggressive of the futurists and one of the notorious "Les Six," he believes that the works of Beethoven and Wagner ought not to appear on any modern programme. In 1923 he visited the United States, conducting some of his works and lecturing at several universities. He wrote the operas *La Brébis égaree* (Paris, 1923); *Les Malheurs d'Orphée* (Brussels, 1926); a trilogy, *l'Orestiade*, comprising *Agamemnon*, *Les Coëphores*, and *Les Euménides* (Paris, 1927); *Le pauvre Matelot* (Paris, 1928); and a second trilogy consisting of *l'Enlèvement d'Europa*, *La Libération de Thésée*, and *Ariadne abandonnée* (Wiesbaden, 1928); the ballets, *l'Homme et son Désire* (Paris, 1921), *Le Train bleu*, and *Salade* (both in Paris, 1924); incidental music to Lunet's *Esther de Carpentras* (Monte Carlo, 1927); three symphonies for string orchestra; two symphonic suites; *Poème* for piano and orchestra; five string quartets; and other chamber music.

MILHAUD, Gaston (1858–1918). A French philosopher (see Vol. XV). With his death in 1918, French philosophy lost a rare type of scholar, combining a vast fund of historical and scientific erudition with a creative critical mastery. He sided with the pragmatists in their attack on the stereotyped intellectualism of the schools, but was withal a rationalist who had faith in reason and in spontaneous self-imposed discipline. His *Descartes Savant* was published posthumously in 1921. It is a collection of well-documented studies revealing a side hitherto little known of the thinker often styled "the patron saint of French philosophy."

MILITARY TRAINING CAMPS. See Armies and Army Organization.

MILITIA. See Armies and Army Organization.

MILK SUPPLY. See Dairying.

MILKY WAY. See Astronomy.

MILLARD, Thomas Franklin Fairfax (1868–). An American war correspondent and newspaper publisher in China. He was born in Phelps County, Mo., and trained in the Missouri School of Mines and the University of Missouri. He became a newspaper reporter and editor at St. Louis (1895–97) and war correspondent for *Scribner's Magazine*, the *New York Herald*, the *World* (New York), the *London Daily Mail*, and other publications in the Greco-Turkish, Boer, and Spanish-American wars, the Boxer uprising in China, the Russo-Japanese War, and the World War. He founded and edited the *China Press* (1911–17) and *Millard's Review* at Shanghai (1917–). He served as unofficial adviser to the Chinese delegations at the Paris Peace Conference, at sessions of the League of Nations, at the Washington Conferences (in 1921); and on Pacific and Far Eastern Questions. In 1929, while he was Shanghai correspondent of the New York *Herald Tribune*, he was appointed foreign adviser to the Nationalist government of China. He is the author of *The New Far East* (1906); *America and the Far Eastern Question* (1909); *Our Eastern Question* (1916); *Democracy and the Eastern Question* (1919); *Conflict of Policies in Asia* (1924); *China—Where It Is Today and Why* (1928).

MILLAY, Edna St. Vincent (Mrs. Eugen Jan Boissevain (1892–). An American author, born in Rockland, Me. She received her bachelor's degree from Vassar College in 1917 and since then has lived in New York City. She is the author of *Renascence and Other Poems* (1917); *Figs from Thistles* (1920); *Second April* (1921); *Aria da Capo* (1921); *The Lamp and the Bell* (1921); *Two Slatterns and a King* (1921); *The Harp-Weaver and Other Poems* (1923); *The King's Henchman* (opera, 1927); *The Buck in the Snow* (1928). Her work is finely conceived, and she is regarded as one of the foremost poets in America today. In 1922 she won the Pulitzer Prize for the best volume of verse.

MILLE, mēl, Pierre (1864–). A French novelist and journalist (see Vol. XV), who was correspondent for the *Temps* during the World War. He developed an entertaining and artistic novel along the lines of the old-fashioned "romance." Among his later writings are *Le Monarque* (1914 tr. 1925); *Sous leur dictée* (1917); *Trois femmes; Histoires exotiques et merveilleuses; Nuit d'amour sur la montagne* (1920); *Le bol de Chine; ou Divagations sur les beaux arts*, essays (1920); *L'Ange du bizarre* (1921); *Myrrhine: Images exotiques et françaises; Monsieur et Madame Barbe-Bleue* (1922); *La détresse des Harpagon* (1923); *L'illustre Partonneau* (1924); *Le diable au Sahara* (1925); *L'écrivain*, about contemporary writers (1925), and *Christine et lui* (1926).

MILLER, Alice Duer (1874–). An American author, born in New York City. She graduated from Barnard College in 1899 and in the same year married Henry Wise Miller. Her stories cleverly portray certain aspects of social life. Her works include: *The Modern Obstacle* (1903); *Calderon's Prisoner* (1904); *Less Than Kin* (1909); *Blue Arch* (1910); *Are Women People?* (1915); *Come Out of the Kitchen* (1916); *Ladies Must Live* (1917); *Wings in the Night* (1918); *The Charm School* (1919); *Manslaughter* (1921); *Priceless Pearl* (1924); *Are Parents People?* (1925); *Reluctant Duchess* (1925); *The Springboard* (play, 1927).

MILLER, David Hunter (1875–). An American lawyer, born in New York City. He graduated from the New York Law School in 1910 and in the year following was admitted to the bar. He served as special assistant in the Department of State in Washington in 1917 and 1918 and was attached to the mission of Colonel House in Paris. During the peace negotiations, he acted as technical adviser to the American Commission and, with Sir Cecil Hurst of the British Foreign Office, drew up the final draft of the Covenant of the League of Nations. After a short service in the Department of State, he became counsel to the German government on the Upper Silesian question before the League of Nations in 1921. He served in the Spanish-American War and was the author of *Secret Treaties of the United States* (1910); *Reservation to Treaties* (1919); *International Relations to Labor* (1921); *The Geneva Protocol* (1925); and many monographs and articles on international and legal subjects. He was co-author of *What Really Happened at Paris* (1921); *The Polar Regions and Their Problems* (1927); *Drafting of the Covenant* (1928); and *Peace Pact of Paris* (1928).

MILLER, Dayton Clarence (1866–). An American physicist, born at Strongsville, Ohio, and educated at Baldwin University and Princeton. During 1888–89 he was professor of natural science at Baldwin University and in 1890 went to the Case School of Applied Science at Cleveland as instructor in mathematics and physics, becoming professor of physics there in 1893. Dr. Miller contributed important papers to scientific journals on the velocity of light in magnetic field, relative motion of earth and ether, efficiency of incandescent gas light, photographic registration of sound waves, quality of musical sounds, and similar subjects. Besides his many papers, he is the author of *Laboratory Physics* (1903); *Boehm on the Flute and Flute Playing* (1908); and *The Science of Musical Sounds* (1916). He was elected to the National Academy of Sciences and was president of the American Physical Society in 1925–26.

MILLER, John Anthony (1859–). An American astronomer, born at Greensburg, Ind. He studied at Indiana, Stanford, and Chicago universities. After teaching mathematics at Indiana and Stanford universities, he became professor of mechanics and astronomy at the former in 1895. In 1906 he was called to the chair of mathematics and astronomy at Swarthmore College, of which he became vice president (1914–), and director of the Sproul Observatory (1911–). He was chief of the solar eclipse expedition sent by the University of Indiana to Spain in 1905 and of those sent by Sproul Observatory to Brandon, Colo., in 1918, to Mexico in 1923 and to Sumatra in 1926. His studies of stellar parallax, the solar corona, and measurements of double stars resulted in valuable contributions to the progress of astronomy. Dr Miller is the author of *Trigonometry for Beginners* (1896), and *Analytic Mechanics* (1915).

MILLER, Richard E. (1875–). An American artist (see Vol. XV). He was elected to the National Academy in 1915 and in the same year won the medal of honor of the Panama-Pacific International Exposition. He had in the previous year been awarded the Potter Palmer Medal and the $1000 prize of the Art Institute of Chicago and the Thomas S. Clark Prize of the National Academy of Design.

MILLERAND, mēl'räN', Alexandre (1859–). A French President and public official (see Vol. XV). He was again Minister of War (August, 1914–November, 1915), was general commissioner of the Republic for Alsace and Lorraine (1919–20), and Premier and Minister of Foreign Affairs (January–September, 1920). In the same year, he became President of the French Republic, after stipulating that he accepted only on condition that the firm foreign policy of the bloc national, which he had organized, be continued. With the success of the radicals in the election of May, 1924, he was forced to resign (June 11). He continued as leader of the bloc national in the Senate (April, 1925–January, 1927, October, 1927–). Among his later publications were *La Guerre Libératrice* (1918) and *Le Retour de l'Alsace à la France* (1923).

MILLIKAN, Robert Andrews (1868–). An American physicist, born at Morrison, Ill. He studied at Oberlin and Columbia and in Göttingen and Berlin, and in 1910 became professor of physics at the University of Chicago. In 1921 he became director of the Norman Bridge Laboratory of Physics at the California Institute of Technology at Pasadena. His original researches had much to do with the composition of matter. He was the first to succeed in isolating an electron. Professor Millikan's brilliant successes gained for him the Comstock Prize of the National Academy of Sciences in 1913 and the Nobel Prize in physics in 1923. During the World War, he was vice chairman of the National Research Council and afterward chairman of the science and research division of the Signal Corps, with the rank of lieutenant colonel. In addition to membership in many scientific societies at home and abroad, he is a fellow of the American Academy of Arts and Sciences, a member of the American Philosophical Society, and since 1915 a member and foreign secretary of the National Academy of Sciences. He is the author of textbooks and other volumes which include: *A Course of College Experiments in Physics* (1898); *Mechanics, Molecular Physics, and Heat* (1901); *Electricity, Sound, and Light* (1908); *The Electron* (1917); *Science and Life* (1923); *Evolution in Science and Religion* (1927).

MILLIN, Sarah Gertrude (Mrs. Philip) (1889–). A British novelist, who was born in South Africa and privately educated. Most of her writings have been interpretations of South African colonial life and particularly of Negro character. Her works include *Dark River* (1920); *Jordans* (1923); *God's Stepchildren* (1924); *Mary Glenn* (1925); *South Africans* (1927); *An Artist in the Family* (1928); *The Coming of the Lord* (1928); and *The Fiddler* (1929).

MILLS, James Edward (1876–). An American chemist, born at Winnsboro, S. C., and educated at Davidson College and at the University of North Carolina. During 1900–10 he taught at the latter university and became associate professor in 1904. After some years on the faculty of the University of South Carolina, he became professor there in 1913. In 1921 he was appointed technical director of research and development work for the Chemical Warfare Service at Edgewood Arsenal and since 1924 has been chief of the chemical division there. During the World War, he was a captain in the Engineer Corps (1917) and then passed to the Chemical Warfare Service (1918). His special researches, on which he published papers, had to do with subjects in the field of physical chemistry, such as molecular attraction, heats and vaporization of liquids, and specific heats.

MILLS, Ogden Livingston (1884–). An American lawyer and public official, who was born at Newport, R. I., and graduated at Harvard. He was admitted to the bar in 1908 and began practice in New York City. Having been defeated as a candidate for Congress in 1912, he was sent to the State Senate of New York for two terms (1914–18). In the World War, he was commissioned captain and served with the A.E.F. in France. He represented the seventeenth New York District in Congress (1921–27), resigning his seat in 1927 to become Under Secretary of the Treasury.

MILLS COLLEGE. A college for women at Oakland, Calif., founded in 1885. The student enrollment increased from 127 in 1914 to 624 in 1927–28, in addition to which there was an enrollment in the 1928 summer session of 43; the faculty increased from 37 to 71, plus 26 assistants, in the autumn of 1928; and the library from 15,000 to 45,000 volumes. The total endowment funds of the college on June 30, 1928, amounted to $1,366,256, and the total income for 1927–28 to $411,037, as compared with an endowment of $452,280, and an income of $71,545 in 1914. During the period 1914–1928, an ambitious building programme resulted in the erection on the campus of the following buildings: Alumnæ Hall; Warren Olney Hall, a $120,000 residence hall; Orchard House; Meadow House; the Mary Keyser Chemical Laboratories, grouped about a central court; an art building in 1925; Ethel Moore Hall in 1926; Outdoor Fireplace on Pine Top in 1927; and a music building in 1928. During the same period, the scheme of dividing courses by departments was changed to a division by schools and departments, as, school of fine arts, school of language and literature, school of social science, school of natural sciences, school of education, and school of graduate studies. President, Aurelia Henry Reinhardt, Ph.D., LL.D., Litt.D.

MILLSPAUGH, Arthur Chester (1883–). An American financial adviser, born at Augusta, Mich., and educated at Albion College, the University of Illinois, and Johns Hopkins. After teaching political science for two years and working in the drafting office of the United States State Department for three more, he became acting foreign trade adviser in 1921–22. When Persia requested that an American financial adviser be sent to Teheran, Dr. Millspaugh was appointed, and he and his staff reached the Persian capital in November, 1922. He found the Persian treasury empty and the fiscal administration a chaos, but with the help of the Persian authorities and the military, he straightened matters out. A budget was established, taxes were collected, and brigandage greatly diminished. He spent five years in Persia and in 1927 became financial adviser and general receiver for Haiti. He wrote *The American Task in Persia* (1925).

MILLSPAUGH, Charles Frederick (1854–1923). An American botanist, born at Ithaca, N. Y., and educated at Cornell University and the New York Homœopathic Medical College. For several years, he practiced medicine and from 1891 to 1893, taught botany at West Virginia University. In 1894 he was appointed curator of the department of botany of the Field Museum of Natural History; from 1897 to 1923 he was professor of medical botany at the Chicago Homœopathic Medical College. He was also lecturer on botany at the University of Chicago. Millspaugh carried on explorations in the West Indies, Brazil, and other parts of South America, and was the author of *American Medical Plants* (1887); *Flora of West Virginia* (1891), and many articles in scientific and popular journals.

MILNE, A(lan) A(lexander) (1882–). An English journalist and playwright, educated at Westminster and Trinity College, Cambridge. He began a journalistic career in London in 1903, was assistant editor of *Punch* (1906–14), and served with the Royal Warwickshire Regiment during the World War. His plays include: *Wurzel-Flummery* (1917); *Make-Believe* (1918); *Mr. Pim Passes By* (1919); *The Romantic Age* (1920); *The Truth About Blayds* (1921); *The Dover Road* (1922); *Success* (1923); *To Have the Honor* (1924); *Ariadne* (1925); *The Ivory Door* (1927); and *The Perfect Alibi* (1928). He published many other books, the most charming being his children's stories and poems: *When We Were Very Young* (1924); *Winnie-the-Pooh* (1926); *Now We Are Six* (1927); and *The House at Pooh Corner* (1928).

MIL'NER, Alfred. First Viscount (1854–1925). An English statesman and administrator (see Vol. XV). After a long retirement from politics (since 1905), he became a member of the war cabinet, without portofolio (1916–18), and in 1917 conducted a mission to Russia and made the Dominion Prime Ministers members of the Imperial War Cabinet. In the next year, he was Secretary of State for War and then Secretary of State for the Colonies (1919–21). In 1920 he was head of the Commission to Egypt and made the report on conditions there which resulted in the withdrawal of the protectorate and the establishment of the independent rule, with reservations, of that country. He published the *British Commonwealth* (Sheldonian Theatre, Oxford Lecture, 1919) and *Questions of the Hour* (1923).

MILWAUKEE. The largest city in Wisconsin. The population rose from 373,857 in 1910 to 457,147 in 1920 and to 544,200 in 1928 by estimate of the Bureau of the Census. Between 1916 and 1928, the city's total area increased from 23 to 40 square miles. On Jan. 1, 1929, the town of North Milwaukee, with a population of approximately 7000, was consolidated with Milwaukee. The adjacent towns of South Milwaukee, Cudahy, West Milwaukee, West Allis, Wauwatosa, Shorewood, Whitefish Bay, and Fox Point also have greatly expanded. The city has possessed home-rule power since the passage of the Home-rule Amendment to the State Constitution in 1924 and of the Home-rule Enabling Act by the State Legislature in 1925. The Mayor is the chief executive officer, elected every four years. Since the abolition of the offices of 12 aldermen-at-large, the Common Council has consisted of 25 representatives from each ward, elected in the month of April preceding each presidential election. The council functions to a large extent through six standing committees: finance-printing, judiciary-legislation, public utilities-health, street-alleys-sewers, buildings-grounds-bridges, and permits-rules-engrossed ordinances.

The board of public land commissioners has been active in city planning since 1914. In 1920 a zoning ordinance regulating the height, use, and area of buildings in the various districts of the city was adopted. Land was acquired for the Civic Centre adjoining the public library-museum and the auditorium. It involved the condemnation of 11 additional city blocks, the construction of a 1-mile, 180-ft. plaza extending to Lake Michigan, and the enlargement of Juneau Park at the end of the plaza where the lake drive begins. In 1927 the city received from the State commissioners of public lands a patent to submerged land 1500 feet wide along the shore of Lake Michigan, between McKinley Park and the north boundary of the lake, for park and boulevard purposes. In 1929 the extension of the first unit of the Lincoln Memorial Drive from its terminus at McKinley Park to Lake Park was completed. The garden homes housing development which was undertaken in 1920, pursuant to State law, was said to be the first of its type in the United States. Land was purchased and by 1924, 105 houses were completed and sold to citizens on the installment plan, to be owned on a coöperative basis; however, as the company was not able to raise sufficient funds above the $200,000 subscribed by the city and county to carry out the original $550,000 plan, an amendment to the Wisconsin statutes was effected permitting the houses to be sold outright.

Municipal improvements have been developed at a rapid rate. In 1928 there were constructed 54 miles of water mains, 81 miles of sewers, 40 miles of streets, 20 miles of alleys, and 29 miles of municipal street-lighting system. Numerous new fire stations, branch police stations, and branch libraries have been opened since 1924; and two new viaducts and two bascule bridges have been constructed. The Cedar-Biddle Streets Bridge, which is the city's most modern one, provides a roadway 60 feet wide, two sidewalks 12 feet wide, and affords a navigation channel in the Milwaukee River of 120 feet. It was erected at a cost of $750,000.

In 1929 the Public Safety Building, to house the central police station, county jail, criminal court, and other departments was completed as part of the Civic Centre at a cost of approximately $1,500,000. The new $6,000,000 Milwaukee County Court House was also under construction. The designs for both these buildings were chosen after an architectural competition. Cedar and Biddle streets have been widened to 130 feet, forming a through downtown artery that will eventually connect the Civic Centre with the lake front. Other streets in the business district have been widened to provide two additional traffic lanes by setting back the curbs. The city's park area was increased from 1021 acres in 1924 to 1230 acres in 1929. Among the outstanding gifts was a 60-acre park at Fox Point, donated by Dr. Joseph Schneider. Other properties were acquired as additions to Lincoln, Washington, Garfield, and Pulaski parks. By 1929, 44 playgrounds had been acquired.

The greater-harbor project, involving the construction of an outer harbor in Milwaukee Bay, the development of an extensive system of docks and warehouses, and the unification of railway terminals, have been carried forward by the harbor commission. Land on Jones Island was reclaimed for the outer harbor by dredging the waterway and filling behind new bulkheads. A new south breakwater, approximately 9900 feet long, was constructed by the Federal government. In 1929 the slip and open dock for the municipal car-ferry terminal was completed. In 1921 the city completed a municipal street-lighting system of gas-filled incandescent tungsten lamps, and a new intake and $1,000,000 pumping station were constructed. A $13,000,000 modern sewage-disposal plant on Jones Island, operated on the activated-sludge system of disposal and capable of handling 85,000,000 gallons of sewage a day, was completed in 1927. In 1928 the plant produced 100 tons of milorganite fertilizer a day, selling at $600,000 annually; the gross operating cost for that year was $950,000. In 1927 the city also completed a storm-relief sewer, 6.82 miles long, at a total cost of $2,002,417. An emergency landing field for aircraft was established by the harbor commission on the north harbor tract at the entrance to the inner harbor. It was named "Maitland Airport" in honor of Lieut. L. J. Maitland, a native of Milwaukee, who made the flight from Oakland, Calif., to Hawaii in June, 1927.

In 1927, 80,163 children attended Milwaukee's 97 schools, of which there were 80 elementary schools, 7 senior high schools, 3 junior high schools, 4 pre-vocational schools, 1 school for deaf children, and 2 technical institutions. School expenditures for 1927 were $6,076,305 for general school purposes, $380,300 for extension, $326,893 for trade schools, $727,543 for school repairs, and $1,862,464 for school construction. The part-time vocational school, completed in 1923 under an independent tax levy and governed by an independent board selected by employers and employees, has been praised as a model school by educators in the United States and Europe. In 1927 there were 19,597 students in the day classes and 11,815 in the evening classes. The public library, in extending its service, was the first to supply a trained worker in adult education to reach the various extension classes, clubs, trade unions, and other organizations. The Art Institute first received municipal support in 1918, which culminated in 1922 in an agreement whereby the city was to acquire full ownership in 1932. In 1923 a civic symphony orchestra was started, giving bi-weekly concerts in the auditorium. In 1928, 136,429 persons were employed by 1429 industrial establishments in Milwaukee and received $218,141,948 in wages; the value of products manufactured was $857,139,774.

Milwaukee has attained its excellent financial standing and credit as the result of a scientific budget system, the elimination of all bonds for operating expenses, the changing of all departments to a cash basis, and the economies made possible by a centralized purchasing department paying cash for all work, including contracting. The budget adopted for the operation of city activities during 1928 totaled $34,344,737. The public debt amortization fund, which has been in operation since 1923, had total assets of $1,706,335 at the end of 1927. As a companion measure to this amortization fund, the first Civic Foundation of Milwaukee was organized to constitute a trust fund for gifts received from public-spirited citizens. For the first 25 years, the city treasurer was to receive annually half of the net income of the fund and thereafter seven-eights of the net income each year. The estimated cost of new buildings for which permits were issued in 1927 was $46,711,971. The assessed valuation of property in 1927 was $963,143,000; the net debt was $50,819,000. Bank clearings in 1928 were $2,158,203,000.

MILWAUKEE-DOWNER COLLEGE. A college for women at Milwaukee, Wis., resulting from the union in 1895 of Milwaukee College, chartered in 1851, and Downer College, chartered in 1855 and located at Fox Lake, Wis. The number of students increased from 278 in the regular courses in 1914–15 to 400, to which number the enrollment is limited, in the autumn of 1928, and the enrollment in extension courses during the same period increased from 67 to 77. The faculty members numbered 37 in 1914–15 and 46 in the autumn of 1928. The library was increased from 10,875 volumes to 25,000; and the endowment rose from $216,207 to $1,276,302, while the income in 1927–28 amounted to $286,552. Gifts received and pledged during 1927–28 amounted to approximately $250,000. The two-year occupational therapy course, first offered during the World War, was later lengthened to a three-year course and a four-year course, a degree and a diploma being given in the latter; and courses in public-school music, library economy, Spanish, and additional courses in comparative literature were added to the curriculum. A $50,000 gift from the Carnegie Corporation, as an additional endowment for the art department, made possible an increase in the work offered in the history and appreciation of art; and a member of the art department faculty was awarded a scholarship by the American Institute of Architects to study art in Harvard University during the summer of 1928. Ellen C. Sabin Science Hall, valued at $290,000, exclusive of equipment, was erected in 1927–28 to house the departments of botany, chemistry, home economics, physics, psychology, and zoology. President, Lucia Russell Briggs, A.M., LL.D.

MILYUKOV, mĭl'yōō-kôf', PAVEL NIKOLAEVITCH (1859–). A Russian exile and historian (see VOL. XV), who was Foreign Minister (March to May) in the first coalition government of the 1917 revolution, under Premier Lvov. He opposed the policies of Kerensky and the Bolshevists, fled from Russia, and finally settled in Paris, where he published after 1920 the republican-democratic newspaper, *Last News*. His later works include *The Russian Intellectual Movement* (1918); *Russia's Call to Humanity, "Save our Souls"* (1919); *Bolshevism, an International Danger* (1920); *Russia and England* (1920); *Russia To-day and To-morrow* (1922); and *The Breakdown of Russia* (2 vols., 1925–26).

MINE, SUBMARINE. In the World War, the submarine mine played a most important part. The numbers used and the areas planted were so enormously greater than in any previous war—indeed, than in all previous wars combined—as to make such former use seem trivial. The various types of mines were much improved during the War and the methods of planting and sweeping were revolutionized. Both the British and Germans were much impressed by the use of mines in the Russo-Japanese War and were prepared at the outbreak of hostilities to use them in great numbers. At this time, due to war experience, the Russian mine was probably the best, but, as the Germans picked up Russian mines early in the War, they were able to improve their own. British, French, Italian, and American mines were improved by experience and from inspection of captured German mines, but it was not until September, 1917, that the improved British mine began to be turned out in adequate quantities. The improved American mine began to be manufactured in enormous numbers in the latter part of 1917. Some new types of mines were developed during the War, such as the depth bomb (see BOMB, DEPTH) and the British net mine. The Leon drifting mine, which was brought out just before the War, was used with great effect in the Dardanelles where the conditions exactly suited it.

The plans of the German mines were derived from a careful examination of captured ones. The mooring rope reel was secured to the mine-case and not to the anchor. Anchor and mine were held together by a device locked with a sal-ammoniac plug. When dropped, mine and anchor sank slowly to the bottom where they remained until the dissolving of the sal-ammoniac plug permitted glycerine to escape from beneath a plunger in a dashpot. The mine was then released and rose until, at the required depth below the surface, the reduction of pressure allowed a clamp to securely grip the anchor rope. The main firing circuit was closed by the tension on the mooring rope as soon as the mine started upward, but the battery was still inoperative. Several contact horns protruded from the case, each horn consisting of a small lead cylinder enclosing a glass tube that contained the electrolytic fluid. Directly below each horn and inside the case there was a brass cylinder that had in its upper part the terminal plates of a battery the wires from which passed through a wooden plug into the detonating fuse, though each zinc wire was brought to the filling hole where the circuit was kept broken while the mine was being handled. Over each lead contact horn was screwed a brass safety cylinder that was removed before the mine was dropped. When one of the contact horns was struck by a passing vessel, the lead cylinder was bent and the glass container inside it broken. The electrolyte then poured into the brass cylinder beneath and completed the formation of a battery that produced a current and exploded the mine. Though their efficiency was admitted, neither the German nor the Russian mine was copied in England, as their cost (about $1000) was deemed excessive.

The Leon floating mine was invented by a Swedish officer. It is cylindrical in shape and may be dropped in the usual way or expelled from a torpedo tube. The weights are so adjusted that it floats with its axis vertical. The upper half contains the explosive and firing mechanism and the lower half is divided into a water reservoir, that fills where the mine is dropped, and the compartment for the depth mechanism. The latter consists of a battery and motor, driving a propeller on a vertical shaft, and a hydrostat which starts the propeller to lift the mine when it sinks beyond the designed depth and stops it when it reaches the upper limit. With the chamber filled, the mine is only slightly heavier than water and is easily kept from 5 to 15 feet below the surface.

At the outbreak of war, the Germans promptly laid mine fields along their own coast and began laying small areas or lines off the British coast. The first British mine field was laid early in October north of Ostend and designed to check the passage of German submarines through the Channel. Others were placed off British harbors. During 1915, 15 small mine fields were laid near the Belgian coast and others in German waters. In that year, the Germans first began to use submarine mine layers and in 1916 the British also used them. In the latter part of 1916, the British laid the Belgian coast barrage, 12 miles off the Belgian coast and 40 miles long, supplemented by mine nets about a mile from the mines.

Early in 1917, a deep net barrage was laid across the Straits from the Goodwins to Snouw Bank, supplemented with deep-set mines. The nets dragged and the field had to be swept and relaid. During the year 1917, 15,686 mines were laid by the *Abdiel* (ex-destroyer) and five mine-laying submarines; but it was not until September, 1917, that an efficient mine began to be turned out in adequate quantities to warrant undertaking any of the extensive projects that had been under consideration.

The greatest of these was the closing of the entrances to the North Sea—the Channel at Dover and the northern passage from the Orkneys to Norway, the latter requiring a mine field 250 miles long. The mines were dropped at 300-foot intervals and there were 10 rows at a depth of 65 to 80 feet, 4 at about 160 feet, and 4 at about 240 feet. The work was begun in March, 1918. In May, the American Mine Squadron No. 1, consisting of nine large mine layers having a total capacity of 5530 mines, arrived at Invergorden, Scotland. The work was completed in the next five months. The British laid 13,546 of their own mines; the American squadron laid 56,571 American mines and 899 British; total, 70,117. The Dover barrage contained 9500 mines.

The wide use of the mine exerted great effect upon naval strategy and operations. It closed the Baltic against the British fleet and effectively isolated Russia. Its threat of danger curbed the activities of U-boats by compelling them to proceed to their destinations by difficult channels over vastly longer distances; and, of about 200 boats lost, 43 are known to have been destroyed by mines. Probably 7 or 8 of those whose fate is unknown were sunk in mine fields, while many others were so badly injured as to force a return to base. The British losses from mines were: 5 battleships (13 lost from all causes), 1 cruiser (13 lost), 2 light cruisers (12), 5 sloops (18), 20 destroyers (64), 4 submarines (54).

Extensive mining operations were carried out in the Mediterranean and elsewhere, but compared to the great North Sea work, they were relatively small. The vast number of mines laid across harbor entrances and other routes of commerce and of war vessels made the operation of mine sweeping as important as mine laying. The entrances to many ports were swept daily and the channels leading to others were constantly patrolled and swept if mines were reported in them or in their vicinity. On Nov. 11, 1918, the total number of mine sweepers in the British service alone was 726, and large but lesser numbers were in use by the other Allies (including the United States).

Such improvements in mines and in mining operations as have been developed since the War are carefully guarded secrets of the countries in which the improvement has occurred. Developments in mining vessels—mine layers and mine sweepers, especially the former—are in progress in all the leading navies and complete secrecy in regard to them is not possible. France is building a large mine-laying cruiser of 5600 tons; Great Britain completed one of 6740 tons in 1927; and the United States completed the large submarine mine layer, *V-4* (surface displacement, 2890 tons), in 1928. France, Italy, and Japan have built and are building submarine mine layers. See VESSELS, NAVAL, *Mine Layers* and *Mine Sweepers;* under *Naval Operations*, WORLD WAR; BOMB DEPTH; PARAVANE; BOMBING OF VESSELS, etc.

MINE HOISTS. See ELECTRIC MOTORS IN INDUSTRY.

MINE LAYER, MINE SWEEPER. See VESSEL, NAVAL; MINE, SUBMARINE; NAVIES.

MINERALOGY. Developments in this science since 1914 have included the discovery and description of a number of new mineral species, experiments in the artificial production of minerals, and the study of mineral properties, chemical and physical, with the use of more refined or elaborate methods than were previously available.

New Minerals. The possibilities of the occurrence of undiscovered species are still far from exhausted, apparently, for many new compounds or specific variations of known types are brought to notice each year. The listing of the new names is hardly warranted in this place, as all of them are of minor importance in both distribution and economic value, and many are simply varieties of known forms distinguished by some special property. The considerable number of new species which have been added to the sum of our knowledge in minerology have for the most part comprised rare substances of which but relatively minute quantities have been discovered. The notable exception to this rule is furnished by the new sodium borate, *kernite,* which was discovered in 1926 and was found to exist in such quantities as to constitute an important source of commercial borax.

Experiment and Research. For investigations of the fundamental characteristics of minerals, the work of the Carnegie Geophysical Laboratory was of signal importance. Its endowment of technical equipment and the skill of its staff put the institution on a unique basis in this branch of research. One of the tasks it undertook was the investigation of the rock-forming silicates, in which much interest centres on account of their bearing on the formation and conditions of stability of the ingredients of igneous rocks. Rankin, in a study of the system, lime-alumina-silica, reproduced such minerals as quartz, tridymite, cristobalite, corundum, wollastonite, sillimanite, and anorthite, besides many calcium silicates not known to occur in nature but present in certain artificial products. The results throw light also on the compounds formed in the hardening of Portland cement. Andersen experimented with the system, anorthite-forsterite-silica, and explained some of the features of the basic igneous rocks. Johnston, Merwin, and Williams discovered important features of calcium carbonate, particularly that the substances had three phases, only two of which had been known to occur in nature. For the experiments of Bowen in the crystallization of melts, see GEOLOGY.

Allen determined the true chemical structure of the mineral bornite, one of the important copper ores. The artificial production of diamonds continued to attract interest, and the latest trials have been made by Sir Charles A. Parsons, the English inventor, who secured transparent crystals up to seven-tenths of a millimeter in diameter. Contrary to the conclusions of Moissan, who first succeeded in making diamonds, the more recent work indicated that great pressure and heat were not the essential factors in effecting the crystallization of carbon in a molten bath: it appears that the diamond forms at a temperature around 690°C., below the freezing point of the iron matrix, through the reactions of occluded gases. The results, if not wholly successful, were very suggestive and will doubtless encourage further investigation.

A means of distinguishing artificial rubies, the manufacture of which has been brought to a high state of perfection, was given by Michel. The artificial stones have a concentric banding and lines of bubbles, arising from the process of depositing the molten aluminum oxide. The pear-shaped melt shows an optic axis diagonal to the longer diameter. No methods have been found to make synthetic emerald, topaz, peridote, or phenacite. The disperse colors of quartz, according to Watson and Beard, may be referred to the effects of small amounts of foreign substances, of which the commonest are manganese, iron, and titanium oxides. Amethyst contains more than the average amount of manganese, which is present in colloidal form and imparts a purple color. Rose quartz is probably not attributable to an inorganic substance, for it can be bleached by heat, after which the color cannot be restored by exposure to the sun's rays. Blue quartz contains fine rutile crystals which are arranaged after a definite pattern and cause dispersion.

Probably no phase of mineralogical research has developed such importance or claimed the endeavors of such an army of scientists as that which has to do with crystal structure as revealed by the X-rays. The bibliography of this field has now assumed substantial proportions, as evidenced by the exhaustive *Bibliography of Crystal Structure* published in 1927 by the University of Chicago Press. Notable contributors to the advance of knowledge regarding crystal structure have been Sir William Bragg in England, Frederich Rinne in Germany, G. Aminoff in France, and Ralph W. G. Wyckoff in the United States.

The problems of chemical mineralogy have mainly involved the investigation of the chemical constitution of the silicates. In this field, A. N. Winchell has been prominent in this country with his studies of such groups as the pyroxenes, the monoclinic amphiboles, the feldspars, the zeolites, and the micas. Along the same line of investigation, W. Wahl of Germany has made some contributions. In England, the work of A. F. Hallimond on molecular volume and atomic volume relations was noteworthy. The Russian mineralogists have been active in the further expansion and interpretation of von Fedorov's system of crystallo-chemical analysis, a monumental work, but one that is at present somewhat unwieldy. In the field of physical properties, L. J. Spencer has published some extremely useful tables of specific gravity.

Bibliography. Among general works for students of mineralogy published recently are Bayley, *Descriptive Mineralogy* (1917), a new work, not a revision of an old one; Kraus and Hunt, *Mineralogy* (1920, 2d ed., 1928); Kraus and Holden, *Gems and Gem Minerals* (1925); Loomis, *Field Book of Common Rocks and Minerals* (1923); and Whitlock, *Story of the Minerals* (1925).

MINIMUM WAGE. Within the period 1912–28, mandatory minimum-wage legislation in the United States had run its full course and at the end of the period the outlook for the success of legislation of this character was dubious. The higher courts of the States had found minimum-wage legislation constitutional; but with the handing down of the Supreme Court decision in Adkins *v.* Children's Hospital (1923), in which the law of the District of Columbia was found to violate the due-process clause of the Fifth Amendment, the experiment was cut short. Since 1923 the only minimum-wage commission that has been functioning to any purpose has been that of Massachusetts, where the law is not mandatory but depends upon the enlisting of public opinion for its enforcement. Over the period 1912–28, 17 States have experimented with wage regulation for women and minors, viz., Arizona, Arkansas, California, Colorado, District of Columbia, Kansas, Massachusetts, Minnesota, Nebraska, North Dakota, Oregon, Porto Rico, South Dakota, Texas, Utah, Washington, and Wisconsin.

The first law to be passed was that of the State of Massachusetts in 1912. In the next year, the following put minimum-wage laws on their statute books: California, Colorado, Minnesota, Nebraska, Oregon, Utah, Washington, and Wisconsin. By 1923 the other eight States had followed suit. These laws have undergone many vicissitudes in the brief intervals. In Nebraska in 1919 and in Texas in 1921, the legislatures repealed the laws. In April, 1923, the District of Columbia, Arkansas, and Arizona laws were declared unconstitutional by the U. S. Supreme Court. In Porto Rico and Kansas (1925), the State supreme courts found the law unconstitutional, basing their decisions upon the U. S. Supreme Court findings. In Minnesota, the State attorney general ruled that the law, as far as application to adult women was concerned, was illegal. In Wisconsin, the law was held unconstitutional by a Federal district court. The result has been that, by the spring of 1929, many States had definitely ceased paying attention to the establishment of a minimum wage for adult women.

Under most of these laws, the position of minors was undetermined and where the law with respect to women has been held to be unconstitutional, little or no effort was being made to fix a minimum wage for children. Wisconsin has been the only State to attempt new legislation. Its old law was positive. It declared that the State's industrial commission had the right to fix wages consonant with "the necessary cost of proper living." The new law makes the negative rule that "no wage paid shall be oppressive" and by it the industrial commission has the power to issue orders setting forth what rates are oppressive and unjust.

The minimum-wage laws were of three types. In one type, statutory minimums were fixed by law. Such laws were passed in Arizona, Porto Rico, South Dakota, and Utah. The Arizona law of 1917 fixed the minimum wage at $10; the Porto Rico law of 1919 fixed the minimum wage of workers over 18 at $6 and the minimum wage of those under 18 at $4; the South Dakota law of 1923 fixed the minimum wage of experienced workers at $12. The Utah law of 1913 fixed the wage of adults at $7.50.

Laws of the second type created commissions with the power of making investigations in particular industries and the right to hand down decrees; but these decrees could not be enforced and only the power of public opinion might be invoked. Such laws were passed in Massachusetts and Nebraska, but the commission in the latter State never functioned. Laws of the third type created commissions that might hold investigations and hand down decrees and which had the power of enforcement. These commissions were set up in the other 11 States, but in two of them, Colorado and Texas, the commissions never functioned. The following have been the experiences of the States where the commissions have handed down decrees: California, 40 decrees during 1916–23; District of Columbia, 5 decrees during 1919–22; Kansas, 7 decrees during 1918–22; Massachusetts, 35 decrees during 1914–27; Minnesota, 12 decrees during 1914–21; North Dakota, 13 decrees during 1920–22; Oregon, 31 decrees during 1913–22; Washington, 17 decrees during 1914–22; Wisconsin, 23 decrees during 1913–27.

The customary economic arguments have proved of small significance, if the experience of a single State may be taken as typical. The Industrial Welfare Commission of California, in its report covering its activities for the years 1922–26, showed that: 1. The minimum wage does not tend to become a maximum wage. For a group of industries, the minimum wage fixed was $16. In 1920, 46.4 per cent of 56,000 women were getting $17 or more per week; in 1925, of 76,000 women, 63.2 per cent were getting $17 or more. 2. Apprentices were not being dropped as they approached the minimum wage so that new apprentices might replace them at sub-minimum wages. In 1920, of 50,704 women on the payrolls of certain industries, 14.3 per cent were receiving less than $16 a week as learners. In 1925, of 18,228 women, 5.8 per cent were receiving less than $16. 3. The minimum wage did not result in replacing normal workers by substandard workers merely because the latter, by law, were permitted to accept less than the minimum wage. At the end of 1925, there were only 335 licensed sub-standard workers in the State. 4. Minimum-wage legislation was not injurious to the better workers. In 1919, with a $10 minimum, only 446 were receiving $30 weekly or more; in 1925, with a $16 minimum, 6084 women in the same industries were receiving $30 a week or more.

Other Countries. The first minimum-wage law to be written on the statute books of any country was the New Zealand Industrial Conciliation and Arbitration Act of 1894. The minimum-wage principle was subsequently widely adopted in Australia, Great Britain, Canada, South Africa, and, on a smaller scale, in France, Germany, Austria, Czechoslovakia, Norway, Hungary, Argentina, and Uruguay. Only in New Zealand and in certain Australian states, however, was an attempt made to grapple with the whole problem. In other countries, the laws were limited to special groups of workers. In Great Britain, e.g., legislation applied to workers in a list of enumerated trades and for these minimum rates were fixed independently by separate boards. In France, the act of 1915 was concerned only with home work. So were the Norway Act of 1918 and the German Act of 1923, though in these two countries legislation specifically declared that the minimum rate for home work was to be fixed on the basis of the prevailing factory rates.

During the post-war period, the International Labor Office sought to play a larger rôle in minimum-wage regulation. In January, 1926, the governing board of the office placed on the 1927 agenda of the Conference of the International Labor Office the following subject with the end in view of preparing a draft convention: "Minimum-wage fixing machinery in trades in which organization of employers and workers is defective, and where wages are exceptionally low, with special reference to the home-working trades." No action was taken in that year.

MINING EQUIPMENT. See Electric Motors in Industry.

MINNEAPOLIS. The largest city of Minnesota. The population increased from 301,408 in 1910 to 380,582 in 1920 and to 455,900 in 1928 by estimate of the Bureau of the Census. A city-planning commission was created in 1919 in accordance with the proposed city plan prepared two years previously; this, in turn, was followed by a zoning law under the authority of which a zoning ordinance was adopted by the City Council. A central coördinating financial body was created in 1919 under the title of Board of Estimate and Taxation; the Board of Charities and Corrections was reorganized into the Board of Public Welfare; and a Municipal Pension Board was created. The Board of Education, the Board of Estimate and Taxation, the Board of Park Commissioners, the Library Board, the city comptroller, and the city treasurer are responsible directly to the electorate and not to the City Council or mayor. In 1919 a proposed new street-railway franchise was rejected by referendum, and two years later the Legislature placed the street railway company, for the consideration of valuation and rates, under the Minnesota Railroad and Warehouse Commission. In 1920 the city voted to accept home rule, and the following year a citizens' charter committee proposed a new city-manager charter, which was defeated. Agitation for it, however, is still active.

On completion of the U. S. Government high dam in 1917, Minneapolis was made head of navigation on the Mississippi. The city had prepared preliminary terminal facilities. Four important bridges were built spanning the Mississippi; one of these, the Cappelen Memorial Bridge, has a single concrete arch of 400 feet. (For detailed information about the Robert Street Bridge, the Inter-city Bridge, and the Cedar Street Bridge, see Saint Paul.) An extensive building programme, developing especially the junior high schools, has placed Minneapolis fourth in rank in percentage enrolled in the high schools of the United States. In 1928 Minneapolis had 86 public elementary schools, six junior high schools, four junior-senior high schools, four senior high schools, two vocational training schools, and a special hospital school for tubercular children; the school population numbered nearly 80,000. The park system also was enlarged by the addition of 491 acres, making a total area of 3651 acres within the city limits and representing a capital investment of $14,291,279. In 1927 a new auditorium, with a seating capacity of 12,500, was opened. Adequate airport facilities have been provided, lines operating daily between Minneapolis and Chicago, Minneapolis, Des Moines, and Kansas City, and Minneapolis and Winnipeg.

Minneapolis has become a city of diversified industries, the products of its 1200 manufacturing plants covering nearly the entire range of human requirements, with motor vehicles, linseed products, knit goods, structural iron work, bakery products, railroad-car construction and repair, and printing and publishing in the lead. In 1925, 31,730 persons were employed by these establishments and received $40,311,000 in wages; the value of products manufactured was $338,824,000. The flour mills of Minneapolis, however, represent the world's greatest concentration of milling capacity. From 1912 to 1919, their output was more than 17,000,000 barrels in every year but one; from 1920 to 1928, the annual flour production ran between 11,500,000 and 15,500,000 barrels; but even with this decline, the Minneapolis output exceeded the combined output of the two next largest producers. Minneapolis is the home of the Federal Reserve Bank of the ninth district. Bank clearings in 1928 amounted to $4,419,614,000. The assessed valuation of property in 1927 was $426,858,000; the debt was $52,921,000.

MINNEAPOLIS SYMPHONY ORCHESTRA. See Music, *Orchestra.*

MINNESOTA. The eleventh State in size (84,682 square miles) and the seventeenth in population; capital, St. Paul. The population increased from 2,075,708 in 1910 to 2,387,125 in 1920, a gain of 15 per cent; estimated population, 1928, 2,722,000. The white population rose from 2,059,227 (1910) to 2,368,936 (1920); Negro, from 7084 to 8809; native white, from 1,516,217 to 1,882,772. The foreign white population decreased from 543,010 to 486,164. Urban population rose from 850,294 to 1,051,593; rural from 1,225,414 to 1,335,532. The growth of the principal cities was as follows: Minneapolis (q.v.), 1910, 301,408; 1920, 380,582; St. Paul (q.v.), 214,744 to 234,698; Duluth (q.v.), 78,466 to 98,917.

Agriculture. As Minnesota is one of the principal grain-growing States, agricultural conditions have been strongly affected by the fluctuation in prices and production which characterized the war and post-war periods. (See articles, Agriculture, Corn, Wheat, etc.) The number of farms in the decade 1910–20 kept pace almost exactly with the increase in population; the number of farms, 178,478 in 1920, despite agricultural depression, rose to 188,231 in 1925. The acreage of land in farms, on the other hand, fell from 30,221,758 to 30,059,137, or by 0.3 per cent. The improved land in farms totaled 21,481,710 acres in 1920. Crop-land acreage (1925) was 18,651,190. The total value of farm property rose from $1,476,411,737 in 1910 to $3,787,420,118 in 1920, but declined to $2,761,684,227 in 1925. The average value per farm was $9456 in 1910, $21,221 in 1920, and $14,672 in 1925. Farm-land values greatly increased in the period of war prices for farm products. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. The percentage of the total land area in farms increased from 53.5 in 1910 to 58.4 in 1920, but was 58.1 in 1925. Of the total number of farms in 1925, 136,382 were operated by owners; 766, by managers; and 29,936, by tenants. The corresponding figures for 1910 were 122,104; 1222; and 32,811. White farmers in 1920 numbered 178,271, compared with 155,844 in 1910; colored farmers, 207, compared with 293. Farms reported as under mortgage in 1920 numbered 69,545; in 1925, 66,319. The total number of cattle in 1920 was 3,021,469; in 1925, 2,853,465. Dairy cows numbered 2,080,627 in 1920; 1,311,897 in 1925. Despite this drop, the State increased its lead over every other in creamery butter output. Swine numbered 2,380,862 in 1920 and 2,715,074 in 1925. The number of sheep on the farms in 1920 was 509,064; in 1925, 378,972. The estimated production of the principal farm crops in 1928 was as follows: Corn, 143,115,000 bushels; wheat, 23,955,000; oats, 153,338,000; rye, 5,950,000; barley, 60,000,000; potatoes, 38,940,000; flaxseed, 5,518,000; and hay, 6,558,000 tons. Comparative figures for 1913 are corn, 96,000,000 bushels; wheat, 68,040,000; oats, 112,644,000; rye, 5,700,000; barley, 34,800,000; potatoes, 30,250,000; and hay, 2,490,000 tons.

Mining. Minnesota is the leading State in production of iron ore. Although it also has important quantities of clay products, cement, and stone, it is iron which sets Minnesota high among mineral producing States. Minnesota was twelfth in value of mineral products in 1926. The fluctuations in output of iron ore in the period starting with 1914 are indicated by the following figures: 1914, 21,946,901 long tons; 1916, 44,585,422; 1917, 44,595,232; 1918, 41,953,969; 1919, 36,000,626; 1921, 17,811,325; 1922, 30,209,372; 1926, 40,961,361. The diminished production in 1921 was due largely to the general business depression, which lessened demand for the products of iron ore. The value of the clay products, exclusive of pottery, fluctuated from $1,944,886 in 1914 to $1,503,659 in 1918; $3,341,477 in 1920; $2,482,286 in 1921, and $1,852,566 in 1926. In addition to the minerals mentioned above, manganiferous ore, of which the 1925 output attained a value of $1,761,422; mineral waters, and sand and gravel also are produced in the State. The total value of the mineral products in 1926 was $118,361,306; in 1921, $72,609,973; $177,589,967 in 1920; $155,412,823 in 1918; and $45,680,865 in 1914.

Manufactures. Minnesota is an important industrial State. In 1920 there were 11 cities with populations over 10,000, forming 33.6 per cent of the total population. These cities, in 1919, produced 63.3 per cent of the State's manufactured products. There were in the State, in 1909, 5561 manufacturing establishments; in 1919, 6225; in 1925, 3888; in 1927, 3886. Wage earners in manufactories numbered, in 1919, 115,623; in 1925, 100,614; in 1927, 98,833. Capital invested amounted to $275,416,029 in 1909 and $679,386,486 in 1919. The value of the manufactured products in 1909 amounted to $409,419,621; in 1919 to $1,218,129,735; in 1925, to $1,101,856,000; and in 1927, to $1,066,727,215. The increase in value of products about 1919 was to a great extent due to changes in industrial conditions caused by the World War and cannot properly be used to indicate the growth of manufactures. But the increase in the number of establishments and in the number of persons engaged in manufactories showed clearly a considerable growth in the manufacturing activities of the State. Flour-mill and gristmill products were chief in point of value; in 1909, $139,136,000; in 1919, $381,249,000; in 1925, $215,637,578. Slaughtering and meat packing form the second industry in this respect: in 1909, $25,754,000; in 1919, $146,919,000; in 1925, $182,555,429. The manufacture of butter and cheese ranks third, amounting in 1909 to $25,287,000; in 1914 to $33,746,000; and in 1919 to $91,720,000. The product of the lumber and timber industry, in fourth place, was valued at $42,353,000 in 1909; $44,675,000 in 1914; and $52,580,000 in 1919. The principal manufacturing cities are Minneapolis, St. Paul, and Duluth. There were in Minneapolis, in 1909, 1102 manufacturing establishments, with a product valued at $165,405,000; in 1919, 1421 with $491,383,000; in 1925 the product was $338,824,000. In St. Paul in 1909, there were 719 with $58,990,000; in 1919, 818 with $149,638,000; in 1925 products attained $193,013,000. Similar figures for Duluth were: in 1909, 194 with $17,180,000; in 1914, 243 with $19,729,000; and in 1919, 226 with $75,261,000.

Education. Substantial progress has occurred in educational development in Minnesota. School districts have been authorized to establish special departments for the instruction of physically handicapped children, subnormals, the deaf, blind, defective of speech, and the crippled, and a special grant of $100 to $300 per child was allowed by the State for this work; provision was made through the State Department of Education for the rehabilitation of disabled persons; a law was passed requiring physical training and health instruction in all public schools and in all institutions for the training of teachers; and a new supplementary State-aid law was enacted, guaranteeing to every school district $40 per child on a $.02 tax levy in addition to all other forms of State support, with the State paying the difference between what a $.02 tax levy would produce for each pupil involved and $40. The school enrollment increased from 457,041 in 1914 to 549,899 in 1925–26; the number of teachers, from 16,920 to 21,958. The expenditures for all public schools was: Current $42,494,825; outlays, $9,434,842. The permanent school fund amounted to $49,808,470. The percentage of illiteracy in the State decreased from 4 to 2.4 in 1920; among the native whites, from 0.5 to 0.4; among the foreign-born whites, from 7.7 to 5.6; among the Negroes, from 3.9 to 3.5.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $36,700,222 (of which $11,099,620 was aid to local education); for interest on debt, $3,859,640; for permanent improvements, $12,575,914; total, $53,135,776 (of which $15,599,746 was for highways, $4,871,094 being for maintenance and $10,728,652 for construction). Revenues were $63,766,540. Of this, property and special taxes formed 24.6 per cent, departmental earnings and charges for officials' services, 7.9 per cent; and sales of licenses and a tax on gasoline, 49.5 per cent. Property valuation was $2,365,019,180; State taxation thereon, $10,719,860. Net State funded debt on June 30, 1927, was $11,715,348. This total did not include road bonds issued by counties, on which the State was obliged to meet charges.

Political and Other Events. Minnesota was much affected by the agricultural situation in the years following the War. Among the farmers, the Farmer-Labor Party acquired sufficient power to elect candidates for important offices, including two United States Senators. In 1914 W. S. Hammond, Democrat, was elected governor. The Republicans elected Representatives in all districts except one. In 1916 Minnesota was one of the so-called doubtful States. Hughes received 179,553 votes for President, and Wilson, 179,157 votes. The Republicans elected J. A. A. Burnquist governor, and F. B. Kellogg was elected United States Senator. In 1918 Governor Burnquist was reëlected, as was Senator Knute Nelson. The Nonpartisan League took part in the campaign and showed considerable strength. In 1919 A. C. Townley, president and organizer of the National Nonpartisan League (see North Dakota), was convicted of disloyalty and sentenced to three months' imprisonment by the Martin County district court at Fairmount. The Republican candidate for governor, J. A. O. Preus, was elected in 1920. For President, Harding received 519,421 votes and Cox, 142,994. At this election, the people approved amendments authorizing the construction of a trunk highway system, the taxation of motor vehicles, and the assessment of all real property used for railway purposes. In 1922 the Republicans again elected Governor Preus, but the Farmer-Labor organization elected H. K. Shipstead to the Senate. At this election, the State voted to lend its credit for the assistance of farmers. On the death of Senator Nelson in 1923, a special election was held to fill the vacancy. The Farmer-Labor candidate, Magnus Johnson, was elected. Theodore Christianson, Republican, was elected governor in 1924. For President, the vote was: Coolidge, 420,759; La Follette, 339,192; Davis, 55,913. Christianson was reëlected in 1926 and in 1928. In 1928 the vote for President was: Hoover, 560,977; Smith, 396,451. Senator Shipstead, despite the decline of the Farmer-Labor Party, was returned by a great majority.

Legislation. The legislature of 1917 provided for the submission to the people in 1918 of both a woman-suffrage amendment and a prohibition amendment. This Legislature enacted a "blue sky" law and made provision for the voting of citizens absent from the State in the national service. It also created a public safety commission. The prohibition amendment lacked the necessary three-fifths vote, but the 1919 Legislature ratified both the proposed prohibition and woman's-suffrage amendments. It also provided for an eight-hour day on public work, and passed statutes defining and punishing criminal syndicalism and sabotage. The Legislature of 1921 regulated aircraft and appointed a Commissioner of Agriculture empowered to aid coöperative bodies engaged in buying and selling farm products. The office of Labor Commissioner was abolished and the Industrial Commission was created. Provision was made for the enforcement of the laws relating to intoxicating liquors. The compulsory school laws were amended; a workmen's-compensation insurance board was created; and amendments were made to the Workmen's Compensation Law. In 1923 the legislature passed a measure forbidding the wearing of masks in public places. A measure also was enacted to facilitate coöperative marketing of agricultural products. An administrative reorganization of the State under 13 departments was enacted in 1925. Sterilization of the feeble-minded was authorized. A constitutional amendment proposed in 1925 and adopted in 1926 gave authority for State measures to encourage reforestation, and a group of such measures were passed in 1927. Provision for heavier criminal penalties were also then enacted.

MINNESOTA, University of. A State institution, founded in 1868, with its main campus in Minneapolis; the Department of Agriculture, including various colleges, schools, and experiment stations, at University Farm, St. Paul, in Crookston, Morris, Grand Rapids (Minn.), Duluth, Waseca, Owatonna, Itasca and Cloquet; and the graduate medical school in Rochester, Minn. In 1913–14, the number of resident students of collegiate grade was 4155, and total registration, including extension, subcollegiate, etc., 8992; in the autumn term of 1928, the enrollment was 11,815, and the summer session enrollment in that year 6041. The faculty increased over the same period from 608 to 657, on a full-time basis, including professors, associate professors, assistant professors, and instructors. The library was increased from 175,000 to 525,000 volumes, and the income from $2,445,491 to $2,908,606 from endowment funds, service enterprises, revolving funds and intercollegiate athletics; $1,686,862 from student fees and miscellaneous items; $4,637,902 from State appropriations for maintenance, building, and special purposes for 1927–28; and $293,634 Federal Aid. The endowment of the university amounted to

$9,245,417 in 1928, including a permanent fund of $3,914,887, and lands and buildings in trust, $1,590,837.

Under a legislative appropriation voted in 1919, of $560,000 annually for 10 years, the following new structures were finished or in course of construction during succeeding years: On the main campus, a music building, mines experiment station, library, storehouse and shops, an addition to the Minnesota Union, an administration building, a botany building, physics building, and a field house for athletics; a Memorial Auditorium to cost $1,000,000, of which $800,000 was available (still under construction in 1928), the Minnesota Hospital and Home for Crippled Children, at a cost of $851,000, dedicated on November 10, by the late William H. Eustis, donor of $350,000 toward its construction. Contracts were let before the end of the year for the construction of dormitories. On the farm campus, two home-management houses and a dairy building were constructed, at Crookston, an animal products building; at Morris, a hospital; and at Grand Rapids, the main building of the agricultural school. Dr. William J. Mayo and Dr. Charles H. Mayo of Rochester, Minn., gave over $2,000,000 for medical research and examination; a trust fund of $250,000 was established in 1923 by the Citizens' Aid Society of Minneapolis for the erection of the George Chase Christian Memorial Cancer Hospital and, in the same year, a site valued at $100,000 was given for the Minnesota Hospital and Home for Crippled Children by William H. Eustis, as the first installment of a gift for buildings and grounds for the university which was eventually to amount to $1,000,000. Pledges to the amount of $2,000,000 were made by alumni and friends for the erection of an athletic stadium and an auditorium; and two loan funds, one of $5000 and one of $12,000, were established in the names of Edward M. and Effie R. Johnson. Gifts received during 1926 included: Insurance policies amounting to $80,000, by Dr. George G. Eitel to found the George G. Eitel Scholarship Fund; a gift of $100,000 from William H. Eustis; and a gift of $10,250 annually for five years by the Bureau of Social Hygiene to be used to conduct investigations in coöperation with the Women's Coöperative Alliance of Minneapolis. George Edgar Vincent was president of the university until he resigned in 1916 to accept the presidency of the Rockefeller Foundation, when he was succeeded by Marion LeRoy Burton, who resigned in 1920 to become president of the University of Michigan. President, Lotus Delta Coffman, Ph.D., LL.D.

MINNICK, John Harrison (1877–). An American university professor, born at Somerset, Ind., and educated at Indiana, Illinois, Chicago, and other universities. For several years, he taught in high schools in Indiana and Illinois, and from 1911 to 1913, he was critic teacher of mathematics at Indiana University. For two years following, he was instructor in mathematics at the Horace Mann School, New York City. In 1916 he became instructor of mathematics at the University of Pennsylvania and was successively assistant professor of education, professor of education, and dean of the school of education at that university. He was a member of many learned societies, wrote *An Investigation of Abilities Fundamental to Geometry* (1918), and developed standardized tests in geometry.

MINNIGERODE, Meade (1887–). An American writer, born in London. He graduated from Yale in 1910 and for several years was associated with publishers in New York. He represented the United States Shipping Board in France in 1917–18 and in the year following was first lieutenant with the American Red Cross. His books include *Laughing House* (1920); *The Big Year* (1921); *O, Susanna* (1922); *The Fabulous Forties* (1924); *Aaron Burr* (with S. H. Wandell, 1925); *Some American Ladies* (1926); *Certain Rich Men* (1927); *Jefferson, Friend of France* (1928); *Presidential Years: 1787 to 1860* (1928).

MINOT, George Richards (1885–). An American physician born in Boston, Mass. In 1926 he and an associate published a valuable method of treating pernicious anæmia—a condition previously regarded as incurable. He was graduated from Harvard University in the arts (1908) and in medicine (1912). Early in his medical career, he began to specialize in the study of the blood and its diseases and by 1924 had written over 50 papers on this subject. He was made an associate professor of medicine at Harvard and for a time was editor of the *Boston Medical and Surgical Journal.* The impetus to the anæmia treatment came originally from some laboratory results on the treatment of artificial anæmia in dogs by fractions of extract of liver. Dr. Minot with his associate, Dr. Murphy, applied the principle to the treatment of pernicious anæmia in man with strikingly favorable results originally published in the *Journal of the American Medical Association.* The method has now been tested throughout the world in more than 2000 cases with less than 1 per cent of failures.

MIOMANDRE, Francis de (1880–). A French novelist, born at Tours, and educated at Marseilles. He began writing in his early twenties and won the Prix Goncourt in 1908 for his novel, *Ecrit sur de l'Eau.* His novels were highly imaginative and put together with the genuine talent of a romancer who has traveled far and wide at his own study table. His works include: *Du Vent et de la poussière; L'Ingénu; L'Aventure de Thérèse Beauchamps; Le Veau d'Or et la vache enragée; Les Taupes; Ces petits Messieurs; Les Jeux de l'amour et de la danse; La Cabane d'amour; Journal interrompu; Pavillion du mandarin; Voyages d'un sédentaire,* essays; *La naufragée* (1924); and *Les équivoques d'amour,* a play (1928). Consult *Le roman nouveau* by Jules Bertaut (1920).

MIQUELON. See St. Pierre and Miquelon.

MISSISSIPPI. The thirty-first State in size (46,865 square miles) and the twenty-third in population; capital, Jackson. The population decreased from 1,797,114 in 1910 to 1,790,618 in 1920, a loss of 0.4 per cent. The white population rose from 786,111 to 853,962, but was still greatly exceeded by the Negro population, in spite of the fact that the number of Negroes decreased from 1,009,487 to 935,184 during the decade. The native white population increased from 776,722 to 845,943, while the foreign-born white decreased from 9389 to 8019. The urban population of the State mounted from 207,311 to 240,121; the rural population, on the other hand, decreased from 1,589,803 to 1,550,497. The growth of Meridian was from 23,285 in 1910 to 23,399 in 1920; Jackson, 21,262 to 22,817. Vicksburg, with 20,814 in 1910 and 18,072 in 1920, showed a decrease.

Agriculture. As cotton raising is one of the chief agricultural industries of the State, conditions of late years have been greatly affected by the ravages of the boll weevil, which occupied most of the State by 1909 or 1910. Its effect is indicated by the acreage and production of various years during the period: in 1913, 3,067,000 acres and 1,311,000 bales; 1917, 2,788,000 and 905,000; 1921, 2,628,000 and 813,000; 1928 (estimated), 3,994,000 acres and 1,470,000 bales, a total indicative of progress toward recovery. For a more detailed account of the ravages of the boll weevil in the cotton-growing States, see BOLL WEEVIL.

The number of farms, almost stationary from 1910 to 1920, decreased from 272,101 in 1920 to 257,228 in 1925, or by 5.5 per cent. The area of land in farms decreased 11.8 per cent, or from 18,196,979 to 16,053,243. The improved land in farms in 1920 was 9,325,677 acres; the total percentage of land used for agricultural purposes decreased from 61.3 in 1920 to 54.1 in 1925. The total value of farm property rose from $426,314,634 in 1910 to $964,751,855 in 1920, but declined to $550,570,838 in 1925; the average value per farm was $1554 in 1910, $3546 in 1920, and $2140 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 80,808 were operated by owners; 678, by managers; and 175,742, by tenants. The comparative figures for 1910 are 92,066; 825; and 181,491. White farmers in 1920 numbered 110,882, compared with 107,086 in 1925; colored, 161,219, compared with 150,142 in 1925. There was a decrease in the Negro population, 1910–20, of 7.4 per cent, which quite seriously affected the farm-labor situation. Farms reported as under mortgage in 1920 numbered 23,990 and 26,750 in 1925. The number of dairy cows in 1920 was 530,274; in 1925, 320,055; "beef" cows, 261,682 in 1920, numbered 208,460 in 1925; swine, 1,373,311 in 1920, were 697,472 in 1925; mules numbered 308,216 in 1920; 327,646 in 1925; sheep, 164,440 in 1920 and 113,824 in 1925. The estimated production of the chief farm crops in 1928 was as follows: Corn, 22,945,000 bushels; oats, 820,000; potatoes, 1,330,000; sweet potatoes, 6,050,000; hay, 601,000 tons; peanuts, 6,500,000 pounds. (For cotton, see above). Comparative figures for 1913 are corn, 63,000,000 bushels; oats, 2,800,000; potatoes, 960,000; and hay, 293,000 tons.

Manufactures. Although Mississippi is not one of the leading industrial States, it has important lumber and cottonseed-oil industries.

Education. Mississippi has educational problems of great difficulty. The colored population exceeds the white, and in addition to this, the rural localities are many of them thinly populated, and widely extended. In dealing with the problem, notable advances have been made. There was put into operation a splendid system of consolidated schools, which in 1923 numbered 751; and a compulsory school law was put into force, which brought into the schools during the first year of its operation over 33,000 white boys and girls over 7 years of age who had never before attended school. An equalizing school fund was provided, of more than $1,125,000, to be disbursed by the State Board of Education for the benefit of the poorer sections of the State. The State Normal School, established in 1912, was enlarged, and had at the close of this period an enrollment of approximately 1500. The trustees of the schools of every county had been organized for several years in the County Trustees' Association, and the 82 county superintendents of the State were organized into a State association. By 1924 the work of rehabilitation of cripples and vocational education had been organized and was producing excellent results. High-school work in over 1000 schools having one- to four-year courses had been standardized. There were 237 four-year accredited high schools, and hundreds of others doing one to three years of accredited work. Enrolled in the colleges of the State by 1923 were as many students as were contained in the high schools in 1913. A $5,000,000 bond issue has been expended in repairing and expanding the State colleges and institutions. The entire enrollment in the high schools in 1925–26 was 43,105; in the colored high schools alone it was 5156. The total public-school enrollment was placed at 572,896, of whom 290,145 were white and 282,841 colored. The percentage of illiteracy in the State decreased from 26.8 in 1910 to 20.8 in 1920: among the native white population, from 6.2 to 4.4 per cent; among the foreign-born white, from 13.6 to 13.4; among the Negro, from 43.2 to 35.9.

Finance. State expenditures in the year ended Sept. 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $12,233,817 (of which $3,988,337 was aid to local education); interest on debt, $790,168; for permanent improvements, $5,557,599; total, $18,581,584 (of which $5,637,927 was for highways, $1,692,015 being for maintenance and $3,945,912 for construction). Revenues were $16,394,641. Of this, property and special taxes formed 40.7 per cent; departmental earnings and charges for officials' services, 9.4; sales of licenses and a tax on gasoline, 27.6. Property valuation was $724,107,850; State taxation thereon, $4,344,647. Net funded State debt on June 30, 1927, was $17,142,853.

Political and Other Events. Mississippi has remained steadfastly Democratic. In 1916 Senator Williams was reëlected, practically without opposition. For President, Wilson received 80,422 votes; Hughes, 4253. At this election, an amendment was adopted increasing the number of Supreme Court judges to six, to be elected by the people for a term of eight years. In 1917 former Senator Vardaman contested the Senatorial nomination of Representative Harrison, who was nevertheless nominated and elected. Senator Vardaman was opposed by President Wilson. In 1919 Lee M. Russell was reëlected governor. In 1922 Hubert Stephens was elected senator. In 1923 Henry L. Whitfield was elected governor. He died Mar. 18, 1927, and was succeeded by Dennis Murphree. The vote for President in 1924 was: Davis, 100,475; Coolidge, 8546. Theodore N. Bilbo was elected governor in 1927. In 1928 Smith, for President, gained 124,539 votes; Hoover, 26,889.

MISSISSIPPI, UNIVERSITY OF. A State institution for the higher education of men and women at University, Miss., founded in 1848. With the usual exception of the War years, the university grew steadily during the period 1914–28, from an enrollment at the beginning of the period of 528, a faculty of 35, and a library of 25,000 volumes, to an enrollment of 1121 (autumn, 1928), 309 in summer session of 1928, 64 members on faculty, and 40,000 volumes in the library, at the close. The income of the university also increased, from $138,226 to $190,000 from State appropriations, $98,000 from student fees, and $52,000 from all other sources. Five new dormitories were constructed, a pharmacy building, and a chapel, for which the Legislature appropriated $150,000 in 1926. Special appropriations of $1,600,000 were made by the 1928 Legislature for new buildings and other permanent improvements. A school of commerce and business, and a department of hygiene were opened previous to 1924, and a new department of rural economics and sociology was added in 1926. Alfred Hume, C.E. D.Sc., who had been vice chancellor since 1905 and professor of mathematics since 1890, was elected chancellor, effective Sept. 1, to succeed J. N. Powers, LL.D.

MISSISSIPPI RIVER. See Floods and Flood Control.

MISSOURI. The eighteenth State in size (69,420 square miles) and the ninth in population, 1928, 3,523,000. The total population increased from 3,293,335 in 1910 to 3,404,055 in 1920, a gain of 3.4 per cent; estimated population, 1928, 3,523,000. The white population rose from 3,134,932 (1910) to 3,225,044 (1920); Negro, from 157,452 to 178,241; native white, from 2,906,036 to 3,039,018, while the foreign-born white decreased from 228,896 to 186,026. The urban population mounted in the decade from 1,398,817 to 1,586,903; the rural population decreased from 1,894,518 to 1,817,152. The growth of the principal cities was as follows: St. Louis (q.v.), 1910, 687,029; 1920, 772,897; Kansas City (q.v.), 248,381 to 324,410; St. Joseph, 77,403 to 77,939; Springfield, 35,201 to 39,631.

Agriculture. As Missouri is one of the most important agricultural States, conditions have reflected influences which characterized the war and post-war periods. (See Agriculture). Missouri is one of the minor cotton-producing States and while the region where cotton is grown has become infested by the boll weevil, the insect was held back by cold winters and its ravages were not serious. Figures for area and production for several years are 1913, 112,000 acres, production, 67,000 bales; 1920, 136,000 acres, 79,000 bales; 1928 (estimated), 349,000 acres, 146,000 bales. It will be noted that, since Missouri suffered less than most other affected States from the boll weevil, there was an increase in the area grown. In Missouri, a decline in the number of farms set in between 1910 and 1920 and continued thereafter. Their number decreased 1 per cent, or from 263,004 in 1920 to 260,473 in 1925. The total area in farms decreased from 34,744,679 to 32,641,893 acres. The improved land in farms totaled 24,832,966 acres in 1920. The percentage of the total land used for agricultural purposes decreased from 79.1 per cent (1920) to 74.2 per cent (1925). The total value of farm property rose from $2,052,917,488 in 1910 to $3,591,068,085 in 1920, but fell to $2,286,639,415 in 1925. The average value per farm was $7405 in 1910, $13,654 in 1920, and $8779 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 174,383 were operated by owners; 1063, by managers; and 85,027, by tenants. The comparative figures for 1910 were 192,285; 2001; and 82,958. White farmers in 1920 numbered 260,178, compared with 273,578 in 1910; colored, 2826, compared with 3666. Farms reported as under mortgage numbered 85,538 in 1920; and 76,970 in 1925. The total number of cattle in 1920 was 2,781,644; in 1925, 2,372,335; dairy cows numbered 1,066,750 in 1920 and 516,787 in 1925; swine, 3,888,677 in 1920 and 3,510,941 in 1925; mules, 255,455 in 1920 and 371,568 in 1925; sheep, 1,271,616 in 1920 and 893,611 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 181,540,000 bushels; wheat, 19,194,000; oats, 44,968,000; potatoes, 10,285,000; sweet potatoes, 1,155,000; hay, 4,340,000 tons; and tobacco, 4,400,000 pounds. Comparative figures for 1913 are corn, 129,062,000 bushels; wheat, 39,586,000; oats, 26,500,000; barley, 110,000; potatoes, 3,230,000; hay, 1,800,000 tons; and tobacco, 3,315,000 pounds.

Mining. Missouri is first among the States in production of lead. Important quantities of coal, clay products, and cement also are produced, but it is the lead industry which gives it its chief importance as a mineral-producing State, with a rank of sixteenth in value of mineral products in 1926. Fluctuations in production of lead in the period from 1914 on are indicated in the following figures: 1914, 192,612 short tons, valued at $15,023,736; 1916, 233,088, $32,166,144; 1917, 234,156, $40,274,832; 1919, 163,290, $17,308,740; 1920, 165,114, $26,418,240; 1921, 180,085, $16,207,650; 1922, 178,412, $19,625,320; 1926, 207,012, $33,121,920; 1927, 198,760, $25,043,760. The greater part of the output is obtained from the southeast and central parts of the State. Coal production varied in the decade from 3,935,980 short tons in 1914 to 4,742,146 short tons in 1916; 5,667,730 in 1918; 5,369,565 in 1920; 3,551,621 in 1921; and 3,008,495 in 1926. Clay products during the recent years have ranged in value from $6,077,284 in 1914 to $9,155,088 in 1918; $17,474,542 in 1920; $10,668,691 in 1921; $17,618,931 in 1926. The increased value in the War period was due chiefly to changes in the buying power of currency which led to higher prices, since production was not greatly increased. The output of cement has grown gradually to 7,639,966 barrels per year, in 1926; yearly value increased from $4,485,744 in 1914 to $12,917,342 in 1926. During the period affected by the World War the cement produced commanded high prices due chiefly to the decreased buying power of money. The total value of the mineral products of the State for 1926 was $90,003,537, compared with $90,994,479 in 1920; $61,862,232 in 1919; $76,663,995 in 1918; and $48,597,593 in 1914.

Manufactures. Missouri is an important industrial State. There were according to the 1920 census, 13 cities with more than 10,000 inhabitants, containing 39.8 per cent of the total population of the State. In 1919 they reported 75.6 per cent of the value of the State's manufactured products. There were in the State, in 1909, 8375 establishments; in 1919, 8592; and in 1925, 5100; and in 1927, 5422. Persons engaged in manufactories numbered 185,705, 244,939, 194,689, and 195,378, in those years. Capital invested amounted to $444,343,135 in 1909, and $938,760,773 in 1919. The value of manufactured products in 1909 was $574,111,070; in 1919, $1,594,208,338; in 1925, $2,849,729; in 1927, $1,665,173,465. The increase in value of the product about 1919 was due largely to changes in industrial conditions brought about by the War and cannot properly be used to measure the growth of manufactures during the census period 1914–19; but the increase in number of wage earners indicated growth in the manufacturing activities of the State. Slaughtering and meat packing form the first industry in point of value of products, which amounted in 1909 to $79,581,000; 1919, $247,477,000; and 1925, $175,392,412. Flour-mill and gristmill products rank high in value: in 1909, $44,508,000; 1919, $113,297,000; 1925, $82,442,041. The manufacture of boots and shoes furnished products of $48,751,000 in 1909; 1919, $142,466,000; and in 1925, $124,327,761. The manufacture of automobile bodies and parts had an output in 1909 valued at $1,677,000; 1914, $2,183,000; and 1919, $71,939,000. The most important manufacturing cities are St. Louis and Kansas City. In St. Louis in 1909, there were 2667 manufacturing establishments, with a product of $328,495,000; in 1919, 3205 with $871,700,000; in 1925, products amounted to $874,557,000. Kansas City in 1909 had 902 with $54,705,000; in 1919, 997 with $192,815,000; in 1925, products of $221,349,000. St. Joseph is also an important manufacturing city, having, in 1909, 261 manufacturing establishments, with a product worth $17,626,000; in 1914, 267, $17,068,000; and in 1919, 219, $50,697,000.

Education. There has been steady development in the educational system of Missouri. The State was divided some years ago into five districts coterminous with the five State teachers'-college districts, in each of which a high school inspector or supervisor was placed, who had his office at the teachers' college and was responsible for the advancement of secondary education in his district. The department also undertook two other outstanding projects, a State-wide survey of educational conditions and the reorganization of curriculum courses of study and standards for classification of high schools of the State. Trained experts were directing both activities. Attention was also given to the development of the rural schools, and there were assigned to this field one rural supervisor for the State and five rural school inspectors; the work of these supervisors was to help the county superintendents in group and community meetings, to inspect rural schools, and, in general, to help teachers in their work. Under the survey plan, attention was given to conferences of teachers, school-board members, and patrons, in the course of which plans for school improvement, better supervision, and improved presentation of the work, together with the individual problems of teachers, were discussed and remedies suggested. The total enrollment in the elementary and high schools in 1913 was 690,484; in 1925–26 it was 723,167, out of a school population (ages 5 to 17 years, inclusive) of 859,037. There were enrolled in elementary grades 612,414, in the secondary grades 110,753 pupils. The total expenditures on public day schools in 1925–26 were; current, $39,972,574; outlays, $13,244,530. The percentage of illiteracy in the State decreased from 5.4 in 1910 to 3.8 in 1920: in the native white population, from 4.3 to 2.8 per cent; in the foreign-born white, from 10.2 to 10 per cent; in the colored, from 21.1 to 14.3 per cent.

Finance. State expenditures in the year ended Dec. 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $23,892,125 (of which $5,497,348 was for local education); for interest on debt, $3,297,765; for permanent improvements, $19,601,528; total, $46,791,418 (of which $19,994,908 was for highways, $1,411,950 being for maintenance and $18,532,958 for construction). Revenue was $42,771,958. Of this, property and special taxes formed 32.1 per cent; departmental earnings and charges for services of State officials, 15.4 per cent; sale of licenses and taxation of gasoline, 41.1 per cent. Property valuation was $4,967,319,670; State taxation thereon, $3,457,516. Net State funded debt was $69,958,464.

Political and Other Events. While Missouri was regarded as a solidly Democratic State for many years, it gradually shifted to the doubtful class. It was carried by Roosevelt and the entire Republican State ticket except governor in 1904, by Herbert S. Hadley for governor in 1908, and by the Republicans again in 1910. After the Republican split of 1912, the Republicans gradually developed sufficient strength to elect candidates for governor and United States Senator. In 1914 William J. Stone was elected to the Senate, and the Democrats elected the Representatives in all the districts except two. A proposed prohibition amendment to the constitution was defeated at this election. In 1916 the Democratic nominee for governor, Frederick O. Gardner, was elected; the Democrats elected all the State officers except the State auditor. Wilson received 398,032 votes; Hughes, 369,339. A constitutional amendment providing for State-wide prohibition was defeated at this election, but an amendment providing for pensions for the blind was carried. Senator W. J. Stone died in 1918, and X. P. Wilfley was appointed. In the autumn, the Republicans elected their candidate for senator, Selden P. Spencer.

In 1919, Governor Gardner appointed Lieutenant Governor Wallace Crossley as State Fuel Commissioner acting in conjunction with the Federal fuel authorities, to conserve and distribute properly the coal supply when a shortage was threatened by labor trouble in the mines. The Republicans in 1920 elected as governor Arthur M. Hyde, and reëlected Senator Spencer. In the presidential election, Harding received 727,162 votes; Cox, 574,799. By referendum vote, the people approved the enforcement of prohibition throughout the State. In 1922 Senator James A. Reed, although he was bitterly assailed for his failure to support President Wilson in the Senate, and although the former President strongly voiced his objection to Reed, was nominated. In the election, he defeated the Republican candidate, R. R. Brewster. During 1923 at St. Joseph, a trial of 76 so-called radicals, including Wllliam Z. Foster and others, was conducted. Foster was acquitted, but several others were convicted. Sam A. Baker, Republican, was elected governor in 1924; the vote for President was: Coolidge, 648,486; Davis, 572,753. Harry B. Hawes, Democrat, was elected senator in 1926, and a workman's-compensation system was approved by popular vote. A tornado demolished a part of St. Louis, doing about $25,000,000 of damage, Sept. 20, 1927. The Mississippi Valley floods in the spring of 1927 did great damage. In 1928 Henry S. Caulfield, Republican, was elected governor; the vote for President was: Hoover, 834,080; Smith, 662,076.

Legislation. The Legislature of 1915 enacted a measure designed to prevent dishonest advertising. In 1917 the Legislature amended the laws relating to criminal procedure and abolished capital punishment, which was restored in 1919 at an extra session. An income tax was created and corporation, inheritance, and secured-debt tax laws were passed. The secured-debt law was declared unconstitutional. The banking laws were also amended in important details. By a provision of the Legislature in 1919, women were permitted to vote for President. The Legislature enacted a child-labor law and a workmen's-compensation law, the latter annulled by referendum. The Legislature of 1921 created a Commissioner of Agriculture; passed measures for the relief of the deserving blind; created a State Department of the Budget and social-welfare boards in cities of the second and third class; amended the child-labor laws, and created municipal coöperative courts in all counties having a population between 19,000 and 150,000. The laws creating offices of Commissioner of Agriculture and Department of the Budget were later suspended by referendum and defeated.

The Legislature created a State Highway Commission in 1921 and provided for the construction of 7600 miles of hard-surfaced roads from a bond issue of $60,000,000 voted by the people, supplemented by Federal aid. The issuance of $15,000,000 in bonds was authorized for the payment of a soldiers' bonus. There was created the State Department of Finance and a resolution was passed to submit to the voters an amendment enabling women to hold any office in the State. This Legislature also provided for a system of workmen's compensation. This was suspended by referendum. In 1923 the Legislature passed a general prohibition act and enacted measures to extend the voting privilege equally to men and women. A municipal zoning act was passed in 1925. Incorporation laws were liberalized in 1927, and a State Department of Labor and Industrial Inspection, uniting two former Departments, was created, while State bank requirements were rendered more stringent.

MISSOURI, UNIVERSITY OF. A coeducational State institution at Columbia and Rolla, Mo., founded in 1830. The student enrollment increased from 2605 in 1914 to 4439 in 1928, with 2169 registered in the summer of 1928; the faculty in the same period from 262 to 400 members; the library, from 165,000 to 326,000 volumes; the productive funds from $1,280,000 to $2,500,000; and the income from $1,100,000 to $3,500,000. A new building for a School of Journalism was given by Ward A. Neff in 1920, and a hospital, a gymnasium for women, a chemistry building, an agricultural building, and a War memorial building were erected in 1922. In 1921, $50,000 was received for a home economics building; in 1922–23, in memory of their son, Lee H. Tate, Mr. and Mrs. Frank R. Tate gave $125,000 toward a new law building. President, Stratton Duluth Brooks, LL.D.

MITCHELL, WESLEY CLAIR (1874–). An American economist, who was born at Rushville, Ill., and studied at the University of Chicago (A.B., 1896; Ph.D., 1899) and the universities of Halle and Vienna. He was instructor in economics at the University of Chicago (1900–02), assistant professor of commerce (1902–08) and professor of political economy (1909–12) at the University of California, and professor of economics (1914–19, and since 1922) at Columbia University. From 1919 to 1921, he was lecturer at the New School for Social Research in New York. He served as chief of the price section of the War Industries Board (1918–19). Since 1919 he has been director of research in the National Bureau of Economic Research. He became chairman of the Social Science Council in 1927. He is the author of *A History of the Greenbacks* (1903); *Gold Prices and Wages Under the Greenback Standard* (1908); *Business Cycles* (1913, 1927). He edited *History of Prices During the War; Business Cycles and Unemployment.* (Consult *Contemporary Economic Thought*, by P. J. Homan, 1928).

MITCHELL, WILLIAM (1879–). An American army officer, born at Nice, France, and educated at George Washington University and the Army Staff College. He was with Gen. Fitzhugh Lee in Cuba and served in the Philippines in 1899. In 1903 he constructed the Alaskan telegraph system and in 1914 joined the French aviation forces in France. He was the first American officer to fly over the lines, commanded the air units of the 1st Army, and was chief of the Air Service in the Argonne offensive. He commanded the air forces at St. Mihiel and served at Cambrai, the Somme, etc. In 1920 he was appointed brigadier general in the Air Service. After four years' service at Washington, he reverted to the rank of colonel. In 1925, because of his criticisms of the War and Navy Departments in connection with their management of aviation, he was tried by court-martial and sentenced to suspension from the service for five years. He resigned in 1926 and lectured in behalf of reform in aviation laws. He wrote *Our Air Force* (1921), *Winged Defense* (1925), and many pamphlets and magazine articles.

MITCHELL, WILLIAM DE WITT (1874–). Attorney General of the United States in President Hoover's Cabinet. He was born at Winona, Minn., and educated at Lawrenceville School, the Sheffield Scientific School of Yale, and the University of Minnesota (A.B., 1895). He studied law, was admitted to the bar, and began practice at St. Paul in 1896. He served as secretary of the first St. Paul Charter Commission in 1900 and was chairman of the Citizens' Charter Commission in 1922. Having been an officer in the National Guard of Minnesota in 1898–1901, he was made colonel of the 6th Regiment during the World War. In 1925 President Coolidge appointed him Solicitor General of the United States. He filled that office with distinction and although in politics a Democrat, he was named Attorney General by President Hoover, in March, 1929.

MLYNARSKI, mlē-när'skē, EMIL (1870–). A Polish composer and conductor (see VOL. XVI). During 1910–15 he was conductor of the Choral and Orchestral Union at Glasgow. He returned to Warsaw in 1919 to his former posts as conductor at the opera and director of the Conservatory, which latter position he resigned in 1922. He added to his works an opera, *Eine Sommernacht* (Warsaw, 1923), and *Symphony*, in F.

MOBILIZATION. See ARMIES AND ARMY ORGANIZATION.

MOFFAT TUNNEL. See TUNNELS.

MOHAMMED VI (VAHID-ED-DIN) (1861–1926). A Sultan of Turkey, brother of Mohammed V, whom he succeeded in 1918. He lived in seclusion until he became Sultan. After the rise of the Nationalists under Mustapha Kemal Pasha, and particularly after he had signed the Treaty of Sèvres, he was merely a figurehead politically, although as caliph he was the supreme authority of the entire Moslem world. In November, 1922, he was dethroned by the National Assembly and left Constantinople on board the British warship, *Malaya*, bound for Malta. He went to Switzerland and France, where he lived in comparative poverty. He died in San Remo and was buried in Mecca.

MOHLER, John Robbins (1875–). An American pathologist, born at Philadelphia, Pa., and educated at Temple University, the University of Pennsylvania, and Marquette University. For several years, he was a practicing veterinarian and was also in the employ of the Bureau of Animal Industry of the Department of Agriculture. In 1891 he was appointed assistant pathologist in the bureau and was successively zoölogist, chief of the pathological division, assistant chief, and after 1917, chief of the entire bureau. Besides translating several medical works from foreign languages, he was the author of many articles on pathology, bacteriology, and meat inspection. During the World War, he was a member of the Remount Board of the United States Army.

MOINAUX, Georges. See Courteline, Georges.

MOISSEIVITCH, Benno (1890–). A Russian pianist, born in Odessa. He studied under D. Klimov at the Imperial Musical Academy in Odessa and, after winning the Rubinstein Prize at the age of nine, completed his education under Leschetizky in Vienna (1904–8). He made his début in Reading, England, in 1908, and the next year took London by storm. His success was such that for the following 10 years he was on concert tour exclusively in England, appearing in numerous recitals and with all the important symphony orchestras. In 1919 he made his first tour of the United States, after which he visited all the countries of the civilized world. In 1914 he married the Australian violinist, Daisy Kennedy, from whom he was divorced in 1924.

MOLDAVIA. See Rumania.

MOLEY, Raymond (1886–). An American educator, born at Berea, Ohio, and educated at Baldwin-Wallace College, Oberlin College, and Columbia University. He taught in several schools in Ohio until 1914. In 1916 he was appointed instructor and assistant professor of politics at Western Reserve University and from 1919 to 1923 was director of the Cleveland Foundation. Since 1923 he has been associate professor of government at Columbia. He was research director of the New York State Crime Commission, 1926–27. He wrote *Lessons in Democracy* (1919); *Commercial Recreation* (1919); *Facts for Future Citizens* (1922); *The Cleveland Crime Survey* (1922); *The Outline of Government* (1922); *The Administration of Criminal Justice in Missouri* (1926); *The Practice of Politics* (brochure, 1927); and various pamphlets and articles on the teaching of government. He was coauthor of *Criminal Cases in New York Courts* (1927).

MOLINARI, mō′lē̍′nä′rē̍′, Bernardino (1880–). An Italian conductor, born in Rome. He began to study the piano at the age of five and continued his musical education at the Liceo Santa Cecilia in Rome, under Sgambati, Marchetti, and Falchi. He began his career as accompanist of famous visiting artists. In 1909 he was appointed assistant conductor of the Santa Cecilia Orchestra, becoming regular conductor in 1914. In 1920 he began to make extended tours as guest-conductor. Since 1927, when he made his American début with the St. Louis Symphony Orchestra (December 29), he has visited this country every year, directing several of the great orchestras. In 1929 he was appointed, together with Toscanini and Mengelberg, conductor of the New York Philharmonic-Symphony Orchestra.

MÖLLER VAN DEN BRUCK, Artur (1876–1925). A German writer on literature, economics, and sociology, born at Solingen. He was educated and spent several years traveling in Germany, Austria, France, Italy, England, Scandinavia, and Russia. Besides editing the works of Dostoevski, he is the author of *Die Moderne Literatur in Gruppen und Einzeldarstellungen* (1900): *Die Variété: eine Kulturdramaturgie* (1901); *Die Deutschen: Unsere Menschheitsgeschichte* (1904); *Zeitgenossen* (1905); *Die Italienische Schönheit* (1913); *Der Preussische Stil* (1915); *Das Recht der Jungen Völker* (1918); and *Das Dritte Reich* (1923).

MOLNÁR, Ferenc (1878–). A Hungarian playwright whose first New York success was *Liliom* (1922), presenting a penetrating study of characteristic tendencies in an uncouth man. He was further represented on the New York stage by *Launzi* (1923); *Fashions for Men* (1923); *The Swan* (1923); *The Guardsman* (1924); *The Glass Slipper* (1925); *The Play's the Thing* (1926); and *Olympia* (1928). In 1928 English translations of *Twenty-Five Plays* were published.

MOLTKE, mōlt′kē, Raimund Hermann Siegfried (1869–). A German writer and economist. He studied in Leipzig and at the Art Academy in Berlin and later became librarian of the Chamber of Commerce of Leipzig. His most important works, on economic and historical subjects, are *Leipzigs Handelskorporationen* (1907); *Zwei Kapitel aus Leipzigs Handels- und Verkehrsgeschichte* (1912); *Friedrich List* (1913); *Katalog Altkaufmännicher Archive in Leipzig* (1913); *Die leipziger Messen im Weltkrieg* (1920); *Aus Vergangenheit und Gegenwart der leipziger Kaufmannschaft* (1926). He also wrote *Siegfried von Schwarzburg*, a novel (1927), and edited F. A. Weber's *Handbuch der deutschen Sprache* and other works.

MOLUCCA. See Dutch East Indies.

MOMBERT, môm′bĕrt, Alfred (1872–). A German poet, born in Karlsruhe and educated at the universities of Heidelberg, Leipzig, Munich, and Berlin. He practiced law for six years and then devoted himself to his literary work. His works include: *Der Sonnengeist* (1905); *Aeon, der Weltgesuchte* (1907): *Aeon vor Syrakus* (1911); *Der Himmlische Zecher* (1909); *Der Held der Erde* (1919); *Aeon Zwischen den Frauen* (1920); and *Atair* (1925).

MOND, Sir Alfred. See Melchett, First Baron.

MONDELL. Frank Wheeler (1860–). An American public official, born in St. Louis, Mo., and educated in the public schools. For many years, he was engaged in farming, stock-raising, and railroad construction. In 1887 he settled in Wyoming, where he took an active part in the development of the State. In 1909 he was elected a member of the first State Senate. He was elected to the 54th and 56th Congresses and was successively reëlected until 1922, when he was defeated. In the 66th and 67th Congresses, he was majority leader on the floor of the House and took a prominent part in framing the legislation passed by that body. He took an active part in all the Republican conventions from 1902, and in the convention of 1924 was permanent chairman. In 1923–25 he was a director of the War Finance Corporation.

MONET, mȯ̆′nĕ′, CLAUDE (1840–1926). A French landscape painter (see VOL. XVI). He was considered the foremost landscape painter of impressionism. In his last years, he was troubled with cataract, but was able to work intermittently on several large paintings arranged in groups of three to five. The subjects were chiefly water-lilies, and the large group which he presented to the French nation was placed on permanent exhibition in a room built for it in the Orangeries in the Tuileries Gardens, Paris.

MONGOLIA. A Chinese outer territory, with an estimated area of 1,875,000 square miles, and a population variously estimated from 750,000 to 2,500,000. The difficulties of communication because of lack of railways and the obstacles presented by the barren reaches of the Desert of Gobi, which cuts into the heart of the region, make for a sparsely settled population. Agriculture is impossible, with the result that the inhabitants are hunters and raisers of camels, horses, and sheep. The Chinese are steadily penetrating into Inner Mongolia and the Desert of Gobi and beginning to apply themselves to the tillage of the soil. Inner and Outer Mongolia were joined in 1917 by a motor transport service plying between Urga and Kalgan. Urga was the chief town and centre of population. During recent years, Mongolia's fortunes were linked with those of Russia and China. Up to the Revolution, Russian penetration into Outer Mongolia continued. The overthrow of the Czar not only checked the completion of these enterprises but also put Outer Mongolia at the mercy of marauding bands. In November, 1919, the reigning prince, the Living Buddha or Hutuktu, prompted by his advisers, asked for the cancellation of the charter of independence; some days later, the Chinese government acceded by denouncing the Russo-Chinese and Russo-Mongolian treaties of 1913–14. The Chinese did not maintain their position long. Early in 1921, Baron Ungern von Sternberg, heading remnants of Semenov's anti-Bolshevik troops, marched on the Chinese at Urga, captured the town, and put the garrison to the sword. The Hutuktu was compelled to announce his sovereignty once more, though his policies were plainly dominated by the Baron Ungern. The Peking government was defied, and troops were even sent into Inner Mongolia. Ungern could not stand up against the Bolshevik Army and Russian influence again became paramount; Soviet troops remained at Urga; a Mongolian national government, taking control, adopted a consistently friendly attitude toward Soviet Russia. In 1923 a Russian mission proceeded to Peking for the purpose of restoring friendly relations and reëstablishing the economic agreements of 1913–14. In June, 1924, a treaty was signed which called for the restoration of Mongolia to China. Inner Mongolia continues to be administered by Chinese officials appointed through Peking. See CHINA; RUSSIA.

MONITOR. See VESSEL, NAVAL.

MONTAGU, THE RT. HON. EDWIN SAMUEL (1879–1924). An English public official, coauthor of the Montagu-Chelmsford Reform Plan (see INDIA). He was educated at Trinity College, Cambridge, and after 1906 was a Liberal member of Parliament for the Chesterton division of Cambridgeshire. He was Parliamentary Secretary to the Chancellor of the Exchequer (1906–8), and to the Prime Minister (1908–10), and from that year to 1914, Parliamentary Under-Secretary of State for India. He served as Chancellor of the Duchy of Lancaster in 1915 and as Financial Secretary of the Treasury from 1914 to 1916. He was Minister of Munitions and a member of the War Committee in the latter year and Secretary of State for India when he and Lord Chelmsford urged a limited degree of self-government in India, to be extended if successful (1917–22). He was made a member of the Privy Council in 1914.

MONTAGUE, mŏn′tȧ-gu̇, C(HARLES) E(DWARD) (1867–1928). A British author and journalist, who was educated at the City of London School and at Balliol College, Oxford. In 1890 he joined the staff of the *Manchester Guardian*, by 1896 was chief leader writer, and later became a director of the paper. In 1925 he retired to devote his entire time to the writing of novels. During the World War, he served (1915–19) in France, Belgium, and Germany. His first and last books, *A Hind Let Loose* (1910) and *Right Off the Map* (1927), were political and social fantasies. His other publications were *Dramatic Values*, theatrical criticisms (1911); *The Front Line*, with drawings by Muirhead Bone (1917); *Fiery Particles*, short stories (1923); *The Right Place: a Book of Pleasures* (1924); *Disenchantment* (1922); and *Rough Justice*, a novel (1926).

MONTAGUE, WILLIAM PEPPERELL (1873–). An American professor of philosophy, born at Chelsea, Mass., and educated at Harvard University. In 1903 he became a member of the faculty of Columbia University, where he was appointed full professor in 1920. One of the six authors of the Neo-Realist programme, he has written numerous essays on the reduction of consciousness to a form of energy and on the implications of realistic philosophy in the realm of what are ordinarily called spiritual values. *The Ways of Knowing, or The Methods of Philosophy* was published in 1925.

MONTANA. The third State in size (146,997 square miles) and the thirty-ninth in population; capital, Helena. The population increased from 376,053 in 1910 to 548,889 in 1920, a gain of 46 per cent. The white population increased from 360,580 to 534,260; the Indian, from 10,745 to 10,956. There were, in 1910, 1585 Japanese, and in 1920, 1074; the Negro population also decreased, from 1834 to 1658. The native-born white population increased from 286,936 to 440,640; the foreign-born white, from 91,644, to 93,620. Both urban and rural population mounted during the decade, the former from 133,420 to 172,011, and the latter from 242,633 to 376,878. The growth of the principal cities was as follows: Butte, 1910, 39,165; 1920, 41,611; Great Falls, 13,943 to 24,121; Billings, 10,031, to 15,100.

Agriculture. The number of farms, which had increased 120 per cent, or from 26,214 in 1910 to 57,677 in 1920, fell sharply to 46,904 in 1925. The total acreage in farms increased to 35,070,656 (1920) from 13,545,603 (1910) and fell to 32,735,723 (1925). The improved land in farms was 11,007,278 acres in 1920. The percentage of land used for agricultural purposes was 37.5 in 1920, 35 in 1925. The total value of farm property rose from $347,828,770 in 1910 to $985,961,308 in 1920, but declined to $574,-

897,007 in 1925; the average value per farm was $13,269 in 1910, $17,095 in 1920, and $12,257 in 1925. In interpreting these values, the inflation of the currency incidental to the World War is to be taken into consideration. Of the total number of farms in 1925, 36,281 were operated by owners; 367, by managers; and 10,256, by tenants. The comparative figures for 1910 are 23,365; 505; and 2344. White farmers in 1910 numbered 25,018; in 1920, 56,614, of whom 41,051 were native and 15,563 foreign-born. Of the 1063 colored farmers in 1920, 987 were Indians. Farms reported as under mortgage numbered, 29,897 in 1920 and 19,818 in 1925. The number of dairy cows fell from 153,425 in 1920 to 102,768 in 1925; "beef" cows numbered 514,853 in 1920 and 487,663 in 1925; sheep numbered 4,959,835 in 1910, 2,082,919 in 1920, and 2,187,928 in 1925. The area under irrigation increased from 1,679,084 acres in 1909 to 1,681,729 acres in 1919. The estimated production of the chief farm crops in 1928 was as follows: Corn, 5,206,000 bushels; wheat, 77,218,000; oats, 20,221,000; barley, 6,374,000; potatoes, 4,255,000; and hay, 3,103,000 tons. Comparative figures for 1913 are corn, 882,000 bushels; wheat, 20,673,000; oats, 21,750,000; barley, 1,860,000; potatoes, 5,040,000; and hay, 1,188,000 tons.

Mining. Montana is an important State in the production of minerals. In former years gold, silver, and copper were the most valuable products of the mines; zinc and petroleum now rank next after copper. The progress of mining, from 1914 on, is indicated by comparative figures. The production of coal in 1914 was 2,805,173 short tons, valued at $4,913,191; 1915, 2,789,755 short tons, $4,526,509; 1917, 4,226,689, $8,919,136; 1918, 4,532,505, $11,444,875; 1920, 4,413-866, $13,923,000; 1921, 2,733,958, $8,921,600; 1926, 2,797,760, $6,883,000. The production of silver varied from 12,016,460 fine ounces in 1914 to 16,797,479 in 1918; 12,579,178 in 1920; 12,468,151 in 1922; and 12,769,092 in 1926. In the production of copper, Montana ranks second among the States, being surpassed only by Arizona. In 1914 the copper output was 233,229,640 pounds; 1916, 352,928,373; 1918, 323,174,850; 1920, 177-059,260; 1921, 48,098,730; and 1926, 255,372,862. The diminished production in 1921 was due chiefly to business depression which diminished the demand for copper. Comparative figures for gold, lead, and zinc are as follows: 1914, gold, $4,117,911; lead, 9,656,008 pounds, zinc, 111,580,544 pounds; 1918, gold, $3,104,764; lead, 37,135,875 pounds; zinc, 209,258,148 pounds; 1921, gold, $1,480,763; lead, 20,366,917, pounds; zinc, 23,275,966 pounds; 1922, gold, $1,656,757; lead, 29,767,479 pounds; zinc, 11,069,818 pounds; 1926, gold, $1,250,731; lead, 42,306,000 pounds; zinc, 147,402,000 pounds. A considerable amount of petroleum also is produced in the State, the output increasing from 340,000 barrels in 1920 to 1,509,000 barrels in 1921, and 7.727.000 barrels in 1926. In addition to the minerals noted above, quantities of graphite, iron ore, and manganese ore are produced. The total value of the mineral production in 1926 was $79,762,630, as compared with $85,885,403 in 1920; $73,630,824 in 1919; $139,331,507 in 1918; and $54, 244,899 in 1914.

Education. Montana has been one of the most efficient States in the conduct of its educational system; the Russell Sage Foundation in 1920 placed the Montana school system first among those of the United States. The public-school fund, which was greatly increased from time to time by the sale of school lands and by grants of the State, amounted to $17,437,407 in 1925–26, not counting unsold schools lands, and contributed an annual revenue, together with receipts from leases of school lands, of more than $1,000,000. The Legislature has been liberal in the enactment of laws relating to schools. Development in vocational education was marked; the Smith-Hughes Law, providing Federal aid to States, was accepted by the Legislature in 1917, and provisions were made for the coöperation of State and local boards of education in vocational training. The boards of trustees of the school districts of the State were authorized to establish and maintain Americanization schools for all mentally normal persons over the age of 16. One phase of the development is indicated by the increase in enrollment; in the public schools in 1914, 85,728 were enrolled; in 1925–26, 116,990 (elementary schools, 96,049). In the high schools of the State, in 1925–26, the enrollment was 20,941. Expenditures for public day schools were: current, $11,106,389; outlays, $460,258. The percentage of illiteracy in the State decreased from 5.5 in 1910 to 2.8 in 1920. In the native-born population, it remained for both periods at 0.4 per cent; among the foreign-born white population, it decreased from 9.2 per cent to 6; in the Negro population, it decreased from 12.6 to 8 per cent.

Finance. State expenditures in the year ending June 30, 1927, as reported by the U. S. Department of Commerce, were: for departmental maintenance and operation, $5,927,691 (of which $1,318,661 was for local education); for interest on debt, $427,971; for permanent improvements, $1,840,264; total, $8,195,926 (of which $1,535,279 was for highways, $281,646 being for maintenance and $1,253,633 for construction). Revenues were $8,779,813. Of this, property and special taxes formed 29.3 per cent; departmental earnings and charges for officials' services, 7.3 per cent; sale of licenses and taxes on gasoline, 25.9 per cent. Property valuation was $435,510,159; taxation thereon by the State, $1,946,032. Net funded State debt on June 30, 1927, was $4,751,148.

Political and Other Events. The political control of Montana, for a number of years, has fluctuated between the Republican and Democratic parties. An election held in 1914 for representative-at-large was carried by the Democrats. At this election, a State woman-suffrage amendment was carried. On Sept. 6, 1914, Mayor Lewis J. Duncan of Butte was removed from office after trial in the district court for neglect of duty in connection with miners' strikes. The elections of 1916 were notable in that Jeannette Rankin was chosen the first woman member of the House of Representatives. The Democrats elected their candidate for governor, S. V. Stewart; Henry L. Meyers, Democrat, was reëlected to the Senate. In the presidential voting, Wilson received 101,063 votes; Hughes, 66,750. In 1917 there were many industrial disturbances in the mines of the State, and on August 2, Frank Little, organizer and agitator of the Industrial Workers of the World, was lynched in Butte for attempts to organize a strike in the metal mines and for denouncing the Army and the Federal Government. The State was on the point of prosecuting him when he was seized at night and hanged. In the elections of 1918, Miss Rankin was defeated for reëlection to the House of Representatives by Carl Riddick. Senator

T. J. Walsh was reëlected. The Republicans came into power in 1920 and elected Joseph M. Dixon governor, together with other State officers. For President, Harding received 109,430 votes; Cox, 57,372. In 1922 Burton K. Wheeler, Democrat, was elected United States Senator, and two constitutional amendments were adopted. One permitted the consolidation of city, county, and town governments; the other created a State Board of Equalization. The voters also approved a referendum measure for a soldiers' bonus. This was afterward declared unconstitutional and the Assembly voted to submit to the people an amendment of the constitution to permit the granting of a bonus. The amendment was defeated by popular vote.

In 1924 Senator Walsh practically conducted the investigation into the leasing of oil reserves, while Senator Wheeler was responsible for, and took a prominent part in, the investigation of the administration of H. M. Daugherty, Attorney General of the United States. Senator Wheeler was indicted in Montana for alleged infraction of the law which prohibits members of Congress from taking part in litigation in which the Government is concerned. He was tried and acquitted in 1925. J. E. Erickson, Democrat, was elected governor in 1924. The vote for President was: Coolidge 74,138; Davis, 33,805; LaFollette, 65,876. State prohibition was repealed in 1926 by referendum vote. Erickson was reëlected governor in 1928. The vote for President in 1928 was: Hoover, 113,300; Smith, 78,578.

Legislation. The Legislature of 1915 passed a measure providing for the submission of the question of prohibition to the people by referendum, to be voted for in 1916. This was carried. The Legislature of 1917 amended the laws relating to the administration of justice in the courts. It also authorized cities to adopt a commission form of government and amended the prohibition laws. In 1919 a law was passed providing for a State budget. In 1921 the Legislature revised the tax laws and imposed new taxes on the production of oil, gas, minerals etc. In 1920 measures were passed preventing the holding of land by aliens. A measure was also enacted granting a modified old-age pension. Petroleum exploitation was regulated in 1922.

MONTANA, UNIVERSITY OF. A State organization for the higher education of men and women, founded in 1895; a part of the University of Montana, which comprises the State University at Missoula, the State College at Bozeman, the State Normal College at Dillon, and the State School of Mines at Butte. The student enrollment at Missoula increased from 220 in 1910 to 1455 in the autumn of 1928, with 498 in the summer session in the latter year. In 1914–15, the faculty had 84 members; in 1928, 96 members. The library was increased from 100,000 to 145,000 volumes including government documents, between 1923 and 1928. The income for the latter year was $472,532. Six new buildings were completed in 1923, including a library, gymnasium, forestry building, two residence halls, and a central heating plant. E. O. Sisson was president from 1917 to 1920 and was succeeded by Charles H. Clapp, Ph.D., in 1920.

MONTEMEZZI, ITALO (1875–). An Italian composer, born at Verona. He received his musical education at the Conservatory of Milan. Next to Puccini, he is the most talented of living Italian composers. In 1919 he visited the United States, conducting the American première of his opera *La Nave* (Chicago Opera Association, Nov. 18), which had its world première in Milan (1918). His other works include the operas, *Giovanni Gallurese* (Turin, 1905; New York, 1925); *Hellera* (ib., 1909); *L'Amore dei Tre Rè* (Milan, 1913; New York, 1914); and *La Principessa Lontana* (not yet produced); and a cantata, *Il Cantico dei Cantici.*

MONTENEGRO. The history of this state during the World War was obscure, both because of its military unimportance, and more largely, because of its doubtful loyalties. From 1914 to 1918, a division of sentiment ever widened the breach between the partisans of the ruling family and the growing group that looked to Serbia for the fulfillment of racial and nationalistic aspirations. On Aug. 8, 1914, Montenegro declared war on Austria-Hungary. The fear on the part of King Nicholas and his sons that victory for the Allies would mean the submergence of their dynasty led in 1915 and 1916 to a series of intrigues with Austria whose purpose was interpreted by Slav patriots as an endeavor to erect a Slav state in the South, ruled by one of Nicholas's sons and virtually under Austrian domination. Montenegro was overrun by the Austrian Army early in 1916; in the same year, having failed to win over the Central Powers, Nicholas abandoned his country and retired to France. This absence strengthened the hand of the Slav Nationalists. In 1917 Montenegrins met with Serbs, Croats, and Slovenes at Corfu, where the pact setting forth their common principles was issued. When, in 1921, the Montenegrin delegates to the Jugoslav Constituent Assembly voted in favor of union, the history of Montenegro as an independent state was closed. See JUGOSLAVIA, under *History.*

MONTEUX, PIERRE (1875–). A French conductor, born in Paris. He studied at the Paris Conservatoire under Berthelier (violin, first prize), Lavignac (harmony), and Lenepveu (fugue). For some years, he played the viola, first in Colonne's orchestra, then at the Opéra Comique, and during this period appeared with various ensemble organizations. In 1904 he began his career as conductor with the Concerts Monteux in Paris, at which he produced chiefly new works of impressionist composers. In 1911 he became conductor for Diaghilev's Ballet Russe in Paris and subsequently made four European tours with that organization, with which he also came to the United States in 1916. During the summer of 1917, he gave a series of concerts with the Civic Orchestra in New York, and from 1917 to 1919, he was conductor of the French operas at the Metropolitan Opera House. From 1919 to 1924, he was conductor of the Boston Symphony Orchestra. When he assumed the leadership, the once famous orchestra was almost completely demoralized (see MUSIC, under *Orchestras*), but he was able to bring the organization back to its former high level of excellence. In the spring of 1928, he was guest-conductor of the Philadelphia Symphony Orchestra, and in the fall of the same year, of the Concertgebouw Orchestra in Amsterdam.

MONTFORT, môn'fôr', EUGÈNE (1877–). A French novelist who was the editor of the literary review, *Les Marges.* In his novels, he showed a predilection for the sea, particularly for the picturesque Mediterranean and the port of Marseilles, and in several of his books he showed himself a master of description and psychological analysis. His works include: *Les Cœurs malades* (1904); *Le chalet dans la montagne* (1905); *La maîtresse américaine* (1906); *La Turque* (1912); *Les noces folles* (1913); *La belle enfant, ou l'Amour à quarante ans; Mon brigadier Triboulère* (1918); *Un cœur vierge* (1920); *La soirée perdue* (1921); *Brelan marin* (1922); *César Casteldor* (1927). He edited *Vingt-cinq ans de littérature française, 1895–1920* (2 vols., 1922).

MONTGOMERY, ROBERT HIESTER (1872–). An American lawyer, accountant, and university professor, born at Mahanoy City, Pa., and educated in the public schools. He served as instructor in economics and assistant professor of law at Columbia University from 1912 to 1919, and in the latter year he was appointed professor of accounting there. He served in the Spanish-American War, and during the World War was attached to the General Staff in Washington. He also served on the War Industries Board and in several other important capacities. He was a member of many legal and economic societies and author of *Income Tax Procedure* (1917–22); *Excess Profits Tax Procedure* (1920); *Auditing Theory and Practice* (1912–27); *Auditing Principles* (1923); *Financial Handbook* (1925).

MONTHERLANT. HENRY DE (1896–). A French author who glorified sport. Born in Paris, he was educated in a Roman Catholic college. He learned the art of bullfighting and excelled in many sports. His works include *La Relève du Matin*, a religious novel (1920); *Le Songe* (1922); *Chant funèbre pour les morts de Verdun* (1924); *Le Paradis à l'ombre des épées* (1924); *Les Onze devant la porte dorée* (1924), and *Les Bestiaires* (1926; trans. as *The Bullfighters*, 1927). Consult *Jeunes Maîtres, états d'âme d'aujourd'hui*, by Paul Archambault (1926).

MONTREAL. The commercial metropolis of Canada. The population by the census of 1926 was 952,875; in 1928 it was estimated to be 1,032,385. The municipal area is 50 square miles. The city administration consists of a council of 35 aldermen elected every two years, one for each ward, with a mayor elected by the citizens at large, also for a term of two years, and an executive committee of five appointed by the council from among its members. The executive committee administers the affairs of the city generally, reporting to the city council which may adopt, amend, or reject such reports by a majority vote of all the members of the council. The director of departments, appointed by the council, serves as a link between the executive committee and the heads of the various departments in somewhat the same manner as a city manager.

Montreal is the largest inland port in the world, being located at the head of deep-water navigation on the St. Lawrence River, 1000 miles from the sea at the junction of ocean and inland navigation. It is approached by a ship channel of 30-feet depth at low water, which is being increased by the Dominion government to a depth of 35 feet. It is also the terminus of three systems of canals—the St. Lawrence canals, the canals of the United States via the Richelieu River and Lake Champlain, and the Ottawa River Canals. The jurisdiction of the harbor, which extends 16 miles along each bank of the St. Lawrence, is entrusted to a board of Dominion representatives and representatives of the shipping interests and the city corporation. The port has nine miles of deep draft wharfage, capable of accommodating 100 large ocean steamers; four fireproof grain elevators, with a capacity of 15,162,000 bushels, from which grain can be delivered simultaneously at a maximum rate of 500,000 bushels per hour, while at the same time inland vessels and railway cars can be unloaded at a maximum rate of approximately 300,000 bushels per hour; a cold storage warehouse of 4,628,000 cubic feet capacity; 26 permanent fireproof, two-story transit sheds; and an electrified terminal railway system of about 70 miles operated by nine 100-ton electric locomotives. During 1927, 1610 ocean-going vessels of a net registered tonnage of 4,992,486 were entered and cleared. In 1928 Montreal established a new high record in the handling of grain, 423,000,000 bushels valued at $300,000,000 being received and shipped.

Between 1924 and 1929 the Harbor Commission of Montreal constructed the South Shore Suspension Toll Bridge over the St. Lawrence. The cantilever section included a 1097-ft. span with two 420-ft. anchor arms and a vertical clearance of 163 feet. At the north end of the bridge was a 200-ft. reënforced concrete viaduct.

Montreal has important manufactures of boots and shoes, electrical appliances, sugar, textiles, and lumber. In 1926, 96,141 persons were employed in 1736 manufacturing establishments and received $109,364,475 in wages; the value of products manufactured was $556,236,407. The total assets of Montreal's 10 banks are $1,500,000,000, which is approximately 50 per cent of the total assets of all Canadian banks. The assessed value of Montreal real estate in 1928 was $1,160,956,007. In 1928, 6639 building permits valued at $36,284,181 were issued. Recent building activity includes the construction of two new terminals for the Canadian Pacific and Canadian National Railways and of a new hotel of distinctive design erected by the Canadian Pacific Railway. On Oct. 1, 1928, the first international airmail service between Canada and the United States was inaugurated by a flight from Montreal to Albany.

MOON. See ASTRONOMY.

MOON, PARKER THOMAS (1892–). An American professor of international relations, born in New York City and educated at Columbia University. In 1913–14 he was William Mitchell fellow at Columbia and he was Gilder fellow in 1914–15. In the latter year, he was appointed instructor in history, and in 1919, assistant professor, at Columbia. Since 1925 he has been assistant professor of international relations. In 1921 he became managing editor of the *Political Science Quarterly*. He was a member of the staff of the American Commission to Negotiate Peace in 1918–19. He is a member of several economic societies, and author of *A Syllabus of Imperialism and World Politics* (1919); *The Labor Problem and the Social Catholic Movement in France* (1921); *Modern History*, with C. J. H. Hayes (1923); *International Relations* (1925). He also contributed to periodicals and year books.

MOORE, ALEXANDER POLLOCK (1867–). An American newspaper owner and diplomat. He was born at Pittsburgh, Pa., and as a boy went into newspaper work, becoming reporter, city editor, managing editor, and publisher. He was part owner of the Pittsburgh *Telegraph* and

Chronicle-Telegraph, managing editor of the Pittsburgh *Press*, and after 1904 editor-in-chief of the Pittsburgh *Leader*. In 1912 he attracted national attention by his support of the Roosevelt Progressive movement. He purchased the New York *Daily Mirror*, "tabloid," and the Boston *Advertiser* in 1928. He served as Ambassador to Spain (1923–25) and as Ambassador to Peru after 1928. In 1912 he married Lillian Russell (died, 1921), the singer and actress.

MOORE, Clarence Lemuel Elisha (1876–). 'An American mathematician born near Bainbridge, Ohio, and educated at Ohio State University and Cornell. He was assistant in mathematics at Ohio and held a similar appointment at Cornell. In 1904 he was called to the Massachusetts Institute of Technology, where in 1920 he became professor. Among the subjects in which he has made special investigations are geometry of the sphere, geometry of the circle in space, and the differential geometry of hyperspace.

MOORE, George (1852–). An Irish author (see Vol. XVI). A stylist who lived in England, he was not sympathetic either with the literary revival in his native land, or with other literatures of the period. His later works were *The Brook Kerith* (1916); *A Storyteller's Holiday* (1921); *Heloise and Abelard* (1921); *In Single Strictness* (1922); *Ulick and Soracha* (1926); and a play, *The Making of an Immortal* (1928).

MOORE, George Edward (1873–). A British philosopher. He was educated at Trinity College, Cambridge, and worked there as fellow (1898–1904), lecturer on moral science (1911–25), and then as professor of mental philosophy and logic. He became one of the leaders of the realistic group of philosophers, constituted around the scientific researches of which Cambridge was the centre. His volume on *Principia Ethica* (1903) was an attempt to apply the method of scientific realism to the field of morality and value judgments, but the attempt was only partially successful. Among his other works are a popular exposition of ethical theory (*Ethics*, 1912) and a volume entitled *Philosophical Studies* (1922). In 1920 Professor Moore became the editor of the British philosophical periodical, *Mind*.

MOORE, Harry Tunis (1874–). An American Protestant Episcopal bishop, born at Delavan, Wis., and educated at Hobart College and the Western Theological Seminary. In the same year, he was ordained in the Protestant Episcopal Church and served as rector in several cities of Nebraska, Texas, Illinois, and other States. He was rector of St. Matthew's Cathedral in Dallas, Texas, 1907–17, and in the latter year was appointed coadjutor bishop of the Diocese of Dallas. Since 1924 he has been bishop of the same diocese.

MOORE, Henry Ludwell (1869–). An American economist, born in Charles County, Md. He studied at Randolph-Macon College, and in Vienna, and at Johns Hopkins University, where during 1896–97 he was instructor of political economy. In 1897 he became professor of political economy at Smith College (Northampton, Mass.). From this position he resigned in 1902 to accept a similar chair at Columbia University. He retired in 1929. In addition to many articles on the statistical aspects of his specialty, he is the author of *Laws of Wages* (1911); *Economic Cycles, Their Law and Cause* (1914); *Forecasting the Yield and Price of Cotton* (1917); *Generating Economic Cycles* (1923).

MOORE, Henry Thomas (1886–). An American psychologist and college president, born at Ansonville, N. C., and educated at Yale and Harvard Universities. He taught at Simmons College and in 1915–17 and 1919–25 at Dartmouth. Since 1925 he has been president of Skidmore College at Saratoga Springs, N. Y. He also edited the *Journal of Abnormal and Social Psychology*. He is the author of *The Genetic Aspect of Consonance and Dissonance* (1914); *Pain and Pleasure* (1917); and *Modern Psychology for the Beginner* (1922).

MOORE, Hugh Kelsea (1872–). An American chemical engineer, born at Andover, Mass., and educated at the Massachusetts Institute of Technology. He was connected with the American Electrolytic Company and with the Burgess Sulphite Fibre Company (1903–10). On the consolidation of several sulphite paper pulp mills as the Brown Company, he became its chief chemical engineer. His original investigations were chiefly concerned with various processes in paper pulp making and its bleaching, on which he obtained many patents. He invented a continuous process for the hydrogenation of oils, and in 1897, the unsubmerged cathode cell. In 1920 he received the gold medal of the American Institute of Chemical Engineers. During the World War, he was a member of the Council of National Defense and also a member of the division of chemistry of the National Research Council. He invented and patented a new method of making calcium arsenate (1925–27) and a new acid-resisting hydraulic digester cement (1926–27). In addition to many chemical papers, he is the author of *The Human Elements in the Mill* (1918) and *Why the Church Fails to Interest People Enough to Attend* (1918).

MOORE, John Bassett (1860–). An American jurist and diplomat (see Vol. XVI). He served as delegate to the Pan-American Financial Congress in 1915 and was vice president of the International High Commissions organized by that conference. In 1921–28 he served as judge of the Permanent Court of International Justice. As ambassador extraordinary and U. S. delegate, he presided at the International Conference at The Hague in 1922–23 on Rules for Aircraft and Radio in Time of War. He was awarded the Roosevelt Distinguished Service Medal in 1927. His later works on politics and diplomacy included *Principles of American Diplomacy* (1918) and *International Law and Some Current Illusions* (1924).

MOORE, John Monroe (1867–). An American bishop of the Methodist Episcopal Church, South, born at Morgantown, Ky., and educated at Lebanon College and Yale and in Germany. He was ordained in the Methodist Episcopal Church, South, and filled pastorates in St. Louis, Mo., and San Antonio, and Dallas, Texas. For several years, he was managing editor of the *Christian Advocate* and he was secretary of home missions of the Methodist Episcopal Church, South, from 1910 to 1918. In the latter year, he was elected bishop and given charge of work in Brazil (1922), in Oklahoma and eastern Texas (1922–26), and in western Texas and New Mexico (1926–). He also served as a general secretary of the Federal Council of Churches of Christ in America. He was the author of *Etchings of the East* (1909); *The South To-day* (1916); *Brazil—An Introductory Study* (1920); and *Making the World Christian* (1922).

MOORE, RICHARD BISHOP (1871–). An American chemist, born at Cincinnati, Ohio, and educated in England and France and at Chicago University. He was instructor in chemistry at Missouri, during 1905–11 professor of chemistry at Butler College, and thereafter physicist to the Bureau of Soils of the Department of Agriculture. In 1912 he became connected with the United States Bureau of Mines, whose chief chemist he was in 1919–23. Since 1926 he has been dean of science and head of the chemistry department at Purdue University, Lafayette, Ind. His original investigations were largely concerned with the properties of rare gases in the atmosphere, and the metallurgy of rare metals, especially tungsten, uranium, and vanadium, and more recently the metallurgy of radium, on which he wrote valuable papers. He is the author of *A Laboratory Chemistry* (1904).

MOORE, (WILLIAM) UNDERHILL (1879–). An American lawyer and educator, born in New York City and educated at Columbia University. From 1892 until 1907, he practiced law in New York City. After service on the faculty of the Universities of Kansas and Wisconsin, he was appointed professor of law at Columbia University in 1916. He served in the Spanish-American War. He wrote *Cases on Bills and Notes* (1910, 2d ed., 1922) and contributed to the *Columbia Law Review* and other law publications.

MORAND, PAUL (1888–). A French novelist, born in Paris, son of a French father and a Russian mother, and educated at the Sorbonne. He entered the French diplomatic service and was attached to the embassies at London, Rome, and Madrid. As a man of letters, he rose to prominence with his novels and stories of post-war, cosmopolitan Europe, *Tendres Stocks*, stories (1921) and *Ouvert la Nuit*, stories (1922). His other works include *Fermé la Nuit*, stories (1923); *Poèmes* (1924); *Lewis et Irène* (1924); *L'Europe galante* (1925), vol. i of *Chronique du XX^e Siècle, Bouddha vivant* (1927) being vol. ii; *Rien que la terre*, travel in the Far East (1926); *Le voyage*, on the art of travel (1927); *Mr. U.* (1927); *Paris-Tombouctou* (1928); and *Magie Noire*, African stories (1928). Most of these books have been translated into English.

MORANZONI, ROBERTO (1882–). An Italian operatic conductor, born in Bari. He studied violin with Pier Tirindelli in Venice, and when his father, a military bandmaster, was ordered to Alexandria, he attended the Conservatory there, studying counterpoint under Cicognani. When the latter accepted a call to the Conservatory at Pesaro, Moranzoni followed him, continuing his studies there in composition under Mattioli and Mascagni. In 1901 he began his career as assistant conductor to Mascagni at the Teatro Costanzi in Rome. After conducting in Bologna, Milan, Turin, Paris, and London, he made his American début with *Tosca* with the Boston Opera Company (Nov. 12, 1910), and remained until the dissolution of the organization in 1916. During 1917–24 he was conductor at the Metropolitan Opera House, where he conducted the world première of Puccini's triptych, *Il Tabarro, Suor Angelica,* and *Gianni Schicchi* (1918). In 1924 he became one of the conductors of the Chicago Civic Opera Company.

MORAVIA. See CZECHOSLOVAKIA.

MORAVIANS. A religious denomination comprising, in the United States, three branches: The Moravian Church (Unitas Fratrum); the Evangelical Union of Bohemian and Moravian Brethren in North America; and the Independent Bohemian and Moravian Brethren Churches. It was formed in Bohemia in 1457 under the leadership of John Huss and Jerome of Prague, and opposed the efforts of Austria and the Roman Catholic authorities to suppress it. At the beginning of the Reformation, it had more than 400 churches. In 1741 Moravians settling at Bethlehem, Pennsylvania, founded the first Moravian Church in the United States. The doctrine is evangelical, without a creed peculiar to itself, and in its policy the denomination follows a modification of the episcopacy, having a ministry of three orders: bishops, presbyters, and deacons.

The Unitas Fratrum, the largest branch, is organized in two coördinate provinces: the Northern, with a provincial synod meeting every fifth year (a meeting of the Northern Province is planned for 1930); and the Southern, of which the provincial synod meets every third year. The church maintains five educational institutions. Missionary workers are maintained in southern California and Alaska, and in Nicaragua, the West Indies, Jamaica, Labrador, Surinam, South America, the Himalayas, and Unyanwesi, Central Africa. Publications are the two weeklies, *The Moravian*, and *Der Brueder-Botschafter*, and the monthly, *The Moravian Missionary.* On Jan. 1, 1928, there were: 131 churches; 159 ministers; 26,394 communicant members, although the actual membership was estimated at 36,516; and 123 Sunday schools with 21,534 scholars. These figures may be compared with those of 1916 when there were 110 churches, with 26,373 registered members; and 104 Sunday schools, with 14,954 scholars.

The Evangelical Union of Bohemian and Moravian Brethren in North America, of which the first congregation was organized in 1864, at Wesley, Tex., is under the direction of a synod which meets each year on July 6, the day of the death of John Huss. In 1926 (the latest year for which figures were available) this denomination reported 34 churches in North America with 5241 members and 24 Sunday schools, with an enrollment of 1708; total expenditures were $12,023; and church property was valued at $76,700. This shows an increase over 1916, when there were 23 churches with 1714 members; and 20 Sunday schools with 565 scholars. Expenditures for the year amounted to $5499 and church property was valued at $19,720.

The Independent Bohemian and Moravian Brethren Churches were founded in 1858 in College Township, Iowa. According to the United States census, there were three churches in 1916, and the same number in 1926; membership dropped from 320 to 303; and scholars of the three Sunday schools decreased from 348 in 1916 to 318 in 1926.

MORESNET. See EUPEN, MALMÉDY, AND MORESNET.

MOREY, CHARLES RUFUS (1877–). An American archæologist and author, born at Hastings, Mich., and educated at the University of

Michigan. From 1900 to 1903, he was a fellow of the American School at Rome. In 1903–04 he was a fellow at Princeton University, and in 1906 he became head of the Princeton summer school. He was appointed professor of art and archæology there in 1918. In 1925–26 he was in charge of the American School of Classical Studies in Rome. A member of many learned societies, he was the author of art studies including *East Christian Paintings in the Freer Collection* (1914); *Lost Mosaics and Frescoes of Rome* (1915); *Romanesque Sculpture* (1920); *Sardis,* vol. v (1924).

MORGAN, Edmund Morris, Jr. (1878–). An American jurist and educator, born at Mineral Ridge, Ohio, and educated at Harvard University. In 1905 he began practice in Duluth, Minn., remained there until his appointment as professor of law at the University of Minnesota in 1912. From 1917 to 1925, he was professor of law at Yale University. Since 1925 he has held a similar chair at Harvard. In the World War, he served in the judge advocate general's department with the rank of lieutenant-colonel. He was the author of *Cases of Common Law Pleading* (1917) and *Introduction to the Study of Law* (1924).

MORGAN, J(ohn) Pierpont (1867–). An American financier (see Vol. XVI). He took a prominent part in the financial aspects of the World War and following its outbreak made the first loan of $12,000,000 to Russia. His firm was appointed commercial agent of the British government in the United States in 1915 and conducted purchases of all munitions and supplies in the United States. In the same year, a loan of $50,000,000 was made to the French government, and he organized a syndicate of about 2200 banks and floated a loan of $500,000,000 to the Allies. After the World War, he was frequently called on to advise the American and foreign governments in financial matters and made several trips to Europe to investigate and report on financial conditions there. In 1929 he was one of the unofficial American delegates to the Reparations Conference in Paris. The same year, he received the degree of LL.D. from Princeton University.

MORGENTHAU, Henry (1856–). An American diplomat (see Vol XVI). In 1913 he was appointed Ambassador to Turkey and served until 1916. During 1914–16 he was in Turkey in charge of the interests of Great Britain, France, Italy, Russia, Serbia, and other countries. In 1919 he was a member of the commission appointed by President Wilson to investigate conditions in Poland. He was appointed Ambassador to Mexico in 1920, but owing to the severance of relations between the United States and that country, he did not serve. He was vice president of the Near East Relief from 1919 to 1921 and chairman of the Greek Refugee Settlement Commission created by the League of Nations in 1923. He wrote *Ambassador Morgenthau's Story* (1918) and *All In a Lifetime* (1919). Decorations were conferred on him by various countries for his services during the World War.

MORINI, Erika (1906–). An Austrian violinist, born in Vienna. She received her first instruction from her father, who was the director of his own music school in Vienna, and completed her studies under Otakar Sevcik. Hers is a case of remarkable precocity, for when she made her début in Berlin, under Nikisch, in 1917, the critics made no allowance for her youth, but spoke of her work as the equal of that of the most famous of the younger generation of violinists. Her American début at New York (Jan. 26, 1921) was one of the musical sensations of the year. In the next three years, she played with overwhelming success in more than 100 cities of the United States. She made her first visit to London in 1923. Overwork during this tour of England necessitated her retirement for three years, part of which time she spent in further study with Sevcik. She resumed her concerts in 1927 in Europe and America, and proved that she is one of those rare cases, where a child prodigy has developed into a really great artist.

MORISON, Samuel Eliot (1887–). An American historian, born in Boston, Mass., and educated at Harvard and in Paris. He was instructor, lecturer, and professor of history at Harvard after 1915 and Harold Vyvyan Harmsworth professor of American history at the University of Oxford, 1922–25. He served as a private in the United States Army in the World War and was attached to the Russian division of the American Commission to Negotiate Peace in 1919. He was a member of many learned societies and wrote *Life of Harrison Gray Otis* (1913); *History of the Constitution of Massachusetts* (1917); *Maritime History of Massachusetts* (1921); *The Oxford History of the United States* (2 vols., 1928).

MORLEY, Christopher (Darlington) (1890–). An American editor and writer, born in Haverford, Pa. He graduated from Haverford College in 1910 and from that year to 1913 was a Rhodes scholar at Oxford. He served on the editorial staff of several publications and journals and from 1920 to 1924 conducted a column in the New York *Evening Post.* In the latter year, he joined the staff of the *Saturday Review of Literature.* Morley's critical insight and keen sense of humor have made him one of the most popular essay writers of the day. In 1928 he successfully undertook the production in Hoboken, N. J., of American plays of the middle nineteenth century. His books in prose and verse include *The Eighth Sin* (1912); *Songs for a Little House* (1917); *The Rocking Horse* (1919); *Parnassus on Wheels* (1919); *Travels in Philadelphia* (1920); *Pipefuls* (1920); *Tales from a Rolltop Desk* (1921); *Chimney-smoke* (1921); *Where the Blue Begins* (1922); *The Powder of Sympathy* (1923); *Inward Ho!* (1923); *Parson's Pleasure* (1923); *Thunder on the Left* (1925); *Hostages to Fortune* (1925); *The Romany Stain* (1926); *I Know a Secret* (1927); and *Essays* (1928).

MORLEY OF BLACKBURN (John Morley), First Viscount (1838–1923). A British public official and man of letters (see Vol. XVI). From 1910 to 1914, he served as Lord President of the Council, but resigned in the latter year after the declaration of war with Germany, which he opposed. He retired to his country home and devoted himself to the writing of his *Recollections,* which was published in 1917. The book dealt very briefly with the end of his political life and was supplemented in 1928 by *A Memorandum on Resignation,* which was found among his papers. A complete edition of his works was brought out in 1921. Consult *Lord Morley's Criticism of English Poetry and Prose,* by J. D. McCallum (1921); *Lord Morley; Writer and Thinker,* by John H. Morgan (1924); and

Early Life and Letters of John Morley, by Francis W. Hirst (1927).

MORMONS. See Latter-day Saints.

MORNINGSIDE COLLEGE. A coeducational institution at Sioux City, Iowa, founded in 1894. The student enrollment increased from 584 in 1913–14 to 1313 in 1927–28, and in addition, there was a summer-session enrollment in 1928 of 251. The faculty in the autumn of 1928 had 50 members. The productive funds of the college in 1928 amounted to $600,000 and the income for 1927–28 to $171,833. The library contained 30,475 volumes in 1928. Between the years 1914 and 1928, a chair of religious education, departments of economics and sociology, and a complete course in public-school music were established; and Main Hall, a conservatory, a gymnasium, a temporary science hall, and women's residence halls with a capacity of 200 and costing $300,000, were constructed. President, Frank E. Mossman, A.M., D.D.

MOROCCO. The largest of the Barbary states, in northeastern Africa. Since 1912 about 95 per cent of its area has been a French protectorate; the rest, except for the free zone around Tangier, is under the protection of Spain. Total area, 218,525 square miles. The Spanish zone included 8280 square miles in the North. However, Spanish claims also took in the 9500 square miles in the Cape Juby region (southern zone) and the 580 square miles of Ifni on the west coast. By 1929 the French had occupied about 200,000 square miles. An official French census in 1926 gave the population for the French zone as totaling 4,229,146. The largest cities in the French zone, with populations for 1926, were: Casablanca, 106,608 (34,984 Europeans); Marrakesh, 149,263 (3652 Europeans); Fez, 81,172 (3559 Europeans); Rabat, 38,044 (1316 Europeans); Meknes, 29,930 (4923 Europeans). For the Spanish zone (northern), the population is estimated at 550,000; for Tangier, at 60,000 (13,000 Europeans). Tetuan, in the Spanish zone, has 24,000 inhabitants. Immigration, which had languished during the World War, became considerable again after 1918. See Tangier Controversy.

Industry. Agricultural and pastoral pursuits occupy four-fifths of the native population. Of the 24,000,000 acres in the French zone capable of cultivation, only 6,000,000 acres are being tilled. Barley and wheat receive the most attention; other crops are beans, oats, maize, and millet. Fruit trees, notably the olive, orange, lemon, palm, and almond, are beginning to play an important part. Stocks in 1926 in the French zone comprised 9,248,462 sheep, 3,037,731 goats, 1,932,840 cattle, 59,811 pigs, 562,835 asses, 190,251 horses and mules, 117,917 camels. Minerals include phosphates (1,337,100 tons produced in 1928), iron ore, copper, lead, petroleum, and manganese. Among the local industries are flour mills, breweries, soap and candle factories, cement factories, etc. The total number of European industrial establishments in 1926 was estimated at 600, employing 11,000 persons. As a result of European occupation, steady advances have been made. The construction of roads, harbors, and sanitary measures are the particular concern of the French. The harbor of Casablanca has received particular attention. The Spanish have concerned themselves with irrigation projects as well as the expansion of the port facilities of Ceuta and Laraish.

Commerce and Communications. The trade of the French zone has increased regularly. In 1913 imports and exports were 181,426,000 and 40,180,000 francs, respectively; by 1927 they had increased to 1,798,597,755 and 851,390,141. The bulk of the foreign trade was with France. The chief exports in 1927 were barley, eggs, beans, linseed, wool, phosphates, live stock, and almonds. A total of 2,921,000 tons of shipping entered French Moroccan ports in 1912 and 2,421,088 tons in 1927. The trade of the Spanish zone was as follows: imports and exports for 1913 were 25,335,000 and 2,876,000 pesetas; for 1926, 123,000,000 and 18,000,000 pesetas. The trade for Tangier was as follows: imports and exports for 1913 were 24,455,000 and 3,408,000 francs; for 1927, 129,445,005 and 33,543,730. Under the French administration, road building has progressed rapidly so that by 1927, 2448 miles were open for use. As part of the same general plan for the opening up of the protectorate, military lines of 2-foot gauge were converted into standard gauge lines. There were 1100 miles of such roads in 1928. The principal lines were the Fez-Oudja (223 miles), Fez-Casablanca (210 miles), Casablanca-Marrakesh (171 miles). In the Spanish zone, a meter gauge line runs from Ceuta to Tetuan, and another from Rio Martin to Tetuan. Telephone and telegraph communications have been widely extended, and wireless stations were erected at Fez, Marrakesh, Mogador, and Tangier.

Government. In the French zone, as a result of increased activity, administrative costs mounted steadily. Expenditures in 1916–17 were 45,389,000 francs; in 1928, 641,232,265. Revenues are usually in excess with the result that the debt service carried annually was conspicuous. Of the 1928 budget, 140,717,893 francs were applied to the public debt, which in that year totaled 705,624,000 francs, of which 300,000,000 francs had been floated in 1922 as the first section of an authorized loan of 700,000,000 francs. No further sections of this loan have been floated. The scheme encompassed a great series of public works, including the development of harbors, roads, water-power resources, phosphate works, posts, telegraphs and telephones, health service, forestry, public instruction, etc. The budget for the Spanish zone in 1928 balanced at 55,913,441 pesetas. Education, under the foreign influence, has made great advances. In 1912 the French zone had only 37 schools; by 1926 it had 199 with 27,595 pupils in attendance.

History. The partial withdrawal of French troops on the outbreak of the World War, and the ever-present anti-European feeling which German agitators continually fostered, aggravated the unruliness long chronic in Morocco. As the War continued, French occupation was extended; the Tafilalt region was subdued by 1917, and an uprising of the Ait Atta there was put down, after desultory fighting, by 1919. France's policy of continuing public works and of befriending native chieftains stood her in good stead, for many of the powerful native leaders remained consistently friendly. In 1919 and 1920, as a result of trouble in the Sifru region and the Gharb, the French were able to push further into the interior, so that by 1923 most of the country, with the exception of the Middle Atlas, was effectively occupied. An exceptionally able administrator, Marshal Lyautey, was appointed to the post of Resident General for a second term on April 7, 1917, after a year's absence in Paris as Minister of War. Under his energetic direction, remarkable progress was made in sanitation, road construction, railway building, and education. Lack of success in dealing with the warlike Riff tribesmen, however, caused Lyautey's resignation in September, 1925. He was succeeded by Theodore Steeg, who, in turn, was replaced on Jan. 2, 1929, by Lucien Saint. Although the "Pearl of Northern Africa" prospered greatly under French rule, it was indebted to France, as a result of five loans, to the extent of 705,624,000 francs on Jan. 1, 1927.

The Spanish problem in Morocco was less easily solved. Because of the lax administration and the difficulties of communication, the native independent temper was less easy of subjugation. Bridandage continued the rule; the Riff and Jebala tribes were particular offenders. Most of the dissident spirits gathered around the old bandit chief, Raisuli. From 1916 to 1919, all attempts to eject him from the Tangier-Tetuan road which he held were unavailing; when he finally evacuated the country, he merely moved to another centre of operations.

By 1919, too, another leader, Abd-el-Krim, leading the Riff mountain tribes, appeared. In 1921 he inflicted a crushing defeat upon the Spanish troops at Melilla, capturing thousands of men and a hundred cannon. With the advent of 1923, the Spaniards were driven back to a narrow strip along the coast line. The influence of this succession of reverses on the situation at home was momentous. (See SPAIN.) In July, 1922, the Spanish High Commissioner General, Berenguer, was forced to resign; his successor, Gen. Ricardo Burguete, found it necessary to retire in December; and in September, 1923, because of the unsatisfactory handling of the whole situation, the Spanish government was seized in a *coup d'état* and a military dictatorship under General Rivera was created.

Rivera, however, was no more successful in dealing with the Moroccans than the old administration had been. Indeed, in 1925, it seemed as though Abd-el-Krim, after he had captured his rival, Raisuli, might make good his claim, established in 1922, to the title of Sultan of All Morocco. Unfortunately for Abd, he now ventured to attack the French who had tried to help the Spanish by cutting off the chieftain's grain supply. France sent in such modern weapons as airplanes and tanks, and by 1926 had a force of 150,000 men in the field. To these were added 104,000 Spanish soldiers—all against a total of from 65,000–75,000 badly-organized Riff tribesmen. After a series of reverses, some of Abd's allies deserted him, and on May 28, 1926, he surrendered. The French shipped him off into exile to the island of Réunion, near Madagascar, and then sent some official advisers into the recovered Spanish Morocco to help the Spanish High Commissioner straighten out things once more.

An area of 225 square miles around the Free City of Tangier was made an international neutral zone by a convention signed on Dec. 18, 1923, and a protocol signed in July, 1925, by Great Britain, France, and Spain. The international arrangement was somewhat modified by a Paris protocol of July 25, 1928. This latter protocol was also signed by Italy.

Theoretically, Sultan Sidi Mohammed, who succeeded his father, Moulay Youssef (reigned 1912–1927), to the throne on Nov. 18, 1927, became ruler over an absolute monarchy. Actually, the various treaties and conventions in force gave all power to the French Resident General, the Spanish High Commissioner, the Administrator of the Tangier Zone, and a large group of French and Spanish local controllers. (See FRENCH COLONIES, SPAIN, TANGIER, WORLD WAR).

MORRIS, JAMES CRAIK (1870–). An American Protestant Episcopal bishop, born at Louisville, Ky., and educated at the University of the South, the Louisville Law School, and the General Theological Seminary. He was ordained in the Protestant Episcopal Church in 1896 and was the curate of churches in Texas and New York. From 1901 to 1916, he was dean of St. Mary's Cathedral in Memphis, Tenn., and from 1916 to 1919, rector of Grace Church in Madison, Wis. In 1920 he was consecrated Bishop of the Panama Canal Zone and Parts Adjacent.

MORRIS, ROBERT TUTTLE (1857–). An American surgeon, born in Seymour, Conn., and educated at Columbia University. He became a professor of surgery at the New York Postgraduate Medical School in 1895 and professor emeritus in 1917. He is the author of many books, including *How We Treat Wounds To-day* (1886); *Lectures on Appendicitis* (1895); *Dawn of the Fourth Era of Surgery* (1910); *Microbes and Men* (1918); *A Surgeon's Philosophy* (1918); *Doctors vs. Folks* (1918); *The Way Out of the War* (1918); *Nut-growing* (1921); and *Editorial Silence* (1927).

MORROW, DWIGHT WHITNEY (1873–). An American banker and diplomat, born at Huntington, W. Va., and educated at Amherst College and Columbia Law School. In 1899 he began the practice of law in New York City as a member of the firm of Simpson, Thatcher & Bartlett. In 1914–27 he was a member of the firm of J. P. Morgan & Co. He resigned on Sept. 30, 1927, to accept appointment as U. S. Ambassador to Mexico. As Ambassador, he was brilliantly successful in promoting friendly relations between the two countries. He took an active part in civic matters in New York City and in New Jersey. He was director of the War Savings Committee of New Jersey (1918). During the World War, he served with the Military Board of Allied Supply and received the Distinguished Service Medal. In 1925 he was chairman of the President's Aircraft Board.

MORROW, HONORÉ W. See WILLSIE, HONORÉ W.

MORTAR, TRENCH. See TRENCH WARFARE MATERIAL.

MORTGAGE BANKS. See AGRICULTURAL CREDIT.

MOSCICKI, IGNACY (1867–). A President of Poland, born at Mierzanov, then Russian territory. He was forced to leave Russia in 1892 because of his political activities and lived five years in London. In 1897 he became assistant and in 1901 director of the physical laboratory at the University of Fribourg, Switzerland, and in 1912 was appointed professor of physics at the University of Lemberg. He was elected President by the Diet in June, 1926, after Marshal Pilsudski, the dictator following a successful *coup d'etat,* had refused election to the office and suggested Professor Moscicki for the post. See POLAND, under *History.*

MOSCOW, mŏs'kō. The capital of the Union of Soviet Socialist Republics (commonly called Soviet Russia) and of the Russian Soviet Federation. The population at the census of 1926 was 2,025,947; in 1929 it was estimated at 2,285,100. The population has increased more than 40 per cent since the revolution, making Moscow the largest city of the Soviet Union. The municipal area is 27.5 square miles. After the revolution, the city was divided anew into six sections which were named: Khamovniki, Krasnaya Presnya, Sokolniki, Baumansky, Rogozhsko-Simonovsky, and Zamoskvorechye. The development of Moscow since the revolution has changed the aspect of the city to that of a modern metropolis. Above the low government buildings, most of which were the former mansions of the aristocracy, and the hundreds of church cupolas rise Moscow's modern skyscrapers. The best example of the new type of architecture is the Moscow Trust for Agricultural Industry, a 12-story building erected in 1924.

With the transfer of the Soviet government to Moscow in 1918, it was natural that the Kremlin, around which the life of Moscow had revolved for more than 800 years, should be chosen as the seat of government. Within its walls the All-Russian Executive Committee, the Central Executive Committee of the Soviet Union, the Council of the People's Commissariats, and the Council for Labor and Defense of the Soviet Union hold their sessions. In front of the Kremlin, in the Red Square, stands the Lenin Mausoleum, a structure of black basalt in the vault of which lies the embalmed body of the leader of the Russian Revolution. During the revolution, the Red Square was the scene of many violent battles; about 500 revolutionists who fell during these skirmishes are buried, with other prominent communists, in the plot of ground called the Brothers' Graves between the Nikokhi and Spaski gates.

Opposite the citadel, where once stood the stone commercial booths of mediæval Moscow, are the Commercial Arcades. The first floor of the building is occupied by the colossal government department store known as the Governmental Universal Stores of the Supreme Council of National Economy. Along the western wall of the Kremlin extends the Alexander Garden in which stands a granite obelisk on which are engraved the names of the great revolutionary leaders. The obelisk was made from a Romanoff monument which commemorated some festal occasion. Most of the departments of the Government are housed in Ilyinka Street in the vicinity of the Kremlin. Among these are the People's Commissariat of Finance, the People's Commissariat for Commerce, the People's Commissariat of Home Affairs, the People's Commissariat of Workers' and Peasants' Inspection, and the Central Control Commission of the Communist Party. The Club of the Nobility has been converted into the House of the Labor Unions, and its ball room is used for the trade-union conferences of the Soviet Union.

Museums and Educational Institutions. One of the greatest changes wrought by the Soviet government was the change in the status of the Russian Orthodox Church, which was shorn of its wealth, deprived of State support, and reduced to the position of a voluntary, unprivileged, and self-supporting society. Several of Moscow's famous churches and monasteries, such as the Church of Michael Malein in the Kremlin, the Cathedral of St. Basil in the Red Square, the Church of the Georgian Virgin, the Simonov Monastery, and the Novodyevichi Nunnery, have been transformed into museums. The Chapel of the Iberian Virgin was torn down in 1929 to widen the main gate of the Red Square, and the famous icon, the jewel-encrusted portrait of the Madonna, was removed to one of Moscow's churches. Since 1922 the most important art treasures taken from the churches and monasteries during the revolution and nationalized at that time have been kept in the Oruzheinaya Palace within the Kremlin. The inscription on the wall of the Second House of the Moscow Soviet, "Religion is opium for the people," proclaims the sentiment of a state which has adopted the precepts of Karl Marx.

The Moscow Soviet has kept abreast of Leningrad in the establishment of museums. The State Russian Historical Museum, facing the Red Square, was reorganized in 1921 into the Historical and Ethnological Museum of the Peoples of the Soviet Union and embodies the Department of Antiquities, formerly housed in the Rumyantzeff Museum. The Court of Finance has been converted into the Central Museum of the Red Army and Navy, with an especially interesting exhibit dealing with the period of the revolution. The Museum of the Revolution, founded in 1924 and housed in the former palace of the Razumovskis, presents the history of the Communist Party and of the Russian revolutionary movement. The picturesque estate of Pokrovskaye-Streshnyevo was changed in 1919 into a museum of the life of the nobility during the period of decadence. The Museum of the Lenin Institute, founded in 1924, contains objects relating to the life and work of Lenin. The Museum for the Promotion of Art, founded in 1923, contains examples of cubism, futurism, constrictivism, and other schools of modern Russian art. The Central Museum for the Protection of Labor and Social Insurance, under the control of the People's Commissariat for Labor, affords an excellent means of visual education on methods of industrial hygiene and labor protection. The State Bakhrushin Theatre Museum contains a large collection of objects connected with the history of the Russian stage. The State Toy Museum, founded in 1918, illustrates the many aspects of the influence of toys on a child's development. The Museum of the Central Industrial Region, organized in 1923, depicts the ethnography, geology, and archæology of the region about Moscow. The Rumyantzeff Museum, the finest architectural structure of the eighteenth century in Moscow, has been converted into the Lenin State Public Library with a collection of more than 3,000,000 volumes.

The Soviet government points with pride to its educational record. Before the World War, when Moscow had a population of 1,600,000, the children receiving an education numbered 295,000; in 1926 when the population numbered 2,025,000, 430,000 children were attending the public schools. A total of 900,000 persons in 1926 attended the public schools, technical schools, higher educational institutions, and the various "stations" for the elimination of illiteracy. Under the Soviet régime, more than 200,000 adults have learned to read and write. During the fiscal year 1925–26, the Moscow Soviet expended 37,000,000 rubles for public education. Among the important educational institutions established under the Soviet régime are the Marx-Engels Institute, founded in 1921 for the purpose of scientific research into the origin, development, and extension of the theory and practice of socialism and revolutionary communism;

the Communist Academy, with which are associated the Institute for Soviet Upbuilding and the Institute for World Economy and World Politics; the Institute of the Red Professorship, whose function is the training of Marxist teachers for the higher schools; the Children's City—Third International, an experimental station for the communistic education of children; the Experimental Station for Social Upbringing, whose object is the investigation of educational processes and the adoption of new school systems; the Central Workers' Institute, established for the experimental study of production processes and the training of workers in different trades; and the Academy of Fine Arts, founded in 1917 for the purpose of scientific research into the nature of art and artistic culture.

Industrial and Municipal Development. Moscow, next to Leningrad, is the greatest centre of trade and industry of Soviet Russia. Of the entire trade turnover of the country, 23 per cent falls to the share of the Province of Moscow. The gross output of the industry of the Moscow Province, 97.7 per cent of which is socialized, is likewise a high percentage of that of the entire country. During 1928 the sum of 370,000,000 rubles was expended on the capital development of Moscow's industries. The textile, foodstuffs, leather, and metal industries are being chiefly developed. In 1927 and 1928, the industrial output of Moscow increased 51 per cent and labor efficiency 35 per cent. In 1929, 25 per cent of all Moscow workers were placed on a seven-hour working-day basis.

The health measures instituted by the Moscow Soviet are having a beneficial effect. During the fiscal year 1926–27, the Moscow Soviet spent 46,000,000 rubles for health protection: the number of dispensaries was increased 19 per cent and the number of hospitals 12 per cent. In 1913 the death rate amounted to 25 out of every 1000; in 1928 it fell to 13 out of every 1000. Moreover, of the 49,860 babies born during 1928, only 6400 died, whereas in 1924 out of 54,300 babies 16,000 died during their first year. This decline in mortality is largely the result of the exhibits sponsored by the People's Commissariat for Health, such as the Exhibition of Health Preservation of the State Institute of Social Hygiene and the Exhibition of the Protection of Maternity and Infancy. The death rate was expected to decline still further as the Moscow Soviet continued to improve the sewer system, enlarge the park space, and increase housing facilities.

Considerable improvements have been made in the city's water-supply system, about 85 kilometers (52.8 miles) of new water mains having been laid since 1920. In 1927 and 1928, 140,000,000 rubles were expended for housing construction; the total floor space of the new dwellings, 880,000 square meters (9,472,000 square feet), accommodated 150,000 persons. In 1929 plans were made for the construction of a subway, 5 kilometers (3.1 miles) long, between the Sverdlov Square in the centre of the city and the Kalancheev Square on which the "October" and other railway stations are located. Another line, 12 kilometers (7.4 miles) in length, was to connect the Sokolniki section with the Krasnaya Presnya and Khamovniki sections.

Moscow has retained its title of Russia's cultural centre. The Great Academic Theatre and the Moscow Art Theatre have flourished under the Soviet régime, the leaders, even during the darkest days which followed the revolution, encouraging dramatic art, maintaining the ballet, and giving recognition to all distinguished actors, dancers, and musicians, provided that they were loyal to the Soviet State.

MOSELEY, George Van Horn (1874–). An American soldier, born in Evanston, Ill. He graduated from the United States Military Academy in 1889, was commissioned second lieutenant in the cavalry, and rose to the rank of brigadier general in 1921. He was appointed chief of the 4th Section of the General Staff at General Headquarters in 1918 and had general charge of the strategic supply, transportation, construction, and evacuation of the American Army in France. He was a member of several important commissions, including the Harbord Commission to the Near East, and was assigned as assistant to General Dawes in the U. S. Bureau of the Budget in 1921. In 1925–27 he commanded the 11th Field Artillery Brigade in Hawaii. He was awarded the Distinguished Service Medal and was given decorations by the Belgian, British, French, and Italian governments.

MOSES, George Higgins (1869–). A United States Senator. He was born at Lubec, Me., and was graduated from Phillips Exeter Academy (1887) and Dartmouth College (1890). From 1892 to 1918, he was editor of the Concord (N. H.) *Evening Monitor.* As private secretary of two New Hampshire governors and the chairman of the Republican State Committee, he had an early introduction to practical politics. In the Republican National Conventions of 1908 and 1916, he served as delegate-at-large from New Hampshire. He was Minister to Greece from 1909 to 1912. In 1918 he was elected to the United States Senate for an unexpired term and was reëlected for the terms 1921–33. He was made president *pro tempore* of the Senate in 1925 and has been chairman of the Rules Committee and a member of the Foreign Relations Committee. He was permanent chairman of the Republican National Convention at Kansas City in 1928.

MOSUL. See Iraq.

MOTHERS' PENSIONS. Mothers'-pension laws, or laws providing for public aid to dependent children in their own homes, are intended to conserve family life by preventing the break-up of homes after the death, desertion, or disability of the father. The first State-wide mothers'-aid law was passed in 1911, two years after the White House Conference on the Care of Dependent Children, called by President Roosevelt, had declared as its fundamental proposition that children should not be deprived of home care except for urgent and compelling reasons, and that "children of parents of worthy character . . . and children of reasonably efficient and deserving mothers who are without the support of the normal breadwinner, should, as a rule, be kept with their parents, such aid being given as may be necessary to maintain suitable homes for the rearing of children." The mothers'-pension movement became an effective answer to the arguments of opponents of child-labor legislation that children of widowed mothers would be helpless if they were not permitted to work. By the close of 1913, 19 States had State-wide mothers'-pension or aid-to-mothers laws, and Missouri had provided for such aid in Kansas City and St. Louis. By 1928 such laws were in effect in the District of Columbia, Alaska, Hawaii, and all the States of the Union except the following: Alabama, Georgia, New Mexico, and South Carolina.

At first, the aid was usually limited to widows, but the conception of this method of provision for children has gradually widened, until by 1928 only five States, of the 44 in which laws were in operation, limited the grant to children of widows, though all the States included widows directly or by implication. The Colorado act included a parent, or other person designated by the court, who because of poverty was unable to provide properly for a dependent child. Children of widowed or deserted mothers, and of mothers whose husbands were serving penitentiary sentences or were physically or mentally incapacitated, were commonly included. The ages under which children were eligible for aid ranged from 14 to 17 years and one State (Ohio) mentioned no age limit; in many States, the upper age limit had been made to correspond with the upper age limit of the child-labor law, so that aid might be continued until the child was legally permitted to go to work. In the majority of States, maximum amounts were specified, ranging from $8.66 to $35 a month for one child, with additional amounts (usually smaller) for each additional child. Frequently, the maximum amount for a family of any size was specified in sums ranging from $40 to $70, but in six States there was no such limitation. The amount of aid granted to each family can be adjusted to the actual needs of the family only if the maximum amount authorized by law is sufficiently high or if no limit is specified. The administration of the aid-to-mothers law was vested either in a court having juvenile jurisdiction, a county or town board granting poor relief, a county board of public welfare, a special county board, or a State board. Ten States and the District of Columbia require that mothers receiving pensions be citizens or have made a declaration of intention; in 39 States, there is a requirement calling for a period of residence in the State.

How important has become this public aid to dependent children may be gauged from the following figures: During 1928, New York State was spending $6,396,307 on its dependent families, which numbered 12,538. In the same year, New York City was spending $5,156,436 to care for 9907 families with 26,096 children. The Children's Bureau estimated that, at any one date, approximately 200,000 children were receiving this form of public aid in their own homes. In 20 States, the sum of $18,000,000 was being spent annually. It is not unreasonable to expect that before long these public agencies will take care of all dependent children and make the work of private philanthropy an anachronism.

MOTHS DESTRUCTIVE TO VEGETATION. See ENTOMOLOGY, ECONOMIC.

MOTION PICTURES. See MOVING PICTURES.

MOTOR SHIP. See SHIPBUILDING AND NAVAL ARCHITECTURE; SHIPPING.

MOTOR VEHICLES. In recent years, motor vehicles have undergone very little change in basic principles and design. Many improvements, however, have been made in the way of mechanical details and in the ease of passenger cars, in refinements of body lines, finish, and equipment. Each succeeding year's models of passenger cars show that style is becoming more and more a factor as affecting appearance; the resemblance between different makes became strikingly evident in the 1929 models. Outstanding changes since 1919 have been the introduction and complete adoption of so-called balloon or low-pressure tires and four-wheel brakes. Systems of finishing cars also have entirely changed with a great gain in resistance to deterioration. The nitrocellulose, or lacquer, system has superseded the old oil-base paint-and-varnish system, and chromium has now replaced nickel for the plated parts.

Power plant accessories that were innovations in this period were gasoline strainers, air cleaners, and oil filters, all having their effect in reducing or retarding wear of moving parts by removing dust, grit, and foreign particles from the gasoline and air entering the cylinders in the combustible mixture, and from the lubricant between its cycles of circulation, the latter making less frequent changes of crank-case oil necessary.

Speaking generally, engineering talent, since substantially satisfactory reliability and endurance already were achieved, has been directed toward greater comfort and convenience for driver and passengers. Faster, comfortable riding, and longer driving without fatigue are now possible through better springing, the now nearly universal use of some form of shock absorbers, better weight distribution, improved form, tilt, and cushioning of seats, careful selection of tire sizes and pressures, and reduction of vibration, not only from without, as by the means just noted, but also from within through rubber insulators in engine and other mountings, better engine counterbalance, vibration dampeners, lighter reciprocating parts and quieter gearing. The driver has had his convenience considered in easier gear shifting, simplified chassis lubrication, quicker pick-up through more power, and less tiring steering and braking mechanisms.

Of the three sources of motive power—steam, electricity, and gasoline—the last has increased in use while the others waned until the internal-combustion engine was practically the sole survivor.

Steam Automobiles. Steam automobiles are rapidly passing out of use in the United States, where their application has been mostly for passenger use; but they are still used to some extent in England for commercial purposes. Several marked improvements were made in the steam automobiles, overcoming some of the objections against them. One of these was the frequent refilling of the water-supply tank, which in the earlier Stanley steamers was necessary every 25 or 30 miles. This was because the steam was exhausted directly into the air after it had passed through the engine. The later steam automobile exhausts into a condenser at the front of the chassis where the radiator is placed in gasoline vehicles. The steam condenses, the cylinder oil is separated from it, and the water is pumped back into the tank and used repeatedly, but must be replenished for loss exhausted to the air through a relief valve when steam is used in excess of the condenser capacity as on heavy pulls. The cruising radius on one tank of water is increased from 6 to 10 times that possible without the condenser.

The other big improvement was the Doble combustion system, in which the usual Bunsen or Argand burner is replaced by a more intense blow torch or blast flame that burns in a closed combustion chamber, under the boiler, lined with refractory material. This reduces the fire risk, a hotter fire is obtained, and it is more easily started. The older burner was started from a "pilot" or small auxiliary burner that was started initially by preheating with a plumber's blow torch. It took 15 to 20 minutes to start generating steam with the fire-tube boiler and old burner combination for enough steam to supply the engine. In the new combustion system, an electrically driven air blower supplies the blast and vaporizes the fuel sprayed into the air stream thoroughly. So completely are the two mixed that the resulting vapor may be ignited almost instantaneously by an electric spark plug such as used in internal-combustion motors; as a flash boiler is used, steam generation starts almost as soon as the combustion chamber is filled with burning gas. A generator driven from the axle while the vehicle is in motion keeps the storage battery charged. The battery supplies the blower motor, the igniting spark for the electric "pilot" and current for the lamps used in night driving. The engine used is the simple, two-cylinder, double-acting type, directly geared to the rear-axle differential-drive gear. Much better results are obtained with kerosene or fuel oil in the blast combustion system, and the burner cannot clog so easily as when a Bunsen burner is used with fuels of other than high volatility, when imperfect combustion causes carbonization of the numerous fine fuel vapor spray orifices.

Electric Automobiles. Electric passenger automobiles are no longer made and very few are still in use. A few electric commercial vehicles are still made and have their advantages for certain types of short-haul work. Storage batteries were increased in capacity without a proportionate increase in weight, by more careful design and construction, and were installed in shock-insulated containers which were readily accessible for examination and easily changed for fully charged batteries as replacements. This was valuable where it was not always possible to lay up the vehicle for the time necessary to recharge the battery if exhausted in service.

Gas-electric Trucks. Combination gas-electric trucks have been designed and put to practical use. In these, an internal-combustion motor drives a generator, which in turn keeps a charge of electricity in the battery. The wheels are driven by electric motors; in some there is a separate motor in each rear wheel. In special applications, such as fire apparatus of the heavier types, there may be a motor in each of the front wheels and none in the rear. There are other forms which have a driving motor in each of the four wheels, all of which may be moved at an angle from the normal direction of vehicle movement to make steering easier. There is still another system in which a small engine is operated at constant speed while the vehicle is in motion, regardless of the vehicle speed; the generator supplies current to a driving motor, and the storage battery, which is smaller than that ordinarily used in electric vehicles, is "floated on the line" so that it absorbs excess current when power requirements are less than that supplied by the engine-generator combination, and it gives out electricity to the power motor when more than normal output is required. Such combinations are cumbersome and relatively inefficient and have not won much recognition.

To increase the cruising radius per charge, some makers of electric vehicles use a motor that can be turned into a generator by simple control-lever movement when coasting down hills; advantage can be taken of the conversion of mechanical power due to vehicle momentum produced by gravity into electrical energy which is "stored" in the storage battery of the vehicle. Tests made by competent drivers have shown an increase per charge in cruising radius of from 10 to 15 per cent when the driving motor may be used as a dynamo under favorable conditions.

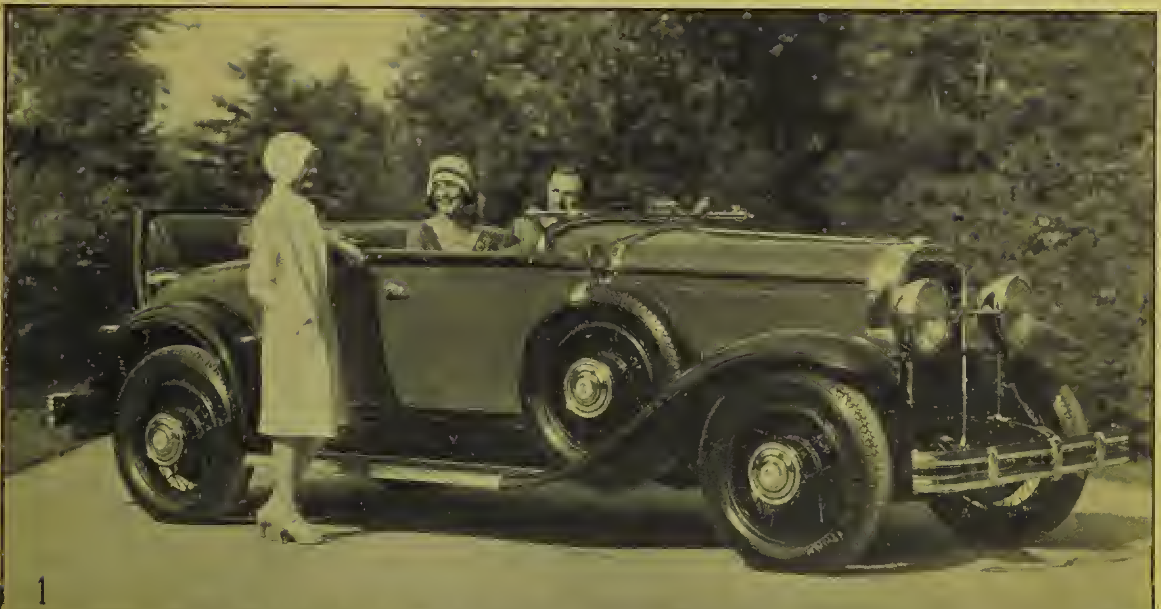
Trackless Trolleys. Still another form of motor vehicles using electric motors for power is a hybrid between the usual form of electric rail car and the self-propelled motor vehicle; it is built just like an electric automobile as far as chassis and body construction go, as well as in the placing of the driving motor and the character of control and power transmission elements. No storage battery is provided in some, but a trolley pole taking current from a pair of conductors overhead is used. In other forms, a battery is supplied to take care of crossovers or to permit the vehicle to change from one line to another. Having rubber tires, these trackless trolleys, as they are called, cannot use rails as a return; so that two trolleys and trolley wires are necessary. The overhead conductors must be carefully separated from each other. The vehicle is steered the same as the conventional automobile and can thus pass around slower traffic that might retard a car on rails. The expense of installation is less than for trolley cars, because no roadbed need be provided other than the highway used by all vehicular traffic.

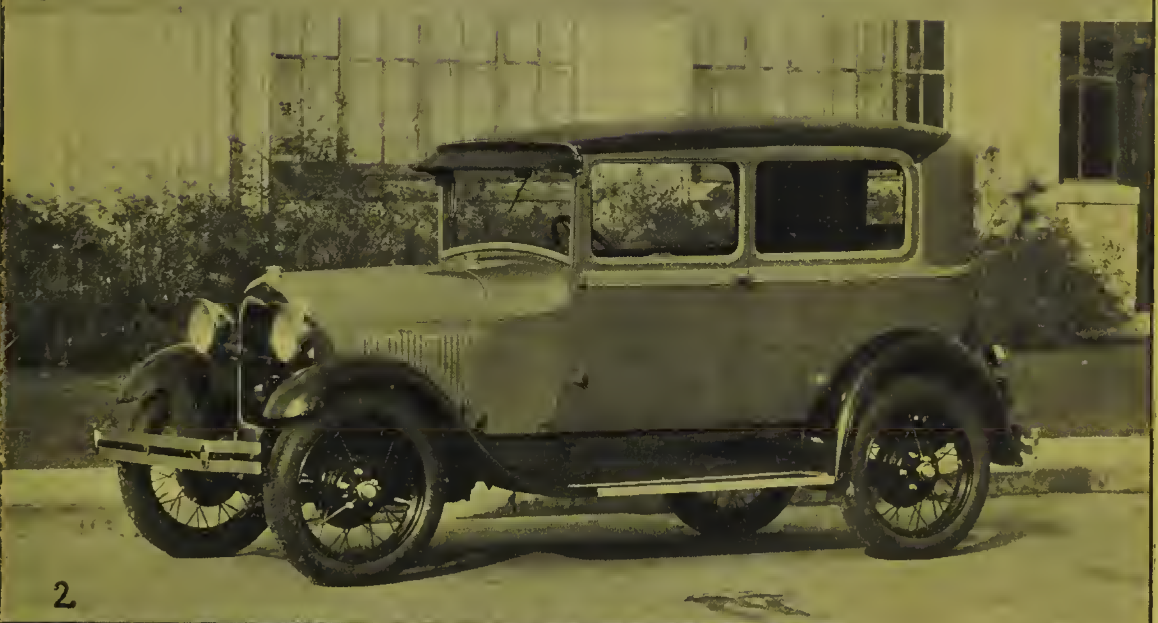
Internal-combustion Engines. No radical changes in power plant for gasoline-propelled vehicles were made after 1919, although much was done to refine mechanical details and improve efficiency. The more outstanding of such refinements were those made in the design of manifolds and combustion chambers to secure better distribution and vaporization of the combustible mixture and so burn it as to derive the maximum power from it. Higher compression was a notable change made possible because of present availability of more suitable fuels. See INTERNAL-COMBUSTION ENGINES.

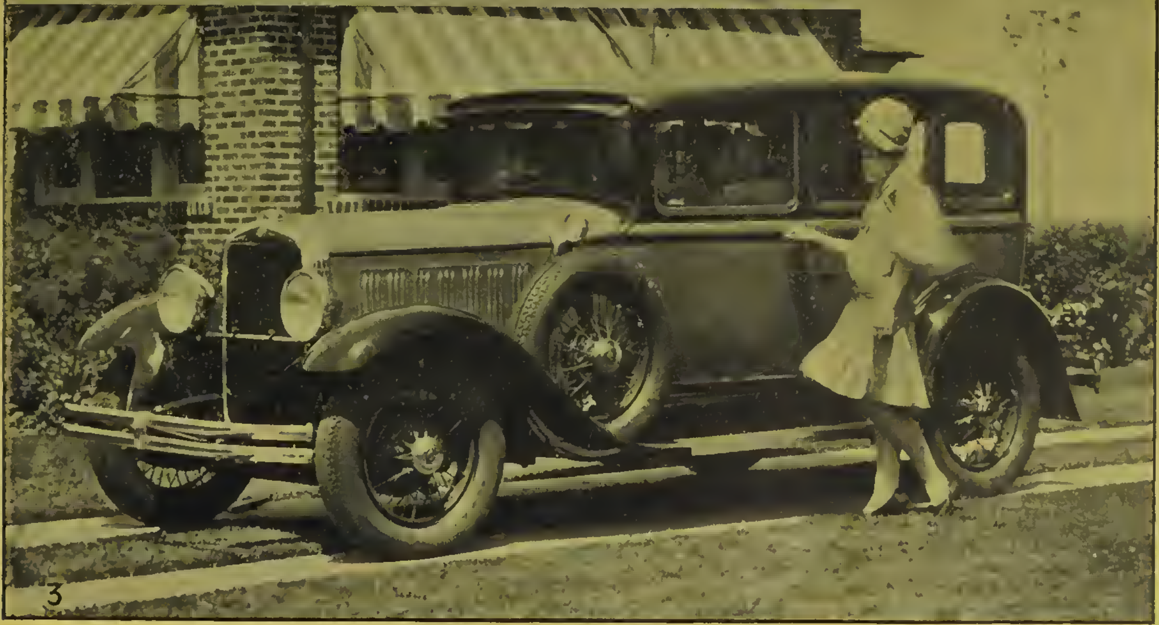
Most interesting have been the changes in practice concerning the number of cylinders used. Before 1919 the building of passenger cars with less than four cylinders had been entirely discontinued. In that year there were produced 102 models; 29.4 per cent were equipped with four-cylinder engines; 56 per cent with six-cylinder; 11.7 per cent with eight-cylinder; and 2.9 per cent with 12-cylinder engines. All of the eight-cylinder cars at that time were of the V type or twin-four. Straight eights did not come into production until 1924, when Packard introduced the first made in any quantity. The year before, Duesenberg built the first straight eight. Twelve-cylinder cars gradually dropped out, Packard discontinuing the last when it adopted the straight eight.

The passenger-car models of 1929 are 95 in number and divided as to cylinders as follows: Four-cylinder, 4.4 per cent; six-cylinder, 55 per cent; and eight-cylinder, 40.6 per cent. Only four makes of eights are now V type, while 18 makes now produce straight eights. It is interesting to observe that the six-cylinder type has held its own as the most popular, but the fours remain only on the lowest-priced cars.

MOTOR VEHICLES





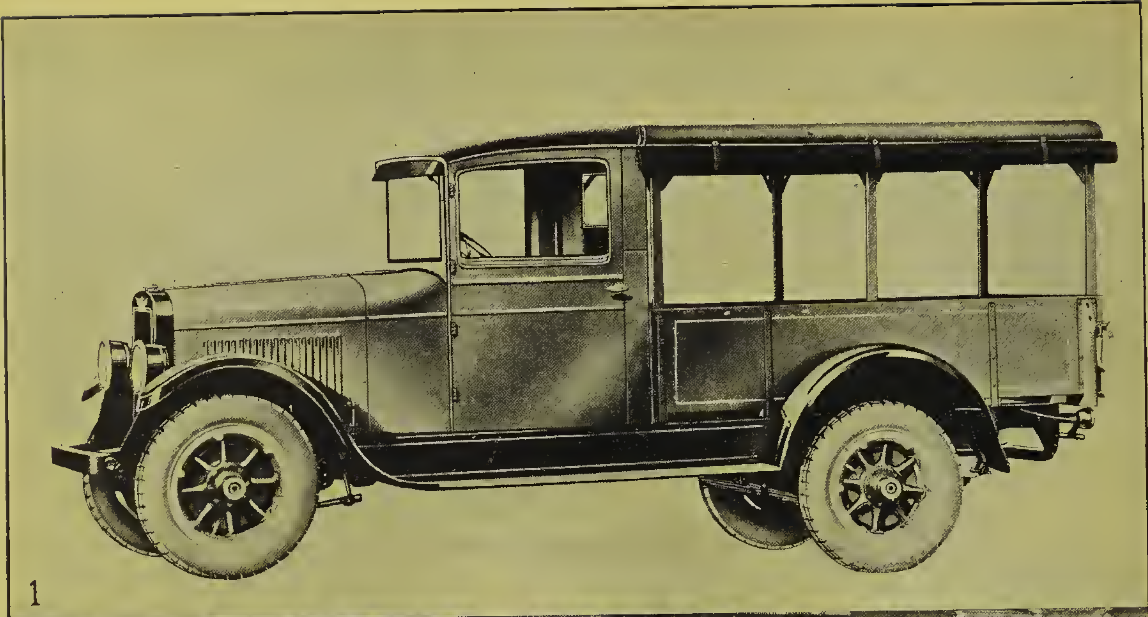


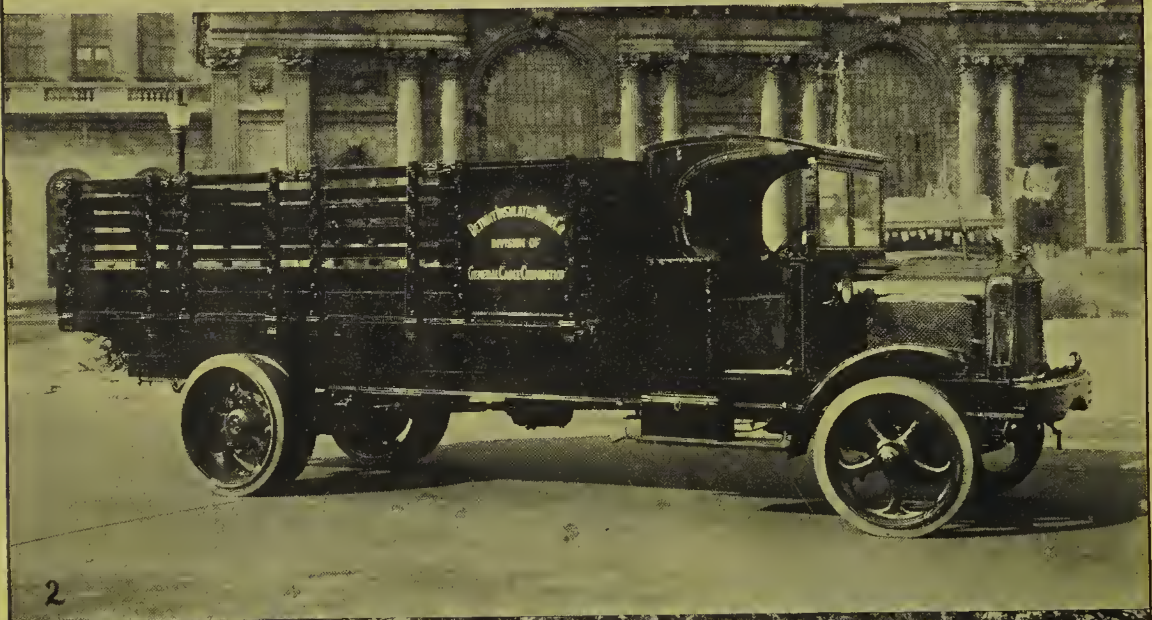
1. Buick Roadster.

2. Ford Sedan

3. Studebaker Dictator Eight Regal Sedan.

TYPICAL PLEASURE CARS




DIVISION OF
GENERAL CABLE CORPORATION
2

CINCINNAT
NEW YORK PITTSBURGH CLEVELAND INDIANAPOLIS CHICAGO LOS ANGELES
COLONIAL
STAGES
3

1. Reo General Utility Speed Wagon 2. White Model 52 Heavy-duty Truck
3. Mack Interstate-type Bus

COMMERCIAL VEHICLES

The middle-priced group are all at least six- and some of them eight-cylinder and nearly all of the higher priced cars have either V or straight eight engines.

The gain in eight-cylinder popularity for passenger cars is the significant development of the past decade. Even more striking is the increased use of six cylinders in the commercial car field. Of 529 models in 1919, 97.9 per cent were four-cylinder, 1.7 per cent were six-cylinder, and only 0.4 per cent were still two-cylinder. Of 845 models in 1929, 52.7 per cent are four-cylinder; 47 per cent, six-cylinder; and 0.3 per cent, eight-cylinder engines. In the light and medium-weight trucks, the sixes predominate but fall off in the heavier trucks to make the average as just given.

There has been a considerable trend toward the provision of more power in the engine in proportion to the weight of car to be moved. Four-wheel brakes furnishing ability to stop quicker have made higher speeds safe, and laws in many States have been modified, increasing the maximum allowable speed, particularly in the open country. Authorities indeed are becoming as much concerned over the slow driver as they formerly were over the speeder, for they have the problem of increasing the capacity of their roads and it is expensive to build more roads or widen old ones, so they are striving to move traffic faster. Even car owners who are not interested in speed like more power for hills to save gear shifting, and for quick get-away after traffic stops.

The increased engine power generally has been provided not so much through larger cylinder diameters or increased piston displacement as by higher compression and higher speeds. Lightening of the reciprocating parts and more accurate balancing of crankshafts have made higher speeds possible without excessive vibration. Aluminium is being more used for pistons in place of cast iron, since the difficulty of its greater coefficient of expansion has been overcome by use of split skirts and other improvements in design that avoid the former necessity of excessive clearance with consequent piston slap when the engine is cold. Connecting rods also are being made lighter but equally strong by the use of alloys. Higher speeds called for more effective lubrication and the old splash system of distributing oil to the cylinder walls and crank and connecting-rod bearings has given place almost completely to the pressure or positive-force feed system. Higher speeds also have brought changes in valve design and operation. For the quicker admission and exhaust of the cylinder charge, the valve areas and lifts have had to be increased and mechanism devised to move them quietly, so that much study has been given to cam contours, rocker arms, roller lift tappets, etc. Finally, with complete enclosure of all moving parts, engines, even of the poppet type, are now remarkably silent.

Knight and other sleeve-valve engines are inherently less noisy and have other advantages that have led many to investigate these types; but, thus far, they have not pushed the poppet type into the discard. European manufacturers are doing more with sleeve-valve engines, but in the United States there remain today only two makes of cars so equipped. For a time, there was prospect of interest in an imported single-sleeve design somewhat simpler and cheaper to manufacture than the Knight double-sleeve valve, but no stock car has yet adopted it. Another object of attack in quieting engines has been the power transmission from the main shaft to the camshaft and to the electric generator, ignition distributor, and water- and oil-circulating pumps. Honors are still about evenly divided between gear trains with angular or helical teeth and a composition intermediate gear, and chain drives of the silent-link type.

Always in internal-combustion engines there is more heat generated than can be converted into power and it is necessary to carry away the excess heat to keep the temperature down to that which will not cause preignition of the combustible mixture nor injure the metal of cylinders, pistons, and valves. Cooling by a circulation of water in jackets surrounding the cylinders and valves is the prevailing practice. On aviation and motor-cycle engines, air cooling is universal because of the saving in weight, and there have been several motor vehicles built having this type of cooling; but today the Franklin car is the only one still using an air-cooled engine. This has a blower driven by the crankshaft which circulates air through chambers that pass it around the cylinders which have cast ribs or vanes to increase the cooling surface. Against the disadvantage of a little bulkier and more complicated construction are the advantages of freedom of trouble from freezing of water in winter or boiling away of the water under the high temperatures created by heavy loads in hot weather.

Chassis Design. Front-wheel drive is looming as possibly the next real development in chassis design. Two American makers in 1929 placed stock models on the market, while certain prominent European automobile makers are reported to be secretly at work on front-wheel drives. This type of drive is not new, having been used on a few trucks and some racing cars for several years, one of the latter taking second place in the Indianapolis race in 1925. There are unquestioned advantages in pulling instead of pushing the car, such as facility in lifting out of holes or soft ground, less tendency to skid, ability to build lower bodies when there is no long propellor shaft beneath it and the rear axle does not have to accommodate the differential, and improved riding qualities with less unsprung weight. With front-wheel drive, the differential mechanism would be carried above the springs. Removing all of the power-transmitting mechanism from under the car to a location of easier access under the hood would be a boon to the repairman.

The great disadvantage of front-wheel drive is the mechanical complication of driving the wheels that do the steering. It would, however, somewhat simplify front-wheel braking, as the drums could be removed from the front wheels to the transmission, further reducing unsprung weight, for the jointed transmission shafts could transmit both the driving and retarding efforts.

Some of the mechanical details of front drives have been worked out in connection with four-wheel-drive trucks, but passenger cars introduce special problems. The already rather long front hoods covering the power plants of some sixes and most eights would be aggravated by the increased length required in putting the transmission and differential ahead of the engine, so that four-cylinder or V eights would have some advantage for the front-drive application.

It is not safe to predict anything regarding future developments in the automobile field, there have already been so many unexpected happenings; but at least it would not be surprising if considerable attention is turned to front-wheel driving in the near future.

Chassis Suspension and Lubrication. A great deal of attention has been given in the last few years to securing easier riding and maintaining it with greater convenience. Springs are better, generally longer and made up of more and thinner leaves for greater flexibility. Proper ratios of front to rear springs prevent rocking-horse effects, and shock absorbers check rebounds and some dampen the motion in either direction. Mounted on balloon tires, cars now ride with comfort unknown 10 years ago and perform on fairly poor roads with little distress compared to that which was experienced when high-pressure tires were standard.

At that time, there was only one way of connecting frames and springs—by metallic shackles and bolts, and lubrication was by compression grease cups, the filling of which was such an irksome, dirty job that it was usually neglected. Owners preferred to pay for replacing worn out bolts rather than to give them the lubrication that would prolong their life. An oil can seldom found its way around a car until a squeak became unbearably annoying. Many ways were tried to overcome or mitigate the nuisance of chassis lubrication. In the direction of its complete elimination, there have been introduced a variety of substitutes for the mechanical metal-to-metal shackle, including flexible hinges of fabric and rubber, rubber cushions or blocks in which the ends of the springs are imbedded, and ball-bearing shackles. Simplifying chassis lubrication has been the effort of others who have developed nipples for the quick attachment of high-pressure grease guns and even complete systems of piping for delivering oil under pressure from a central reservoir to the individual lubrication points through metering connections that will pass just the amount required.

According to the number of models (not number of cars) produced in 1929, metal shackles were on 71.2 per cent; rubber on 14.9 per cent; fabric on 6.4 per cent; and ball-bearing shackles on 7.5 per cent. As to methods of lubrication, pressure-gun systems are on 76.9 per cent and central-reservoir systems on 23.1 per cent. All other methods of lubrication have been discontinued. Naturally, metal shackles are used with all of the central oiling systems, but some having pressure-gun lubrication for other points have shackles that do not require lubrication.

Improved Fuel. One of the most important accomplishments of the past decade and one of immeasurable benefit to the automotive industry has been the improvement in fuels for internal-combustion engines. Gasoline had been getting steadily worse in quality because of the necessity, in meeting the increased demand, of getting more out of the crude petroleum and so including more of the less volatile content in commercial gasoline. For a time, the oil producers were seemingly helpless to improve the quality and automobile-engine designers were driven to design their engines for the best use of the poorer fuel.

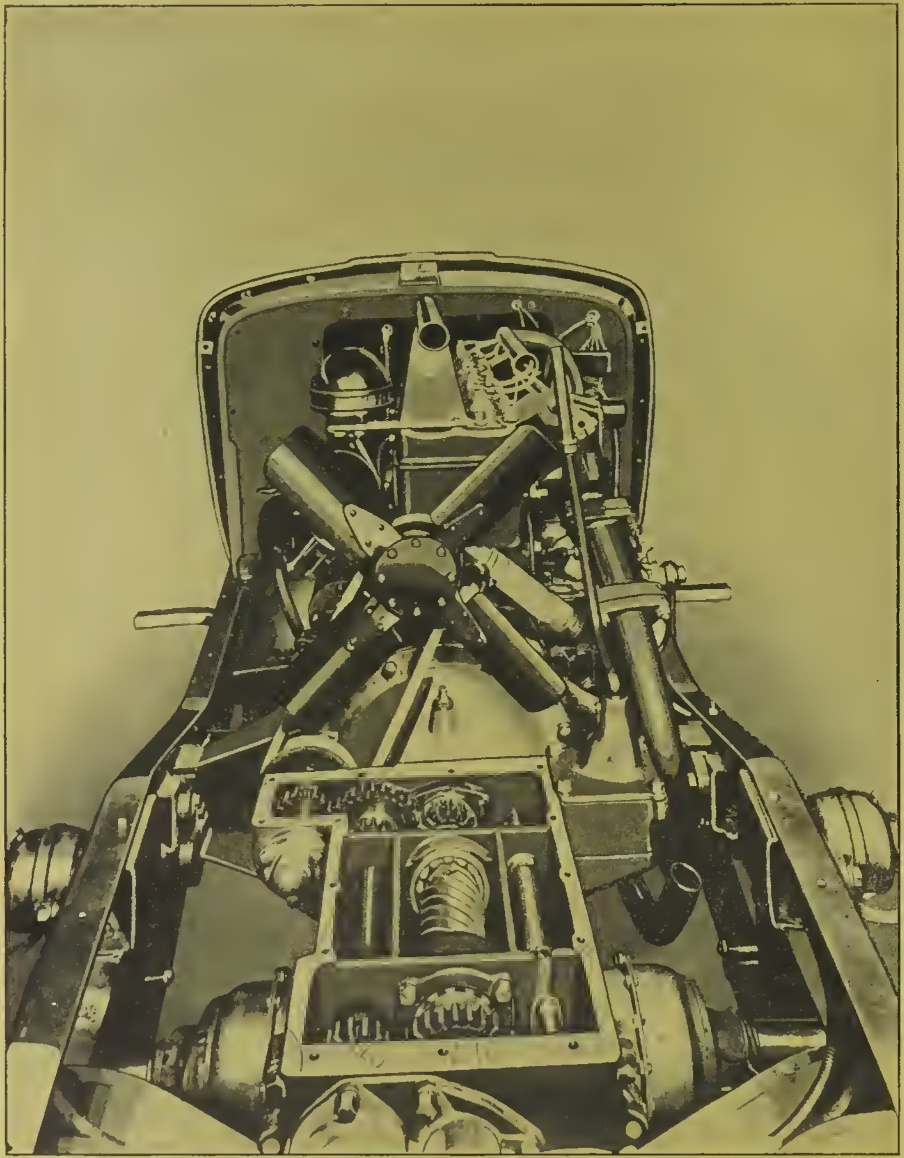
It became the feeling that closer coöperation between the two interests might be helpful, that is, if each could know more exactly the difficulties of the other. Independent investigations had been going on for some time by both sides, but there was little interchange of data. Early in 1921, the U. S. Bureau of Standards became interested and offered its facilities to help if the expense could be shared, as its appropriation did not allow a great deal of research for an individual industry. Associations concerned were brought together and an agreement was reached whereby the American Petroleum Institute and the National Automobile Chamber of Commerce would jointly finance a study by the Bureau of Standards under the direction of a steering committee made up of engineers and chemists from the oil refiners to represent the A. P. I. and from the Society of Automotive Engineers to represent the N. A. C. C.

The work started with the purpose of determining how to make the best use of the fuel then available. Possibly the joint research was a stimulus to refinery advances, but mainly responsible for the improvement of fuel in the past few years was the necessity of securing a greater yield from the crude production to meet the demand for gasoline. The way was found through the more general application of cracking processes. The result has been not only an increased yield but gasoline of higher volatility and less tendency to knock, so that engines could be given higher compression ratios with resulting increase in economy.

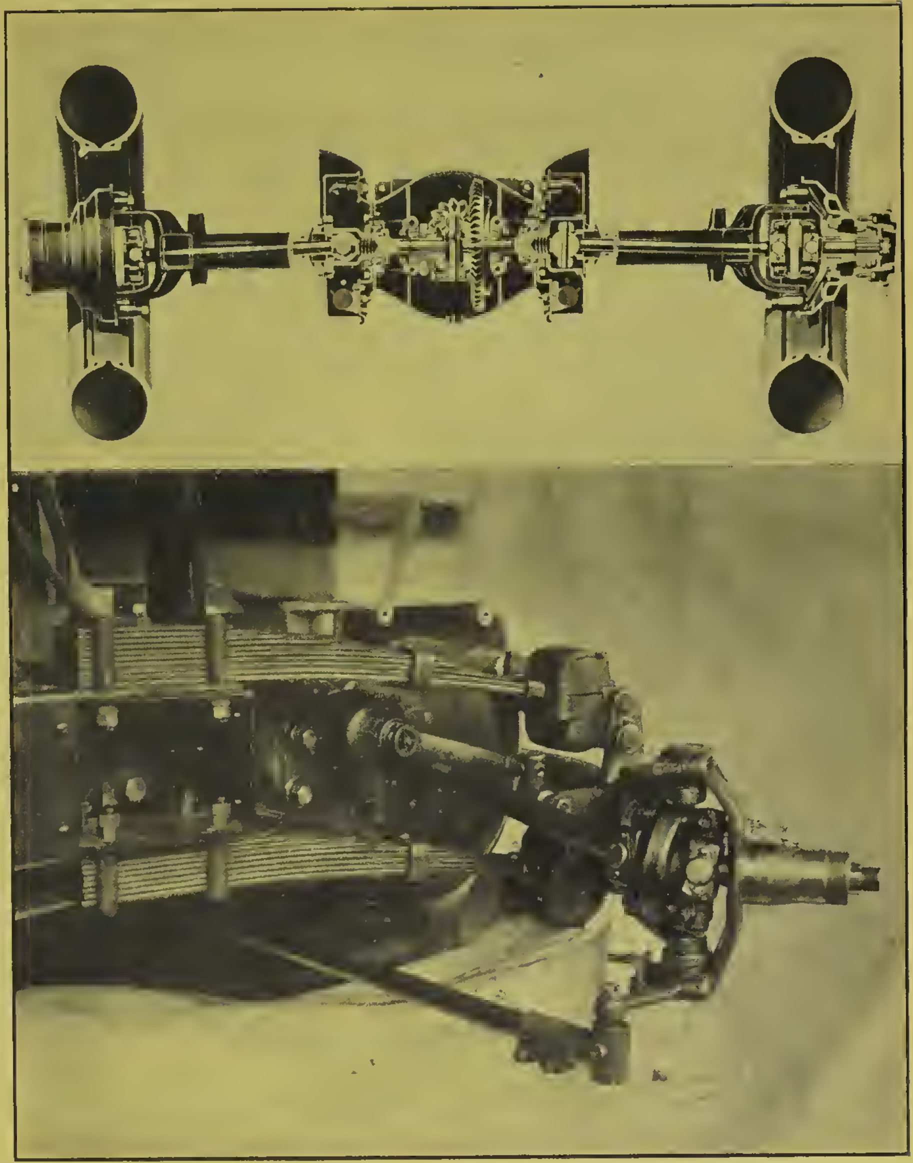
As the better fuels became available, the programme of the Coöperative Fuel Research has kept pace and in the seven years that it has been in progress, there has been developed a fund of information that has had much to do with the present greatly improved car performance, as shown by more power, quicker acceleration, easier starting, and better economy. Meanwhile, independent work was not stopped; on the contrary it was decidedly accelerated, for the individual oil refiners and engine manufacturers added very materially to their own laboratories and technical staffs and contributed greatly to the progress recorded in the past 10 years in the internal-combustion-power field.

In the search for anti-knock fuels permitting higher compression engines, many turned their attention to the possibilities through compounding fuels, or treating them with chemicals of different kinds. Benzol blends became very popular, but benzol is not available in quantity sufficient to treat all of the gasoline required and can never be the sole remedy, for nearly half the mixture must be benzol to eliminate knocking. In the line of fuel treatment, the event was the development by the General Motors Research Corporation of ethyl gasoline. The adding of one-tenth of 1 per cent of tetraethyl-lead will convert quite ordinary gasoline into a very good anti-knock fuel and many companies secured the rights and are selling gasolines so treated quite extensively. The sale would have been much larger if the better standard grades of cracked gasolines had not come into the market before ethyl gasoline came into general use.

Starting, Lighting, and Ignition Systems. The internal-combustion engine is not self-starting and to do away with the necessity of hand cranking various devices were introduced. In general, they were of four types: (a) mechanical, involving a spring that could be wound with little exertion when run down and would wind itself after the first start; (b) pneumatic, moving the pistons by compressed air stored between stops; (c) gas, exploding a combustible mixture

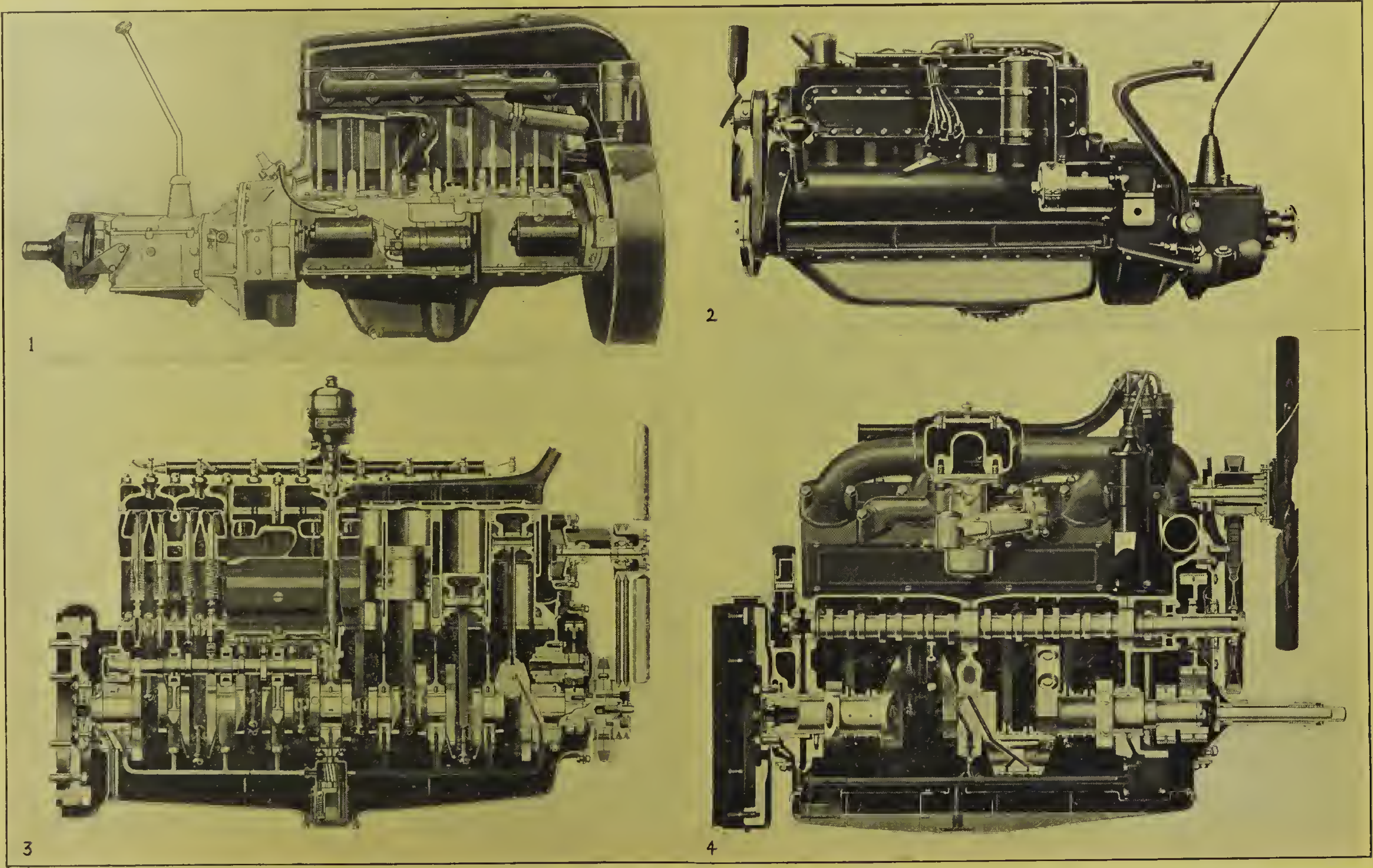


ENGINE OF RUXTON FRONT-DRIVE CAR
Showing Arrangement of Gears and Transmission



CORD FRONT-DRIVE CAR
Cross-section of the Driving Mechanism (above)
Rubber Insulated Shackles and Mounting

FRONT-DRIVE AUTOMOBILES



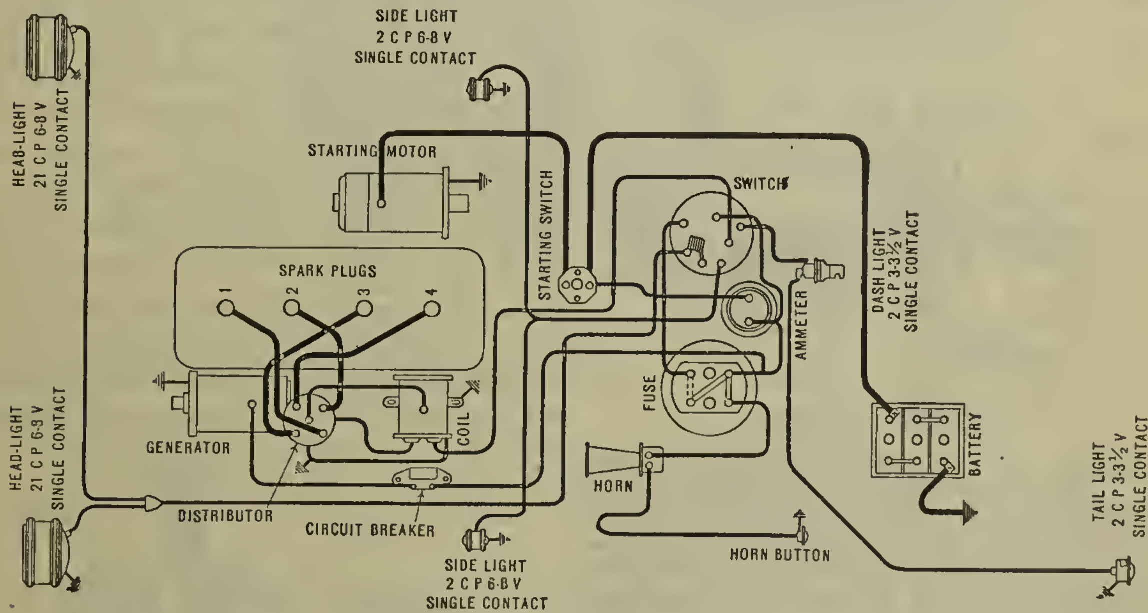
1. Franklin Series 13 Air-cooled Engine
2. Hupmobile Six-cylinder Engine
3. Packard Eight-cylinder Engine
4. Cadillac V-eight (341-B) Engine

ENGINES OF TYPICAL AMERICAN CARS

over the piston that was in starting position; and (d) electric, operated by current from a storage battery recharged while the engine is running. By 1919 all other starting systems had been abandoned in favor of the electric which were of two kinds—the single-unit and two-unit systems—the difference being that in the first the starting motor and generator are in one frame with a single rotor, while the second has separate machines for each. The single-unit system is somewhat simpler, but costs more to repair when windings burn out or suffer injury, and gradually the two-unit system has become the prevailing type.

In general, there are two ways of engaging the pinion of the starting motor with the gear teeth on the flywheel. The older way, still used on about a third of the passenger-car models built, is to shift the pinion laterally on its splined shaft until it engages the flywheel teeth, by a fork that is connected with the same lever that actuates the starting motor switch. After the engine starts, an overrunning clutch allows the pinion to run free on the starting motor shaft, so that the motor cannot be driven by the engine; otherwise, the motor might be injured by excessive speed and it would be difficult to disengage the pinion. As it is, the pinion is easily retracted from the flywheel teeth when the starting lever is released.

The other and more commonly used mechanism is known as the Bendix drive and is entirely automatic in its engagement and disengagement of the pinion with the flywheel gear. The bore of the pinion is threaded to fit a corresponding screw thread on the starting motor shaft and the pinion is eccentrically weighted so that inertia keeps the pinion from rotating with the first few revolutions of its shaft. This moves the pinion laterally until it finds its way into the flywheel teeth and when fully engaged it reaches the limit of its axial movement and is forced to rotate with its shaft, driving the flywheel. When the engine starts, it takes on a speed faster than that at which the starter would drive it and this reverses the pinion travel on its thread and spins it out of contact with the flywheel teeth. All that the operator has to do to start the car is to close the switch controlling the current to the starting motor and release it when the car starts.



TYPICAL ONE-WIRE STARTING AND LIGHTING SYSTEM

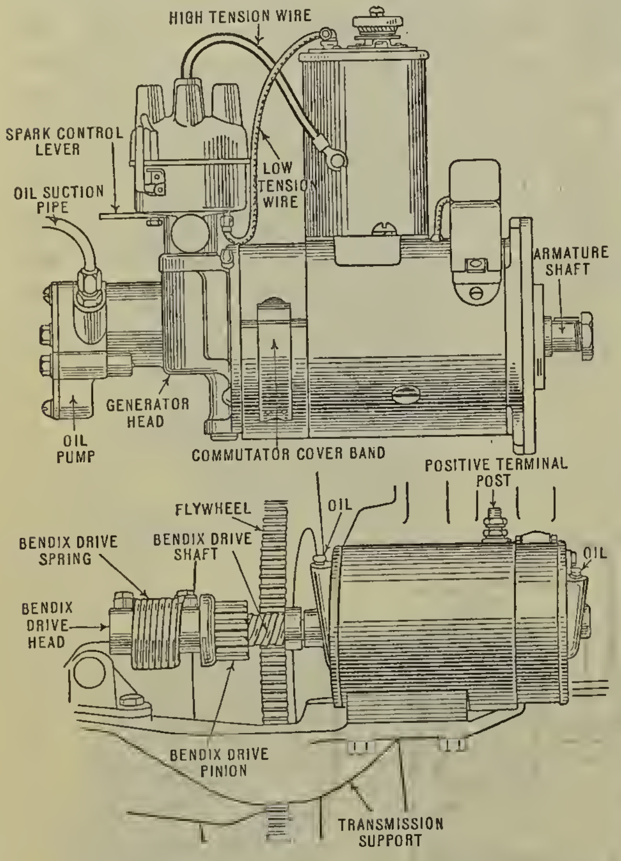
Ten years ago, starters were rarely provided on commercial vehicles, except those of the lighter or delivery type, generally mounted on passenger-car chassis. Now, the exceptions are the other way. All busses and all light- and medium-weight trucks have starters and only a few heavier types are still cranked by hand.

Electric lighting preceded electric starting, in fact gave the electric system its main advantage, for one battery could be used for both and, with the generator added to charge the battery, it was no longer necessary to remove the lighting battery for charging. The lighting also practically determined the voltage used, for 6 volts had been adopted because of the sturdier filaments in the lamps, better resisting breakage from vibration. So, in general, electric starting systems were designed for the same voltage. There were however, in 1919, seven makes of passenger cars that used a 12-volt system and one a 24-volt system. Today, the 6-volt system is universal except on busses where the greater demand for interior lighting makes a higher voltage system desirable.

With the adoption of electric starting and lighting, the use of magnetos for ignition gave way practically entirely to the single-coil-distributor battery system. Some European makers still retain the magneto from a conviction of its greater reliability, but improvement of the battery system has removed objection to it from that consideration. Trucks that are not electrically started still generally use magnetos.

Some makers use two spark plugs to a cylinder and double distributors, not so much for greater dependability as to secure quicker burning of the mixture and somewhat improved engine performance, but single systems are the rule. Ignition troubles are comparatively infrequent now, particularly as spark plugs are made of better materials and last longer under their trying service.

Generators. The generator also has been greatly simplified. The most popular forms employ the third-brush system of current-output regulation instead of the centrifugal governors, slip clutches, separate resistance, etc., of the older systems. A simple form of automatic current cut-out prevents the battery from discharging back through the generator when it is not turning fast enough to generate charging current. The single-wire system is also a step forward in simplifying the layout. Instead of using two wires for each circuit, only one insulated wire is used; the metal frame of the car is used for a return or ground, and one pole of each appliance, such as lamp bulbs, horn, etc., is grounded to the frame or some metal part in good electrical contact with it. The wire is carried in a metal sheath to prevent chafing the insulation, and precaution taken to make all connections so that short circuits are unlikely. In general, separate starting motors and generators are used, but the one-unit system, in which a single motor-generator suffices, also is popular. Two commutators are provided on the armature shaft; one of these is used when the machine is used as a starting motor, and the other commutator and set of brushes come into action automatically when the engine has started and is running fast enough to turn the armature shaft by an automatic driving clutch.



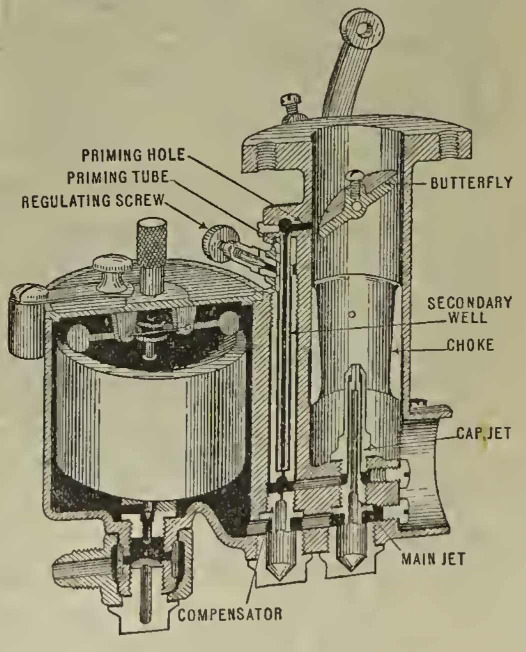
GENERATOR AND STARTING MOTOR USED ON SOME MODELS OF CHEVROLET AUTOMOBILES

The upper figure shows the generator, which has important components of ignition system, such as induction coil and timer distributor, mounted thereon. Below is the starting motor, having the Bendix automatic starting pinion shift. When the motor is started by the switch, the armature rotation automatically engages pinion with gear teeth cut on flywheel.

Carburetors. The principal improvements in carburetors during the period under consideration have been in the direction of making them smaller and simpler, with fewer moving parts. The earlier carburetors had to be adjusted with every change of fuel used or of atmospheric temperature. Most carburetors now will take almost any commercial grade of gasoline, summer or winter, and function automatically with very satisfactory efficiency. The parts must be selected and proportioned according to the car or engine with which the carbuetor is to be used. This combination, determined at the factory, constitutes the "factory setting" and no further adjustments are required with most modern carburetors. Any disorder is therefore generally due to the presence of dirt or water and a simple cleaning restores the functioning. Most carburetors are now particularly easy to clean. Even such troubles, however, are rare, for gasoline strainers are usually provided today that keep grit and water from reaching the carburetor.

More attention is being given to manifold design and preheating of the fuel mixture as means to better utilization of the gasoline. Poor manifolding can destroy much of the advantage of the best carburetor; whereas, a properly designed and heated manifold may overcome the defects of an indifferent carburetor. In the latest designs, intake and exhaust manifolds are located so that heat from the exhaust gases will be used to help vaporize the mixture on its way to the cylinders. Others have so-called "hot spots" in the intake riser from the carburetor. Thus, after an engine is warmed up, there is little possibility of raw or unvaporized gasoline finding its way into the engine.

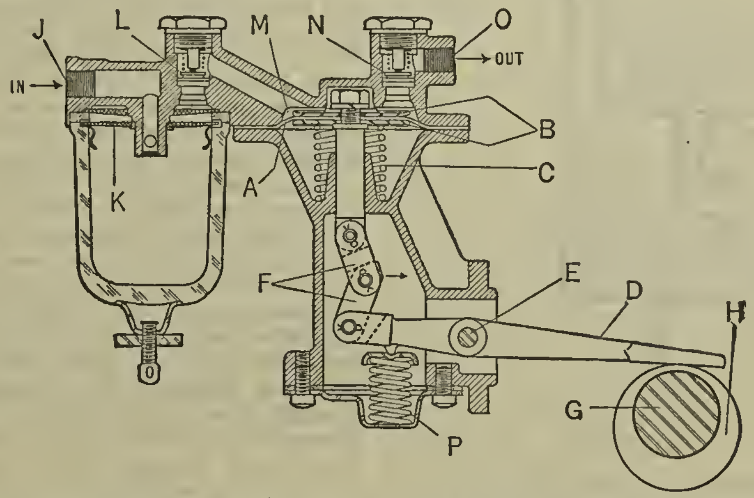
There are other devices that accomplish the same result for a cold engine, making far easier starting in winter. Such are the Packard fuelizer, the Lincoln electro-fog generator, and the Franklin electric-heating arrangement. All are in the nature of carburetor accessories to produce a warm gasoline mist that will easily ignite, even in zero weather, and thus prevent running down the battery and diluting the crankcase oil by liquid gasoline drawn in when priming and choking devices are resorted to for quicker starting.



THE ZENITH CARBURETOR

This fuel-vaporizing device gives automatic mixture compensation without air valves.

Fuel Supply. The original method of feeding gasoline to the carburetors directly by gravity from the main supply tank, usually located under the seat or cowl, has been abandoned on all passenger cars except the Ford, including the new Model A, but still continues to be used on about a third of the motor-truck models. For convenience and safety, the preferred location of the main fuel supply tank is at the rear of the vehicle, from which location it cannot be delivered to the carburetor by gravity. For a time, there was considerable use of the pressure system, the gasoline being forced by air pressure introduced above its surface in the tank to flow through piping to the carburetor. One trouble with this system was difficulty in keeping it tight. Pressure was usually lost while the car was idle and it was necessary to pump it up by hand before the car could be started. Thereafter, pressure was maintained automatically while the car was running.



THE A. O. FUEL SUPPLY SYSTEM

A mechanically operated diaphragm pump driven from any moving part of the engine, inserted in the fuel supply line to deliver gasoline from the main supply tank to the carburetor.

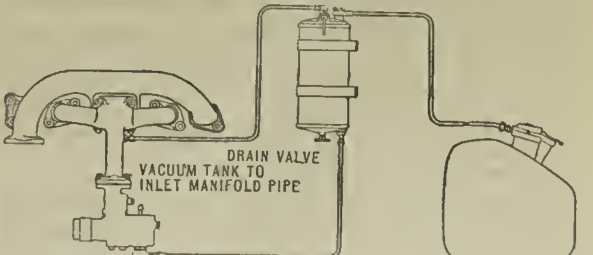
A, Flexible diaphragm.
B, Metal disks clamping diaphragm.
C, Coiled spring tending to keep diaphragm in upper position.
D, Rocker arm pivoted at E and, through links F, capable of pulling pump diaphragm down but not of pushing it up.
G, Revolving shaft carrying an eccentric H to oscillate the rocker arm.
J, Gasoline inlet.
K, Strainer.
L, Suction valve.
M, Pump chamber.
N, Discharge valve.
O, Outlet to carburetor.
P, Spring holding rocker arm in contact with driving eccentric.

This system soon gave place to the vacuum system making use of an intermediate small tank on the engine side of the dash which is filled by suction obtained from the engine manifold and discharges by gravity to the carburetor. The vacuum tank is actually two tanks, one within the other. The inner one through float-actuated mechanism alternately fills and discharges to the outer tank, so that the latter furnishes continuous supply to the carburetor. The system is very simple, subject to little trouble, and is the most common in use today on both passenger and commercial vehicles.

Newer systems accomplish the transfer of gasoline from the rear supply tank to the carburetor through mechanical or electric pumping devices. Typical of these is the fuel-supply system which makes use of a mechanically operated diaphragm pump driven through a rocker arm by an eccentric on the camshaft. The other end of the rocker shaft is connected by toggle links to the diaphragm plunger rod which is normally held at the upper end of its stroke by a coiled spring. Under these conditions, every oscillation of the rocker shaft produces a stroke of the pump, but as soon as the supply of fuel exceeds the demand, as when the carburetor needle valve is seated shutting off the inflow of gasoline, pressure builds up above the diaphragm holding its spring compressed and the rocker arm oscillates idly, bending the toggle links without moving the diaphragm.

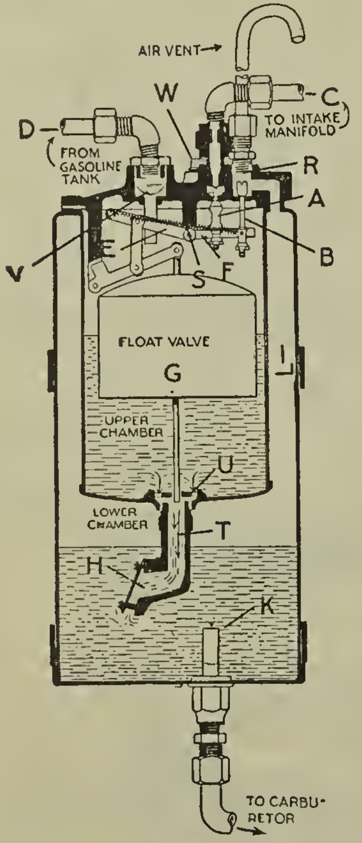
Of the passenger-car models built in 1919, 86.2 per cent had vacuum fuel-feed systems; 7.9 per cent, gravity systems; and 5.9 per cent, pressure systems. Of the 1929 models, 59.8 per cent have vacuum feeds; 34.7 per cent, mechanical pump feed; 3.3 per cent, pressure feed; 1.1 per cent, gravity feed; and 1.1 per cent, electric-pump feed. For motor trucks, the figures were quite different. In 1919, 78.8 per cent of the models then built had gravity feed; 19.4 per cent, vacuum feed; and 1.8 per cent, pressure feed. The 1929 motor trucks had vacuum feed on 70.3 per cent of the models, gravity feed on 25.7 per cent, pressure feed on 2 per cent, mechanical-pump feed on 1.3 per cent, and electric-pump feed on 0.7 per cent.

In the early days of motor busses, they were generally mounted on motor-truck chassis with but slight modification. Now, motor busses are a class by themselves, with their chassis generally specially designed for that service, so that it is



TYPICAL MODERN FUEL-SUPPLY SYSTEM

A vacuum tank is interposed between main fuel container and carbureting device interesting to compare the trends in their equipment with passenger-car and commercial-car practice. In the 1929 busses, we find the fuel systems on 93.2 per cent of the models equipped with vacuum feed; 3.4 per cent, with pressure feed; and 3.4 per cent, with electric-pump feed.



THE STEWART VACUUM TANK

Extensively used as a means of fuel supply, is placed near the carburetor, which it supplies. It draws gasoline from a tank at rear of chassis.

A—Suction valve for opening and closing the connection to engine intake manifold.
B—Atmospheric valve permitting or preventing an atmospheric pressure condition in upper chamber.
C—Pipe connecting tank to engine intake manifold.
D—Pipe connecting vacuum tank to main gasoline supply tank.
E—Lever to which two coil springs, S, are attached. This lever is operated by movement of the float, G.
F—Short lever operated by the lever, E, and in turn operating valves, A and B.
G—Float.
H—Flapper valve in the outlet, T, closed by suction whenever the valve A is open, but opening when the float valve has closed suction valve, A, and opened atmospheric valve, B.
K—Line to carburetor extended on inside of tank to form pocket for trapping water and sediment.
L—Channel space between inner and outer shells connecting with air vent, R.
R—Air vent over atmospheric valve for preventing an overflow of gasoline if the position of vehicle should ever be such as to raise the gasoline supply tank higher than the vacuum tank.
T—Outlet at bottom of float reservoir, in which is the flapper valve, H.
W—Plug for temporary removal while driving to service station in event of trouble due to leaky float and for giving access to tank for wetting valves with gasoline when dry and for washing dirt or sediment from flapper valve, H.
U—Guide for stem of float, G.

Clutches. To connect the engine with the wheels and with various degrees of mechanical leverage, there have been innumerable designs of clutches and gear-changing mechanisms. One of the earliest forms of clutch was the cone-type and for years it was extensively used. By 1919 it was fast losing popularity and is now almost obsolete. Later, came the multiple-disk clutches, some operating in oil, others dry, and finally the single dry-plate clutch which rapidly became the favorite. In 1919 the passenger-car models showed the following percentages of use of different types of clutches. Single plate, 47; multiple disk, 26; cone, 27. The 1929 models show single plate, 81.3 per cent; double plate, 13.5; multiple disk, 4.2; and cone, 1. Motor trucks of 1919 had dry multiple-disk clutches on 50.9 per cent of the models; multiple-disk clutches running in oil, 8.6 per cent; single dry-plate clutches, 25.4 per cent; single plate in oil, 1.3 per cent; cone clutches were still used in 13.8 per cent of the models. Ten years later (1929), the dry multiple-disk clutch had increased its lead, being found on 78.5 per cent of the motor-truck models; the single dry-plate clutch was on most of the rest, 20.6 per cent. Multiple-disk clutches in oil were found on 0.5 per cent and cone clutches had almost disappeared, being on only 0.4 per cent of the models. On the 1929 motor busses also, the dry multiple-disk clutch held the lead, being on 69.5 per cent of the models with single dry-plate clutches on 21.2 per cent; multiple-disk clutches in oil on 7 per cent; and double-plate clutches on 2.3 per cent. Notice the total abandonment here of cone clutches.

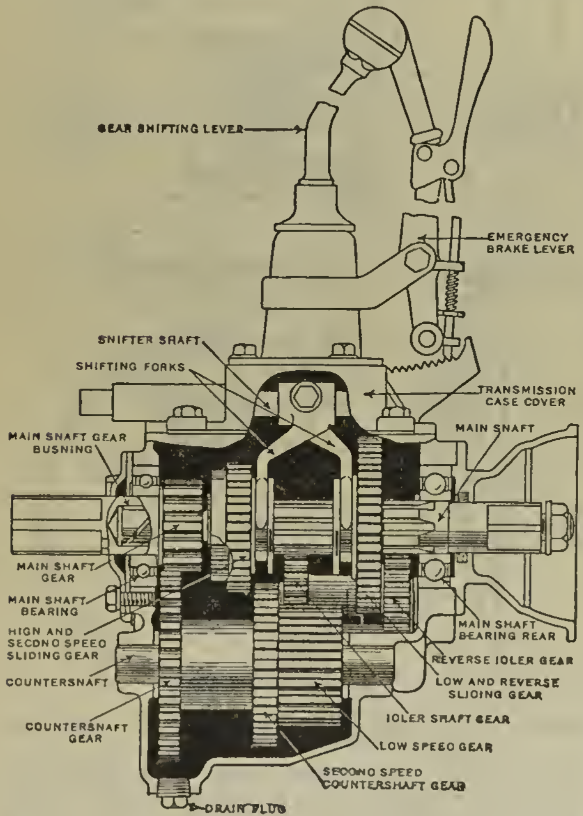
Transmissions. Transmissions also underwent an interesting transition, but the preferred form was determined much earlier and in the past 10 years there has been almost no change in transmissions except in respect to the number of speed changes provided. Nearly all of the variable speed devices already known to the mechanic arts were tried with the advent of the horseless vehicle. There were positive drives through gears, these being of three kinds—the progressive, selective, and planetary types; friction drives through rollers and disks variable in their radius of contact; and electric drives that gave flexible speed connection between engine and axle. The progressive gearset took the speeds in order from lowest to highest or back. With the selective, it was possible to go directly to any speed from any other—forward or reverse.

By 1919 on passenger cars, all other forms of transmission had been abandoned for the selective sliding type with two exceptions, the planetary two-speed transmission still used on the Ford Model T and the Owen-Magnetic which was in the electric class but distinctive in that it regulated speed by what was in effect a magnetic clutch, the slip of which could be controlled, instead of employing a dynamo and motor type of transmission.

The current passenger-car models of 1929 show nothing but selective sliding transmissions with 88.6 per cent giving three forward speeds and 11.4 giving four. Of motor trucks, there is a slightly different history. In this class of service, a fourth type of geared transmission has been much used known as the "individual clutch gearset." It resembles the selective type except that instead of shifting the gears all of the gears are constantly in mesh and running. The gears on the countershaft are keyed to it and those on the main driving shaft revolve idly except when individually connected with it by shifting dog clutches. In 1919 this type of gearset was still used on 9.3 per cent of the models, but the sliding gear, selective transmission was the prevailing type, being on 85.8 per cent. The progressive type was still in use on 3.7 per cent, the planetary on 0.4 per cent, and 0.8 per cent had electric transmissions. While the number of forward speeds is not indicative of any trend, depending mostly upon the size of the truck, it may be interesting to record that in 1919, 62.6 per cent of the models had three forward speeds; 35.8 per cent, four; 0.8 per cent, two; 0.4 per cent, one; 0.2 per cent, six; and 0.2 per cent, eight.

In the meantime, for motor trucks, all other forms of mechanical transmission have been discontinued except the selective gearset, about 96 per cent of which by number of models are of the sliding-gear type and 4 per cent individual clutch. In 1929 truck models, only 22 per cent had three forward speeds; 52.6 per cent had four; 4.7 per cent, five; 0.4 per cent, six; 14.6 per cent, seven; 5.1 per cent, eight; 0.5 per cent, ten; and 0.1 per cent, twelve. In motor-bus practice, the selective gearset also now prevails where mechanical transmissions are used. Gas-electric busses of course vary their speeds electrically. Of the 1929 motor-bus models, 14.6 per cent have three forward speeds; 79.8 per cent, four; 1.1 per cent, seven; and 4.5 per cent have electric drive.

The location of the transmission also was fairly well settled by 1919, most of the passenger-car models and all but the longest trucks having it in one unit with the engine. Long trucks and some passenger cars, still carried the gearset amidships or mounted it on the rear axle. The figures for passenger-car models in 1919 were: Transmissions a unit with the engine, 80.6 per cent; amidships, 13.3 per cent; a unit with the rear axle, 5.1 per cent; and a unit with the torque tube, 1 per cent. By 1929, 93.7 per cent of the passenger-car models had gearsets in unit with the engine and 6.3 per cent had them as separate units.



TYPICAL THREE FORWARD-SPEED AND ONE REVERSE SELECTIVE SLIDING GEARSET

Motor trucks in 1919 had 51 per cent of their models equipped with transmissions in unit with the engine; 45.9 per cent amidships; 2.1 per cent a unit with the jackshaft; and 1 per cent mounted on the rear axle. Ten years later, unit transmissions have gained, for 65.3 per cent of the 1929 models of motor trucks have them in unit with the engine, 34 per cent are amidships, and 0.7 per cent are in unit with the jackshaft. Rather naturally, probably, transmissions in unit with the engine are even more popular on motor busses. Of the 1929 models, 79.6 per cent have their transmissions combined with the engine, 14.7 per cent are separate units, and 5.7 per cent are electrically driven. One bus has it on the front axle.

Rear Axles. Rear axles are of two kinds—live and dead. In "dead" rear axles, the axle is stationary and the wheels run on bearings on the axle housing, being driven usually by chain and sprocket. In "live" rear axles, the wheels are driven by rotating the axle shafts. Live rear axles are of two kinds—plain and floating. In plain live axles, the inner ends of the axle shafts support the differential. In floating live axles, the differential supports the inner ends of the axle shafts. Floating live rear axles are of three types—semi-floating, three-quarter floating, and full floating. In the semi-floating, the outer end of the axle shaft carries the wheel as well as driving it. In the three-quarter floating, the wheel runs on a single bearing in the centre of the hub and on the outside of the stationary axle housing, but is also fixed to the outer end of the axle shaft so that the latter carries most of the lateral thrust on the wheel although relieved of the downward thrust from the weight of the car. In full-floating axles, the wheel runs on two bearings on the non-rotating axle housing and the axle shaft takes nothing but the twisting strain of revolving, the wheel being connected to the axle by a dog clutch at the outer end. Some make an additional classification called seven-eights floating, which is substantially like the three-quarter floating type, the wheel receiving stiffening from a rigid attachment to the axle shaft, but is otherwise equivalent to a full-floating axle, the wheel being well able to carry the car with the axle shaft removed.

In the 1919 passenger-car models, the axle types were as follows: 46 per cent, full floating; 29.6 per cent, three-quarter floating; and 24.4 per cent, semi-floating. In the 1929 passenger-car models, 86.4 per cent have semi-floating rear axles; 7.3 per cent, three-quarter floating; and only 6.3 are still of the full-floating type. Of the motor-truck models for 1929, 65 per cent have full-floating rear axles; 26.6 per cent, semi-floating; 6.8 per cent, dead axles; and 1.6 per cent, three-quarter floating. Nearly the same relations apply in the 1929 motor busses. Of these models, 67.8 per cent have full-floating axles; 28.6 per cent, semi-floating; 2.4 per cent, three-quarter floating; and 1.2 per cent (representing one model, the Uppercu Coach) has the wheels swung from radius arms.

With dead axles, the final drive to the wheels is through sprockets and chains or spur and internal gear from jackshafts combining the differential mechanism. Drive to these jackshafts or the drive shafts in live axles is through bevel gears or worm and worm wheel.

By 1919 passenger-car practice had settled down to the use of bevel gear drive exclusively and the only variable was the type of tooth—straight or spiral, with the preponderance of use in favor of spiral bevel, because of its greater quietness. Of the models built in that year, 86.2 per cent had spiral bevel and 13.8 per cent, straight bevel gear final drives. Motor trucks, in the same year, had their final drives divided as follows: Worm, 66.5 per cent; internal gear, 18.8 per cent; chain, 8.8 per cent; straight bevel, 4.1 per cent; spiral bevel, 0.8 per cent; double reduction, 0.8 per cent; and external gear, 0.2 per cent. In the meantime, for passenger-cars, we have seen a little renewed interest in worm drive and the development of a modified spiral bevel gear known as a hypoid gear, in which the axis of the pinion is offset to one side and does not intersect the axis of the gear. The tooth action is a little smoother than for the ordinary spiral bevel, combining both rolling and sliding contact. The 1929 passenger-car models included no cars with straight-toothed bevel gears. The percentages of the various types of final drive were as follows: Spiral bevel, 88.5 per cent; hypoid, 6.3 per cent; and worm, 5.2 per cent. Notice also the changes in motor-truck practice, for, of the 1929 models, 45.6 per cent had worm drive; 19 per cent, double reduction gears; 15.1 per cent, spiral bevel; 14.3 per cent, straight bevel; 4.2 per cent, chain drive; and only 1.8 per cent are still using the once quite popular internal gear drive. Most of the straight and spiral bevel drives are on the lighter capacity trucks or delivery cars, which follow more closely passenger-car practice, and the worm and double reduction drives are on heavier trucks and chain drives on the heaviest.

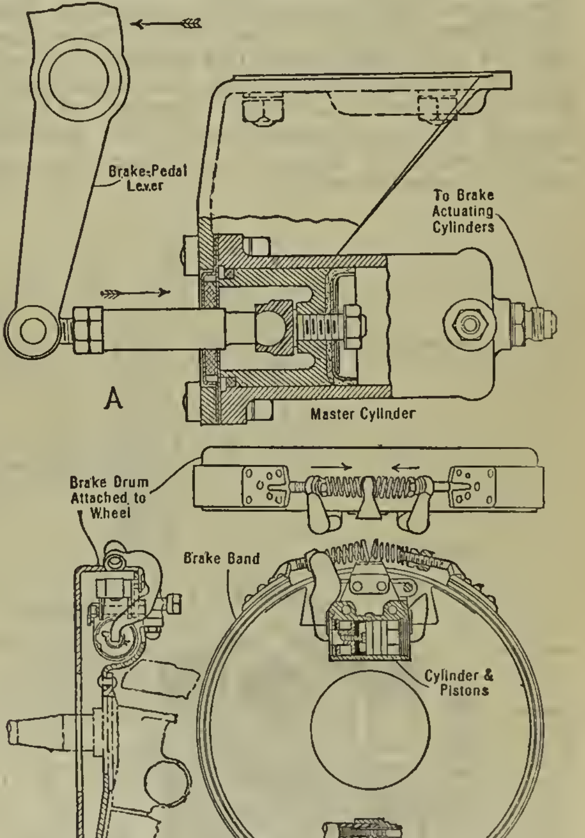
Modern motor busses show a considerable variety in the final drive. Of the 1929 models, 37.1 per cent have worm drive; 25.8 per cent, double reduction; 24.8 per cent, spiral bevel; 6.7 per cent, straight bevel; 4.5 per cent, internal gear; and 1.1 per cent, front-axle drive, this again being the Uppercu coach.

Brakes. Of all the improvements made in automobiles in the past decade, probably none had so much influence on motor-transportation practice and driving habits as the addition of brakes to the front wheels. Four-wheel brakes so greatly increased the stopping ability that it at once became safe to drive much faster than formerly and the result has been that as the use of cars so equipped has become nearly universal, States and municipalities have raised their former maximum speed limits. This has done much to relieve traffic congestion and to increase the capacity of existing roads, which were becoming more and more inadequate, while at the same time the building of new highways and the improvement of old ones was not keeping pace with the demand created by the continually increasing number of vehicles in use.

Four-wheel brakes first commanded serious attention in 1924. One make of car had them as standard equipment the year before, but in this year they were standard equipment on about 14 per cent of the models and optional on nearly 20 per cent more at additional cost.

In 1919 all braking was through the rear wheels either by the direct application of inner shoes or outer bands to drums on the rear wheels or on the drive shaft. The service, or foot, brakes contracted on the rear wheels on 83.2 per cent of the passenger-car models, expanded on the rear wheels on 9.6 per cent; contracted on the transmission on 4.5 per cent; and expanded on the transmission on 2.7 per cent. The emergency or hand brakes, now usually called parking brakes, expanded on the rear wheels of 91 per cent of the models, contracted on the rear wheels on 6.3 per cent and contracted on the transmission on 2.7 per cent. All 1929 passenger-car models, except one model of the Rolls-Royce, provided four-wheel service brakes. Internal expanding brakes are the prevailing type being found on 75.1 per cent of all models; external contracting, on 13.5 per cent; internal front-wheel and external rear-wheel brakes, on 10.4 per cent; and the exception before noted makes the 1 per cent with rear-wheel brakes only, which are of the internal type. They are just about evenly divided between the mechanically and the hydraulically operated systems. The hand brakes on 57.4 per cent of the 1929 passenger-car models contract on the transmission; 18.1 per cent expand in the rear wheels; an equal percentage in all four wheels; and 6.4 per cent contract on the rear wheels.

There was more variety in the service brakes used on motor trucks. Of the models produced in 1919, the foot brakes on 64.1 per cent expanded in the rear wheels; 22.9 per cent contracted on the rear wheels; 7.7 per cent contracted on the drive shaft; 1.3 per cent expanded on the drive shaft; 3.4 per cent contracted on the jackshafts; 0.4 per cent contracted on all four wheels; and 0.2 per cent contracted on the front wheels.



IMPORTANT PARTS OF HYDRAULICALLY ACTUATED FOUR-WHEEL BRAKE SYSTEM

A shows the master cylinder from which oil is forced to the brake-actuating cylinder which is shown at *B*. The latter is mounted on each wheel with two pistons between which oil is introduced. The pressure of the oil forces them apart and constricts the band around the drum.

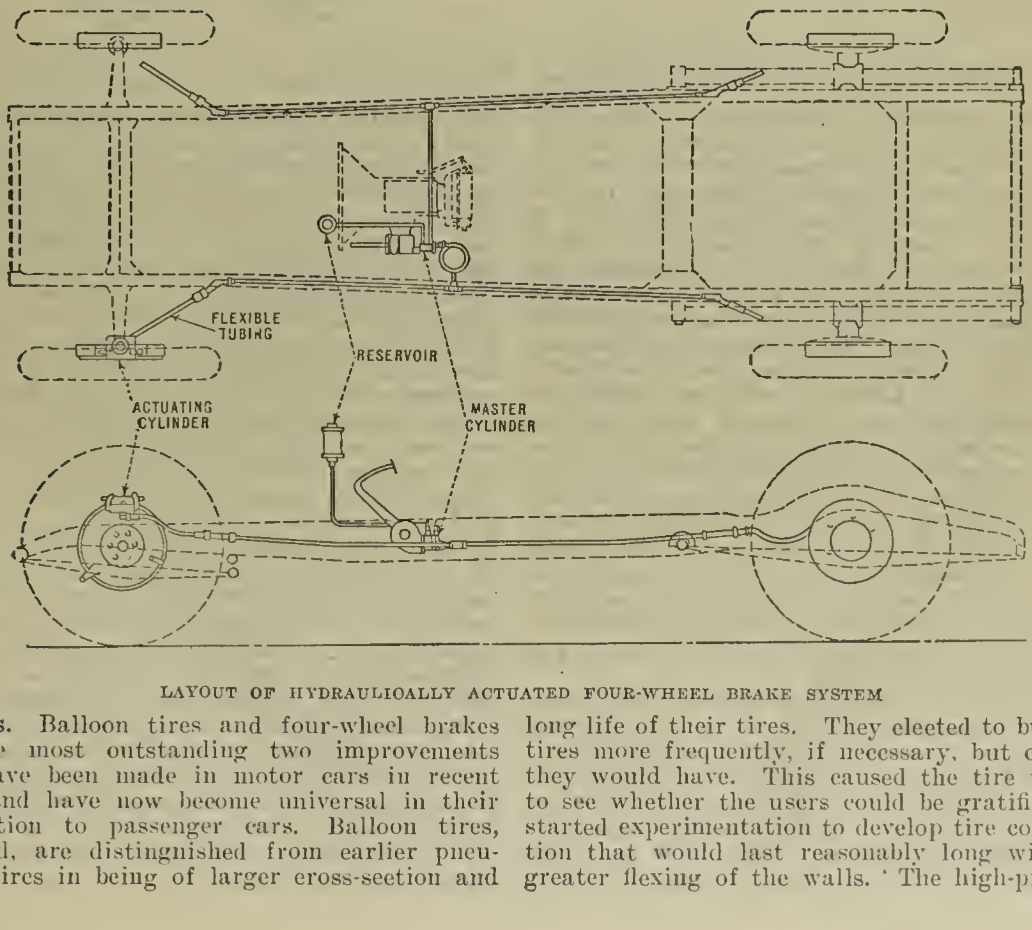
Hand brakes were mostly of one kind, internal expanding on the rear wheels, these being on 90 per cent of the 1929 motor trucks; 6 per cent contracted on the rear wheels; 0.6 per cent, on the front wheels; 2.8 per cent, on the drive shaft; 0.4 per cent expanded on the drive shaft; and 0.2 per cent expanded on all four wheels. Examination of the 1929 truck models shows that almost exactly two-thirds still do not have front-wheel brakes, for 37.1 per cent have brakes on the rear wheels only, 27.2 per cent have the two brakes on the drive shaft and rear wheels and 2.2 per cent have them on the jackshafts and rear wheels. The rest have four-wheel service brakes; 16.2 per cent have the hand brake on the drive shaft; 13.9 per cent have it on the four wheels; 2.7 per cent have it on the rear wheels; and 0.7 per cent have it on the jackshaft. The service brakes on 73.9 per cent of present-day motor trucks are operated mechanically; 12 per cent, hydraulically; 11.5 per cent by vacuum booster; and 2.6 per cent by compressed air.

Motor busses present the most difficult brake problem because of their higher speed and greater weight. This is how it has been engineered in the current models: Service brakes on 60.5 per cent expand on the rear wheels; 34.8 per cent expand on four wheels; 3.5 per cent contract on four wheels; and 1.2 per cent contract on the drive shaft. On 50 per cent, they are mechanically operated; 22.6 per cent use the vacuum boosters; 19.1 per cent, air pressure; and 8.3 per cent are hydraulically operated. The hand brakes on 52.4 per cent of the 1929 motor-bus models contract on the drive shaft; 36.1 per cent expand in the rear wheels; 4.6 per cent expand in four wheels; 4.6 per cent expand on the drive shaft; and 2.3 per cent clamp a disk on the drive shaft.

thinner, more flexible walls and intended to carry lower air-pressure. The object is to secure greater cushioning effect to reduce shock from road irregularities, the softer tires yielding to small inequalities in surface instead of rising over them. Increased comfort to the passengers is the greatest advantage, but a close second is the reduced wear and tear on the vehicle and its mechanism. Car bodies with less racking do not so soon develop squeaks and rattles, and there is slower depreciation of the moving parts when normal wear is not aggravated by shocks that hammer and vibrations that produce crystallization and earlier failure of metal parts under strain.

While experimental work had been going on for several years, it was not until 1925 that they could be considered as really accepted by the industry. In that year, a majority of the makes of passenger cars came out with balloon tires as standard equipment. Meantime, to help the transition and considering the number of older cars on the road, there was a compromise classification of tires known as semi-balloon designed for lower pressure but adapted to fit the standard high-pressure tire rims. True balloon tires required wider rims of smaller diameter. The first balloon tires were for exceedingly low pressures—20 pounds or less. As practice settled down to standard, however, there was a reaction to slightly higher pressures, so that the present range of pressures recommended by the tire manufactures is from 28 to 40 pounds, depending upon the size of cross-section and load.

Car users themselves were really responsible for bringing the balloon tire into being. Experience had shown them that under-inflated tires rode easier and they persistently ignored the warning to maintain certain pressures to insure long life of their tires. They elected to buy new tires more frequently, if necessary, but comfort they would have. This caused the tire makers to see whether the users could be gratified and started experimentation to develop tire construction that would last reasonably long with the greater flexing of the walls. The high-pressure



LAYOUT OF HYDRAULICALLY ACTUATED FOUR-WHEEL BRAKE SYSTEM

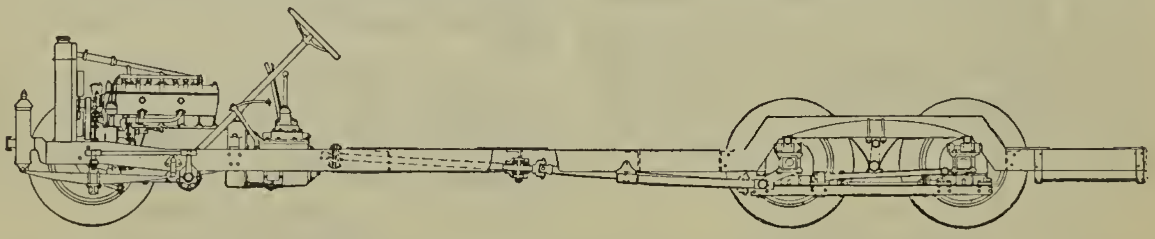
Tires. Balloon tires and four-wheel brakes are the most outstanding two improvements that have been made in motor cars in recent years and have now become universal in their application to passenger cars. Balloon tires, so-called, are distinguished from earlier pneumatic tires in being of larger cross-section and tire had already been wonderfully improved and increased in mileage life by replacing the woven fabric form of reinforcement with layers of diagonally laid parallel cords with the cords of alternate layers crossing at right angles and, but for this improved construction, balloon tires could never have been successful. Cord tires themselves should be recorded in our catalogue of advances since 1919, for they came just at the beginning of that year. The first balloon tires were made with few plies of reinforcement—two, three, and four. This was found impractical and now none are made with less than four and most have six or even more in the larger sizes for heavier duty, as on busses and high-speed trucks.

Truck pneumatics have been a development in themselves. Little used 10 years ago, except on light delivery cars, they are being more and more applied to heavier vehicles. Solid tires are a foe to the roads and the trucks on which they are used suffer faster deterioration. On the other hand, pneumatic tires save the roads, the trucks, and the loads, and allow more rapid movement of the goods.

The great multiplicity of pneumatic tire sizes, even for passenger cars alone which absorb the bulk of the production, has been a serious disadvantage to all concerned. The tire factories must have a large number of molds, the tire dealers must carry excessive stocks, and owners must pay the bill for the complication when they buy tires. The advent of the balloon and semi-balloon tires aggravated an already bad situation. In 10 years, 52 different tire sizes have been standard equipment on the passenger-car models put out in that time, 17 high-pressure, and 35 low-pressure, sizes. Both the tire and car industries appreciated the desirability of fewer sizes and much discussion took place, but without any real result until the beginning of 1928. Then, the National Automobile Chamber of Commerce, the Rubber Association of America, and the Society of Automotive Engineers succeeded in agreeing on a recommended list of 18 balloon-tire sizes within which all requirements for that year were to be drawn with the prospect of still further reducing the list in subsequent years. Then, as the older cars pass out of use, there will be a gradual reduction of the number of sizes that will need to be made and stocked. At the present writing, it is proposed to drop two more sizes and add one so that 17 probably will be continued as standard.

There also has been a new naming of the sizes. Instead of designating a tire by its nominal outside diameter and cross-section, as for example 31 × 6.00 inches, it will be designated by its cross-section and the rim diameter as 6.00–19, for the rim dimension is the one that determines whether the tire will go on the wheel for which it is intended. By the old nomenclature, there was some confusion, for the rim diameter was not always correctly obtained by subtracting twice the cross-section from the nominal outside diameter which was not always the actual. For example, a 29 × 5.00 and a 29 × 5.25 both fitted a 19-inch rim. Calling them 5.00–19 and 5.25–19 emphasizes that fact and leaves no uncertainty as to the wheel they will fit. Similarly, a 32 × 6.00 and a 30 × 5.77 both go on a 20-inch rim and are hereafter to be called 6.00–20 and 5.77–20. Under the old system, any fractional part of an inch on the tire cross-section was ignored in arriving at the nominal outside diameter; in the new list, there are only eight cross-sections—4.50, 4.75, 5.00, 5.25, 5.50, 6.00, 6.50, and 7.00. The old 4.95, 5.77, 6.20, and 6.75 sizes have been dropped. Until the new marking is familiar, the old will be printed on the sides of tires in smaller figures under the new to show with what older sizes it is interchangeable.

Commercial Vehicles. In the field of commercial vehicles, the most marked development since 1919 has been in motor busses for transportation as a public utility. Busses came to be operated with much success in city services as auxiliaries to the electric street railways, as well as traction line feeders, on inter-city lines, for de luxe tours, for schools, and for sightseeing. They have become a very definite part of the United States' transportation system. Just as motor trucks successfully proved their economy and dependability as independent freight carriers, the motor bus was fast becoming a vital factor in passenger transportation. Special chassis designs were evolved for carrying bus bodies. By dropping front axles, underslinging the front and rear springs, and in some instances having the frame side members dropped between the springs, busses were evolved which were easy of access and had a low centre of gravity. When a bus body is mounted on the usual type of commercial automobile chassis, it is apt to sway in turning corners, to skid on slippery streets, and to be uncomfortable for passengers. In order to secure easy riding, special spring suspensions and giant pneumatic tires are employed.



SIDE ELEVATION OF CHASSIS FOR MOTOR BUS
Four driven wheels are employed to support load. Note drop frame to provide low centre of gravity.

Very heavy loads are now carried on large cord tires, and even freight trucks are carried by the more resilient instead of the solid rubber tires. Truck tires are made 8 to 10 inches in width and 40 to 42 inches in diameter, with extra-heavy treads and side walls so that internal pressures from 120 to 130 pounds may be safely withstood. Bus bodies are sometimes carried by special resilient supports, either in the form of rubber pads or metal spring members attached to the chassis frame. One marked improvement was the use of rubber shock absorbers or insulators at the spring ends to replace metal shackles, which soon wear. It is stated that a life of 100,000 miles is not uncommon with the rubber insulators, which act to reduce vibration.

The rubber blocks are molded in suitable shapes to carry the spring-leaf ends and permit the spring leaves to flatten out under load and to move as the spring deflects under the influence of varying highway-surface contour. The blocks of rubber are carried in malleable iron housings forming part of the chassis and are easily renewed when worn.

Motor Rail Cars. Many railroad lines have lost so much of their freight and passenger traffic because of the greatly increasing use of motor vehicles that they have found it unprofitable to operate the usual steam train on short lines. The modification of the motor vehicle known as the rail car has come to the rescue, and motor-truck engineering is followed in many respects. In some cases, the rubber-tired wheels are replaced with flanged metal wheels adapted to run on rails; no other change is made in the chassis. The use of anti-friction bearings of the ball-and-roller type, alloy steels, and aluminium and pressed-steel sections assures heavy-duty qualifications with the economy of light weight. The power plant, change speed gearing, clutch, and power transmission are modified from motor-truck types. The engines are truck engines and usually of the four-cylinder type. Between the engine and the main transmission, an auxiliary reverse transmission is installed which serves to change the direction of main drive shaft rotation when it is desired to reverse the car, and as many reverse speeds as there are forward drive ratios are thus provided. Small rail cars with a passenger capacity of 30 persons can show a profit even if the car does not carry its full capacity on all trips. These cars climb grades well and are controlled much like a motor truck; the engine speed is varied by spark and throttle control; gear shift is made by lever, and the clutch is actuated by pedal control. Of course, the operator is relieved of steering; when a wheel is provided, it is used to operate one set of brakes. Most rail cars are provided with air brakes.

Unit Containers. In freight transportation, containers usually thought of as individual boxes, which can be loaded and sealed by the shipper and transported to the consignee on motor-truck chassis, freight car, boat, or all three, without disturbing the contents, offer great possibilities in the coördination of all transportation facilities and the expediting of freight movement. Some motor-truck manufacturers supply special chassis for handling unit containers, in which mechanism actuated by the engine to facilitate moving them is incorporated in the truck chassis. The demountable body in its various forms was in some use in many parts of the country. It is probably more adaptable for general purposes of motor cartage than the unit goods container.

American Motor-vehicle Industry. Appreciation of the magnitude which the motor-vehicle industry has attained can be had from some figures relating to its 1928 record compiled by the National Automobile Chamber of Commerce. In that year, 4,044,000 passenger cars and 586,000 motor trucks were produced in the United States and Canada. Of the passenger cars, 85 per cent were closed models. The wholesale value of the cars was $2,630,500,000 and of the trucks, $415,320,000. The tire production in the United States was 78,500,000.

Distribution. In 1929 there were approximately 32,028,000 automobiles in use throughout the world, the automobile registration having more than doubled since 1922, increasing in the United States by 100 per cent and in the rest of the world by 210 per cent. There were estimated in countries outside of the United States and Canada 6,336,000 cars, of which about 2,881,000, or 45½ per cent, were manufactured in the United States. The registration of motor vehicles in the United States reached a total of 24,750,000, of which 21,630,000 were passenger cars and 3,120,000 commercial vehicles. Of all the automobiles in the world, 78 per cent is in the United States. Considerably more than half as many motor vehicles as there are in all of the rest of the world, or 5,450,000, are used by farmers in the United States. The road system that has made this large use of vehicles possible includes a total mileage of highways of 3,013,584, of which 615,000 miles are surfaced highway. The number of people employed in motor-vehicle and allied lines—4,110,000—is another index of the size of this industry. The revenue that it brought to the Federal and State governments in 1928 was a tidy sum, taxes on motor vehicles amounting to $785,386,000.

What the automobile industry means to other business is also interesting. In 1928, 3,600,000 carloads of automotive freight were hauled by our railroads. The automobile industry consumed 85 per cent of all the rubber used in this country, 60 per cent of the plate glass, 12 per cent of the copper, 15 per cent of the iron and steel, and 80 per cent of the gasoline, the last mentioned totaling 10,860,000,000 gallons; and of motor oil, there was consumed 434,000,000 gallons. The crude rubber used by the motor industry in 1928 aggregated 814,000,000 pounds and the cotton used in tires, 299,500,000 pounds.

As showing the rapid increase in the use of motor busses, there were 92,000 in 1928. Of these, the street railways operated 9900 and the steam railroads, 1250. Busses have meant much to the extension of better educational facilities for the youth of our country for there are 14,850 consolidated schools now gathering and returning their pupils by this means. The businesses that are not concerned in the manufacture but in the selling, repairing, storing, and supplying of motor vehicles also have reached striking totals. Car and truck dealers number 53,700; public garages, 51,600; service stations and repair shops, 95,400; supply stores, 79,100; and gasoline filling stations, 317,000.

That the industry will continue to grow and thrive is unquestioned, for the long anticipated saturation point has yet to be reached. The average life of a motor vehicle is seven years; therefore, for replacement alone, it will be necessary to build in such a year as 1929 over two and a half million vehicles, for the production in 1922 was 2,589,620. In addition, there will be the new owners who have never owned cars before and the families that have owned only one but are now finding their needs to require two or more, the additional users of trucks in the natural growth of all lines of business, the increasing numbers of motor-bus lines, and finally, the cars and trucks that will be exported which last year was 810,000; so that it is easily conceivable that the production this year will exceed 5,000,000.

MOULIÉ, CHARLES. See SANDRE, THIERRY.

MOULTON, ARTHUR WHEELOCK (1873–). An American Protestant Episcopal bishop, born at Worcester, Mass., and educated at Hobart College, the General Theological

Seminary, and the Episcopal Theological School. He was ordained in the Protestant Episcopal Church in 1901. From 1900 to 1918, he was curate and rector of Grace Church, Lawrence, Mass. He served in the World War as a chaplain in the field artillery and at a base hospital in France. In 1920 he was consecrated bishop of Utah. He wrote *Memoir of Augustine H. Amory* (1909) and *It Came to Pass* (1916).

MOUNT HOLYOKE COLLEGE. A college for women at South Hadley, Mass., founded as a seminary in 1837, and given the college charter in 1888. The enrollment increased from 796 in 1914 to 864 in 1918, dropped to about 800 for each of the succeeding years until 1923–24, when it rose to 946, and had reached 1030 for the autumn term of 1928. The faculty increased from 114 to 124 members with an additional 74 assistants, readers, curators, etc. The library grew from 64,000 volumes in 1914 to 104,000 in 1928. The productive funds of the College for 1927–28 amounted to $3,965,681, and the income for the same year to $1,203,152. A student-alumnæ hall, containing an auditorium, banquet rooms, committee rooms, etc., was built in 1916; Williston Hall, the biological building, burned in 1917 and was replaced by a temporary building in the following year, then by a new permanent building under construction in 1923–24. Two new dormitories were built in the latter year, one to replace Rockefeller Hall, which was destroyed by fire in December, 1922. In the autumn of 1924, Cornelia Clapp Laboratory was opened to accomodate the departments of botany, geology, hygiene, physiology, and zoölogy, each department having laboratories for its different lines of work, and in 1928 two small houses located in the village were acquired for use as a residence for graduate students and assistants, and for freshmen, while a building was under construction to serve the purposes of the English course "Playshop" as a laboratory in the production of original plays. In 1923 a general examination was instituted, to be required of all students at the end of the senior year, in the work of the major subject. President, Mary Emma Woolley, A.M., Litt. D., L.H.D., LL. D.

MOVING PICTURES. Since the first Vitaphone programme was publicly demonstrated in New York City on Aug. 7, 1926, the motion picture has developed more rapidly and changed more completely than in all of the previous period since Edison's invention of the cinematograph in 1894. In that period, all established cinema values have been overthrown; all commercial, technical, and artistic phases have been changed and an entirely new day in the annals of the screen has been introduced. At first, the development was halting and it was widely believed that the introduction of synchronized talk was both a momentary novelty in the history of the films and a backward step in their æsthetics. It was felt by enthusiasts for the silent photoplay that the definitely pantomimic manner of the medium, which had resulted in the American *Greed*, the German *Variety*, the Russian *Potemkin*, and the French *Passion of Joan of Arc*, as well as the inaudible Chaplin comedies, would find but a momentary intrusion on the art of the most distinctive and universal of the modern dramatic forms.

Nevertheless objectors to the arrival of this novelty had forgot the difficult position into which the silent cinema had been forced. It is true that there were over 20,000 moving-picture theatres in the United States and the local films were highly successful all over the world. In addition, the artistic standards had advanced with great strides, resulting in an increased technical and ideational merit in the pictures arriving from the Hollywood studios. The producers and the public were recognizing that the cinema was a definitely pictorial medium and that it was not a scene by scene imitation of a stage play. At the same time, the producers also were beginning to recognize that the motion pictures gave certain signs of losing their hold on the popular attention. There were pessimistic observers who felt that the films had done everything possible, artistically and economically, with the limitation of silence and that the public was wearying of such a restricted medium. There were evidences of an ominous falling off in interest and attendance. It was at this time that motion-picture audibility appeared as a serious issue.

Though the presentation of the first Vitaphone programme in New York in 1926 marked the beginning of the era of sound, there had been a number of earlier attempts to introduce the new element into the cinema, from Edison's Kinetophone to Whitman's Cameraphone. Before 1917 there had been at least a dozen important experiments in sound photography in America and Europe. In 1917, William H. Bristol received a United States patent and in 1923 Dr. Lee De Forest presented short sound motion pictures which were shown commercially. Just a month after the showing of the Vitaphone programme Dr. De Forest produced a two-reel melodrama, which was the first all talking-film dramas.

The opening programme offered by the Vitaphone device was not all-talking. Will Hays, Martinelli, and Marion Talley were heard upon it, and the feature had a synchronized musical score, but no spoken dialogue. Later, the melodramas, *Tenderloin*, *Glorious Betsy*, and *The Lion and the Mouse* were offered with dialogue sequences, but it was *The Jazz Singer*, starring Al Jolson, which was the first outstanding success in the new medium. The star sang half a dozen songs and had a brief scene in which he talked with his mother, and the resulting show proved so enormously popular that the economic triumph of the new medium was assured. The first full-length, all-talking screen drama—that is to say, the first film of 6000 feet or more—was *Lights of New York*. In it each of the characters spoke lines throughout the entire photoplay. In all of these works, however, the scenes were laid entirely indoors, for in the early stages in the manufacture of audible works, it was found difficult to set up the microphone in the open and record successfully. The short Movietone comedy, *The Family Picnic*, was the first attempt in the new manner to get out into the open air. The first outdoor photoplay of full feature length was *In Old Arizona*, which also was made by the Fox Movietone organization.

After the talking motion picture had been made practical, the cinema scientists returned to their efforts to provide color as well. There had been in the past so many handicaps in the path of perfecting color films that efforts to present film dramas in their natural hues had been intermittent and, on the whole, ineffective. At the coronation of King George V, and the subsequent Durbar in India, Charles Urban made moving pictures with the Kinemacolor process; but these were crude and conducive to eye strain. Following this, color was used chiefly in travel pictures and short subjects showing rare flowers, birds, precious stones, and fashions. The first full length photoplay to be made entirely in color was *The Glorious Adventure*, a costume drama of the Restoration, but it failed to prove profitable. With the development of the Technicolor process, color photography made a definite advance and the result was such pictures as *Toll of the Sea*, *Wanderers of the Wasteland*, and certain sections of *The Ten Commandments*. All of these, however, were done in silence. The Warner Brothers, who introduced the Vitaphone process, continued their pioneering efforts by offering on May 28, 1929, *On With the Show*, a cinema musical comedy, which was the first full-length photoplay to combine audibility and color. Since then, they have presented *Gold Diggers of Broadway*, which likewise contains both color and sound. In addition, such screen plays containing musical numbers as *The Dance of Life*, *The Broadway Melody*, and *The Hollywood Revue* have used color in presenting revue numbers.

The chief efforts of the screen magnates, however, have been devoted to perfecting sound, both technically and as a dramatic contribution to the motion picture. At the outset, the moving picture found itself with a new mechanical device on its hands and little idea of what to do with it. In one way, the coming of audibility proved rather devastating, with its hasty overthrow of everything that the silent films had done in the way of creating a distinct medium of artistic expression. In addition, there was the at least temporary stop put to the world-wide circulation and influence of the American films. The cinema had begun by accepting the stage as its model and had striven for years to escape from its allegiance and become independent. With the arrival of the puzzling new medium, the only thing left to do was to return to the influence of the theatre and make picture photographs, scene by scene and word by word, of stage plays. The result of this is that Hollywood set out to buy up all the stage plays, stage directors, stage writers, and stage actors it could find, and the best of the earlier talking pictures were the ones that were most careful at photographing effective stage dramas. Gradually, however, the tendency to strike out in the direction of a more distinctive dramatic form has made itself felt. It had been feared that the established screen stars, most of whom lacked stage training, would prove ineffective before the microphone, but experience has proved that their natural, if untrained, voices are really more successful in the new medium than the more studied tones of the stage players. The attempt of the Actors' Equity Association to organize the cinema players, as it had organized those of the stage, likewise resulted in making the latter players less popular with the producers, and with the return of the acting ascendancy to the film actors, the movement away from sheer stage imitation definitely decreased.

Nevertheless, the first important audible screen efforts were frank photographs of stage plays. *The Letter*, adapted from the Somerset Maugham drama, was the first of the works in the new medium to go in for an adult narrative, but though it made certain attempts to use pictorial movement and effects, it was essentially a stage photograph. *The Doctor's Secret*, an intelligent drama based on Sir James M. Barrie's *Half an Hour*, followed the stage form so carefully that it slowed down the movement to the extent that action which was supposed to take place in 30 minutes took one hour in development. With additional experience in their manufacture, however, the producers slowly learned how to speed up their films, to adopt pictorial methods, and in every way escape from a strict adherence to stage technique. This movement in the direction of freedom reached its highest point when King Vidor's all-Negro photoplay, *Hallelujah*, combined drama, sound, music, and visual effects in a production which suggested pretty definitely that the talking motion picture could be made into a distinctive art form that was a synthesis of drama, poetry, and pictorial splendor.

Music has always been a definite part of the motion picture, since a lone piano accompanied the earliest one-reel photoplay. With the arrival of more pretentious feature films, comprehensive orchestral scores were devised that became an important adjunct to motion-picture presentation. The coming of synchronized talk to the film has by no means done away with the value of music to the screen, and we now have it in the form of an accompaniment to the dialogue, a theme song or a musical comedy number—without which few pictures are regarded as complete. The theme song, which is usually titled so as to have some bearing on the name of the picture, is becoming less necessary to a photoplay, but few films are offered without a scene in which it is possible for some sort of song to be sung by one of the players. The usual way is to arrange for at least one scene to take place during the course of a musical comedy, during which it is possible to present to the audience the valuable commodities of music and dancing. This demand for music in the films being so great, it is natural that the producers have employed to a great extent the presentation of musical comedies and revues in the cinema form. Two productions that promise to become part of a series have been offered in *The Fox Movietone Follies* and *The Hollywood Revue*, and another annual show is promised in the *Show of Shows*. Other screen musical comedies have been *The Cocoanuts*, *On With the Show*, and *The Gold Diggers of Broadway*. In most cases, the method has been to present a dramatic plot to the audience in which the musical and chorus numbers are offered as part of a stage show that figures in the narrative. *The Hollywood Revue* and *The Coconuts*, however, have not bothered with any such suggestion of a realistic story, and have been presented as straightforward, undisguised picturizations of musical shows. The first of the cinema operettas, *The Desert Song*, was likewise offered without the usual formula of a show within a show.

The use, even in an all-talking photoplay, of sound, as opposed to speech, was demonstrated in the melodrama called *Alibi*. The noise of convicts' feet while marching in lockstep; a warehouse robbery to the accompaniment of police whistles and the beat of nightsticks on the curb, a third degree, with only the ticking of a clock to relieve the silence—these were among the most effective scenes of the picture and in none of them was a word spoken. Great mechanical progress has already been made in the talking pictures, but the capture of the human voice still lags behind. In *Bulldog Drummond*, exceptional effect is gained by the sound of rain and the hum of a motor in the dark. The voices recorded in the picture with far more than the average success, but whereas they were a bit less satisfactory than in real life, the noise of rain and motor proved far more effective and dramatic than their actual sound.

One of the most successful features of the talking pictures has been the Movietone news reel. A sound account of Lindbergh taking off on his historic flight across the Atlantic was one of the early achievements in this field. Since that time, such celebrities as George Bernard Shaw, King Alfonso of Spain, Mussolini, and A. Conan Doyle have been seen and heard on the Movietone, delivering messages to the cinema-going public in English. One of the most effective films of this type was the one in which Premier Macdonald, of Great Britain, informally introduced his Labor cabinet to the public by means of the news reel.

There are two outstanding methods of synchronizing sight and sound on the screen—the sound-on-disc, as presented by the Vitaphone process, and the sound-on-film, as employed in the Movietone process. In the former method, the sound is recorded and reproduced from a disc of the type used in the making of phonograph records. In the theatre, the disc is run off in synchronization with the film, which is timed with the machine that projects the film on the screen. The Movietone, on the other hand, is photographed by means of light variations on the side of the film. Both processes are included under the Western Electric system, to which, according to Harold B. Franklin's authoritative book. *Sound Motion Pictures*, vitually 90 per cent of the screen producers have committed themselves, including such important organizations as the Fox Film Corporation, Warner Brothers, Paramount Famous Lasky Corporation, First National, Universal, and United Artists. There is also the R. C. A. Photophone, which is controlled by the Radio Corporation of America and which is used by Radio Pictures, Tiffany-Stahl, and Pathé. In addition, there are the De Forest Photofilm and the Bristolphone.

Since the coming of audibility, there has been a pronounced tendency on the part of the great film producing organizations to amalgamate. In 1927–29 William Fox bought out Metro-Goldwyn-Mayer, and Warner Brothers purchased First National. In 1929 plans seemed almost completed for an alliance between Paramount Famous Lasky and Warner Brothers. If the deal is successful, the motion-picture industry in America will be controlled by three organizations—the Fox group, the Paramount-Warner-First National combine, and the RKO or Radio-Keith-Orpheum organization.

The confusion into which the film industry in the United States was thrown by the coming of audibility is shown particularly in the field of export. It is obvious that, where the American pictures of the silent era could be shown in every country of the world, the field of the local talking product is definitely limited. In the past, from 30 to 40 per cent of the gross revenue of the American motion picture has been derived from the foreign markets. A great part of this revenue came from various sections of the British Empire, and, of course, in these parts of the world, the American screen drama is both comprehensible in its language and possible as a commercial proposition. Naturally, though, in the nations employing an alien tongue, audible films in the English language are in grave danger of finding an unconquerable barrier, even though the Al Jolson picture, *The Singing Fool*, proved successful in Berlin and Paris. It seems likely, however, that its success was due chiefly to its value as a novelty and it must further be remembered that the film was dependent on singing rather than dialogue for its effects. Some effort has been made by the American producers to cater specifically to definite countries. *Innocents of Paris*, which featured the French performer, Maurice Chevalier, was made in a French as well as an English version and Irene Bordoni made a film in which she sings in French, German, Spanish, and Italian, in addition to English. A talking version, done entirely in the German language, has been made of the drama, *The Royal Box*, in the United States recently with the Teutonic players, Alexander Moissi and Camilla Horn, in the leading rôles. Such productions, however, are naturally both freakish and incidental, and, on the whole, it is safe to say that the American film industry, without confessing it publicly, has pretty much given up the hope of continuing its complete domination of the foreign market. Sound has given the foreign producers their long-awaited opportunity to compete in their own countries with the American product. Almost every producer in this country is making a silent version of his dialogue pictures for foreign markets, and, although these works are obvious makeshifts, they are likely to be successful until the foreign picture-makers can make something more popular. There is little reason to think they can do so at present, but with the stimulation offered them by the deficiencies of the made-over American products, they are bound to provide more strenuous opposition to the Hollywood producers than before. Over ten million people, it has been estimated, attended silent film performances each week in 1928, and 85 per cent of these pictures were produced in the United States. It is safe to say that no American producer expects such a complete monopoly to continue.

Even without the coming of sound, however, American producers were beginning to experience great handicaps in releasing to the European market, through the restrictions placed upon the American-made photoplays by the chief foreign countries. Quota legislation, for example, was blamed for the drop in exports from a total of 232 million feet in 1927 to 222 million feet in 1928. The first country to regulate the import of American films was Germany, which first demanded that for each one of them admitted, a film must be produced on German soil, but later modified it to admit an American picture for each German work shown in the United States. The Quota law of Great Britain provides that, in 1929, 7½ per cent of the footage exhibited in English theatres must be British-made. In 1930 and 1931, the ratio is to be increased to 10 per cent; in 1932 it becomes 12½ per cent; in 1933, 15 per cent; in 1934 and 1935, 17½ per cent, and from 1936 to 1938, it becomes 20 per cent. In addition, a fund of $100,000,000 is provided to build up the cinema industry in England. The intention is to give the English moving picture 10 years to become self-supporting. In France, the restricting regulations as modified through the efforts of the organization known as the Motion Picture Producers and Distributors of America, permit 60 per cent of American importations to be admitted into France free, with the added rule that, in exchange for the permission to import any pictures beyond the quota, a number of French films must be distributed in the United States or, as an alternative, seven licenses can be purchased for each film produced in France. The licenses must be purchased from the French producers.

The producing centre of the American motion picture remains in Hollywood, although a few pictures are produced in New York City, which is the financial centre of the industry. The first photoplays were one and two reels in length, but from the production of *Queen Elizabeth* in 1912, the vogue of the feature film, ranging around 5000 feet, or five reels, began. In 1915, however, David Wark Griffith's *The Birth of a Nation* introduced the era of the multiple reel film and paved the way for 8-, 10-, and 12-reel photoplays. The development of the photoplay, as a matter of fact, has always been based on the method of following the leader. Griffith in *The Birth of a Nation*, introduced the first big battle scenes and his pictures of the Civil War served as models for all war pictures made between 1914 and 1919. Mary Pickford inspired innumerable golden-haired ingenues, and Chaplin, recognized as the outstanding figure in cinema farce, caused all film comics at the time of his emergence to adopt black mustaches and huge shoes. William S. Hart and "Broncho Billy" Anderson led the way in the Wild West melodramas, and Douglas Fairbanks was responsible for acrobatic farce comedies. When George Loane Tucker produced *The Miracle Man*, he promoted a wave of religious enthusiasm in the films. The success of Theda Bara in *A Fool There Was* started the "vampire" craze, which lasted for several years. In the same way, the demand for mother-love themes originated with *Humoresque* and Griffith's massive spectacle, *Intolerance*, created an interest in symbolism. Rex Ingram's *The Four Horsemen of the Apocalypse* started the vogue of the war films, but in this case at least, the successors *The Big Parade*, and *What Price Glory* improved on their dramatic ancestor. Rudolph Valentino started the vogue of the dashing sheik lover. The crook melodrama, *Underworld*, created a deluge of crook melodramas.

After the War, for the first time in seven years, films were imported into the United States from Germany. The first of these, *Passion*, was based on the life of Mme. Du Barry, and it was followed by a host of others including *Deception* and *The Loves of Pharaoh*—all costume dramas. Not all of these works were successful, but they inspired many American producers to produce film plays of a historical nature. The Germans also introduced a distinct innovation in the fantastic photoplay, as exemplified by *The Cabinet of Dr. Caligari* and *The Golem*, which demonstrated that the effect of a supernatural story could be increased by the use of weird, impressionistic settings. The possibilities of the screen as a medium for the development of fantasy were shown by Douglas Fairbanks in *The Thief of Bagdad*. The German film, *Variety*, proved the most successful import financially from the Teutonic studios and another German film, *The Last Laugh*, showed how a silent motion picture could be made without a subtitle. With the success, economic, artistic, or both, of the German photoplays, there was an influx of German directors and players to the United States, and Germans who had been in America at the time the vogue started found themselves in great demand. Prominent in the Teutonic group were Erich von Stroheim, Ernst Lubitsch, Emil Jannings, and F. W. Marnau. Von Stroheim, who had been in the United States since before the War, made the greatest example of the realistic photoplay in *Greed*, which was based on Frank Norris's *McTeague*. Lubitsch made his reputation making sly sex comedies, of the type of *Kiss Me Again* and *The Marriage Circle*, but he produced one of the outstanding historical dramas in *The Patriot*.

The chief contribution of the Germans to the art of the cinema was that they showed it was possible to transcribe mature films to the screen and proved that a motion picture was a distinctive dramatic form, not a mere silent photograph of a stage play. Chaplin proved something of the same thing in *A Woman of Paris*, the screen drama that he directed. The climax in the development of the silent motion picture, however, came from Russia, where *Potemkin*, *The End of St. Petersburg*, and *Ten Days That Shook the World* established a new school of cinema that was based entirely on pictorial effects, dynamics, and the drama of movement and visual power, rather than on straight story telling. Another important European film was the French *Passion of Joan of Arc*, which was widely heralded as one of the greatest of motion pictures. In the field of the so-called nondramatic films, the most distinguished have been *Nanook of the North*, a camera record of life in the Arctic; *Moana*, which does the same thing for the South Seas; and *Chang*, a picture of wild life in Siam. The first two films were made by Robert J. Flaherty, and the last was produced by Cooper and Schoedsack.

The unit of moving-picture measurement is the reel, which contains about 980 feet of film. Pictures may be of any length, from 1 reel up, although 5, 6, or 7 reels is the average for so-called feature pictures. The running time for one reel through a projection machine is approximately 15 minutes. The film itself is manufactured of a standard size and material so as to be available for use in projection machines in all countries of the world. After the completion of a moving picture, it goes through three stages: exploitation, distribution, and exhibition. For purposes of distribution, the United States is divided into exchange districts. Copies of the pictures are delivered to the exchanges and are rented through them to the theatre owners for purposes of exhibition. This service is given at various fixed rates to the exhibitor, the rate depending on the assumed value of each picture and depreciating as time goes on and the picture assumes wider circulation. "First-run houses," theatres which show pictures which have not been exhibited in their district before, sometimes pay as much as $20,000 for the rental of a picture for one week.

It is in connection with the representation of dramatic scenes in the form of so-called photoplays that the moving-picture industry finds its widest application. Depicting current events in this way of course aroused interest, but this does not bulk large in connection with the portrayal of successive scenes from some new or standard play in which the action follows along rapidly and emphasizes the dramatic succession of incidents. This involves the reduction of a play to a simple scenario, or story, or it may be the construction of a scenario or outline from new and original ideas. Once this is done, the work of staging and photographing the scenes must be started. This involves large expense and considerable time, as many of the situations may be modified as the work proceeds, to give them proper dramatic value and effect. For production on the large scale that is now necessary, when moving-picture plays as regards not only elaboration but even the prices charged for admission and seats are in some cases put on a level with actual stage productions, extensive workshops and large studios are increasingly common. Several photographs may be in process of production simultaneously, and a large force of costume makers, scene painters, and other assistants are employed, together with the necessary workshops for developing and finishing the films as rapidly as possible. The expense for the duplication of a film, once it is made, is not large proportionately, and as soon as films are released for rental, the profits, according to the popularity of the subjects, are very large. When a film has been made and found satisfactory for exhibition, it is imprinted with the name of the manufacturer and copyrighted. A film may be run about 500 times in the hands of a careful operator before its condition renders its projection unsatisfactory by reason of streaks and spots that appear greatly magnified upon the screen; in addition to which there is a certain increased fire danger from the frayed and split condition of the edges when exposed to the intense heat in front of the lantern. Recent books in the field of motion pictures are Terry Ramsaye's *A Million and One Nights* (1926), and H. B. Franklin, *Sound Motion Pictures* (1929). See PHOTOGRAPHY.

MOWINCKEL, J. LUDWIG (1870–). A Norwegian Prime Minister and shipowner. He was elected to the Storting in 1906, and served as president of that body (1916–18), Minister of Commerce (1921–22), Minister for Foreign Affairs (1923), and Prime Minister and Minister for Foreign Affairs (1924–26). He was head of the Norwegian delegation to the Genoa Conference (1922), a delegate to the Assembly of the League of Nations (1925), was elected vice president of the Storting in January, 1928, and again became Prime Minister and Minister for Foreign Affairs in the radical cabinet formed in February of that year. He was also a member of the committee charged with making the Nobel Peace Prize awards.

MOWRER, PAUL SCOTT (1887–). An American newspaper correspondent, born in Bloomington, Ill. He studied at the University of Michigan and began his newspaper career as a reporter for the Chicago *Daily News*, in 1905. He was a correspondent at the front for the same newspaper in the first Balkan War and again in the World War. In 1921 he acted as special correspondent at the Disarmament Conference. Since 1922 he has been European Director of the Chicago Daily News Foreign Service. He wrote *Hours of France*, poems (1918); *Balkanized Europe—a Study in Political Analysis and Reconstruction* (1921); *The Good Comrade and Fairies*, poems (1923); *Our Foreign Affairs—a Study in National Interest and the New Diplomacy* (1924); and *The Foreign relations of the United States* (1927). He also contributed many articles to magazines on world politics.

MOZAMBIQUE. See PORTUGUESE EAST AFRICA.

MUCK, muk, KARL (1859–). A famous German conductor (see VOL. XVI). During 1912–18 he was the conductor of the Boston Symphony Orchestra, which under him reached the zenith of its glory. It was he who shattered the time-honored tradition that the soloist was the principal attraction at a symphony concert. Suspected as an alien enemy, he was arrested and interned in 1918. Returning to Germany the following year, he resumed his activity as a guest-conductor. In 1922 he became regular conductor of the Philharmonic Society in Hamburg. From 1901 on, he was the sole conductor of the Parsifal performances at Bayreuth.

MUIR, mūr, RAMSAY (1872–). A British historian, educated at University College, Liverpool, and Balliol College, Oxford. He was lecturer at the University of Liverpool (1900–06), professor of history at Liverpool (1906–13), and was at the University of Manchester (1913–21). He also served as a Liberal member of Parliament from Rochdale (1923–24). His works include *History of Liverpool* (1907); *Peers and Bureaucrats* (1910); *Atlas of Modern History* (1911); *Making of British India* (1915); *Nationalism and Internationalism* (1916); *The Expansion of Europe* (1917); *National Self-Government* (1918); *History of the British Commonwealth* (2 vols., 1920–22); *Liberalism and Industry* (1920); *Politics and Progress* (1923).

MÜLLER, mül'ĕr, GEORG ELIAS (1850–). A German psychologist. He completed his analysis of memory (*Analyse der Gedächtnis Stätigkeit*) in 1917. As representative of the associationistic school, he opposed the relativistic notions of the proponents of the *Gestaltpsychologie* (see PSYCHOLOGY, *Perception*). His book on *Complextheorie und Gestalttheorie, ein Beitrag zur Wahrnehmungs Psychologie* (1923), is a defense of associationism against its critics. His later works include *Abriss der Psychologie* (1924) and *Typen der Farbenblindheit* (1924).

MÜLLER, HANS (1882–). An Austrian writer and dramatist, born at Brünn and educated at the University of Vienna. He traveled extensively in Germany, Austria, Italy, France, Belgium, Holland, and England. He is the author of *Dämmer* (1900); *Die Lockende Geige* (1903); *Der Garten des Lebens*, a Biblical epic (1904); *Die Rosenlaube* all verse (1909); *Buch der Abenteuer* (1905); *Geheimnissland* (1909); and *Träume und Schäume* fiction (1911). His reputation rests chiefly on his plays, which include: *Der Reizende Adrian* (1913); *Die Blaue Küste* (1914); *Könige* (1915); *Violante* (1916); *Der Schöpfer* (1918); *Die Sterne* and *Die Flamme* (1920); *Der Vampir* (1922); *Der Tokaier* (1924); *Veronika* (1926); *Die goldene Galeere* (1926); and *Das Wunder der Heliane*, an opera libretto (1927).

MULLER, mụ'lĕr, HERMAN (1876–). A German Chancellor, born at Mannheim. He became a contributor to the *Görlitzer Volkszeitung* in 1899, a member of the Reichstag in 1916 and leader of the Social-Democratic Party in 1919. He served as Minister for Foreign Affairs (1919–20), and as Chancellor in 1920 and again after June, 1928.

MÜLLER-FREIENFELS, RICHARD (1882–). A German writer, born at Ems and educated at the universities of Munich, Berlin, Geneva, Tübingen, Paris, London, and Zurich. He traveled in Europe, Asia, and Africa. His works include: *Psychologie der Kunst* (1912); *Deutsche Denker und die Phantasie* (1916); *Persönlichkeit und Weltanschauung* (1918); *Psychologie der Religion* (1920); *Philosophie des Individualismus* (1920); *Psychologie des Deutschen Menschen* (1921); *Bildungsideen und Erziehungsmöglichkeiten* (1921); *Irrationalismus* (1922); *Erziehung zur Kunst* (1925); *Die Seele des Alltags* (1925); *Metaphysik des*

Irrationalismus (1927). He edited the works of Goethe and Eduard von Hartmann's *Philosophic des Schönen* (1927).

MÜLLER-URY, ADOLFO (1864–). A Swiss-American portrait painter (see VOL. XVI). His later portraits include Mrs Woodrow Wilson (1916); President Wilson delivering his War Speech before Congress on Apr. 3, 1917; Cardinal Mercier, during his visit to the United States, for the Catholic University at Washington; Pope Pius XI (1922); and many others. Pope Pius XI conferred the Knighthood of St. Gregory on him in 1923.

MUNDELEIN, GEORGE WILLIAM (1872–). An American cardinal, born in New York City and educated at Manhattan College, St. Vincent Seminary, and in Rome. He was ordained priest in 1895 and served as associate secretary to the bishop and as pastor in Williamsburg, Pa., from 1895 to 1897. From the latter year until 1909 he was chancellor of this diocese. In 1903 he was appointed censor of the Liturgical Academy, the only American holding that office. In 1906 he received the appointment of domestic prelate and in 1909 was appointed titular Bishop of Loryma and auxiliary Bishop of Brooklyn, N. Y. He held this office until 1916, when he was made Archbishop of Chicago. He was founder and president of the Seminary of St. Mary's of the Lake, at Mundelein, Ill. In 1924 he was elevated to the rank of cardinal.

MUNICH, mū′nĭk. The capital of Bavaria and a cultural centre of Germany. The population at the census of 1925 was 680,704. On May 7, 1925, the German Museum of Natural and Technical Sciences, the largest and most unique museum of its kind in the world, was opened. The project was started in 1906, but its completion was delayed on account of the outbreak of the World War. The exhibits include those showing raw materials, their means of production and refinement; the exploitation of natural sources of energy; construction of bridges, tunnels, canals, and other engineering feats and the development of railroad, steamship, and aëroplane transportation; municipal operation; scientific agriculture; physics, chemistry, geology, and astronomy. The aim of the museum is to afford an insight into the progress of mankind in conquering the forces of nature. In 1921 the Michaels-Kirche, which had been used as a Court church from 1773 to 1918, was restored to the original owners, the Jesuits, and the former royal palace was opened as the Residenz Museum. The Marstall Museum, opened in 1923 and housed in the old royal Riding School, contains state coaches, sleighs, harnesses, etc., belonging to the electors and kings of Bavaria. Since 1926 the Ethnographical Museum, depicting the folk ways of all races and nations, has been housed in the Old National Museum. The new Sociological State Museum contains exhibits pertaining to the prevention of accidents, industrial hygiene, and various devices for the comfort and safety of workers. In 1929 the Lenbach Gallery was enlarged and was opened as the Municipal Gallery of Modern Art. The Munich War Memorial, a simple but impressive monument, was erected in 1924 in front of the Bavarian Army Museum. It consists of a sunken court, on the walls of which are inscribed the names of 13,000 men from the city of Munich who died for the Fatherland, surrounding a cenotaph on which lies the prostrate figure of a warrior. On one side appear the words, "To Our Dead," and on the other side, "They Shall Return."

History. In October, 1918, Bavaria was one of several German states which threatened to secede and set up an independent republic. Red flags were displayed in Munich, and popular meetings were held demanding the Kaiser's abdiction. On November 7, the Bavarian Republic was proclaimed under Kurt Eisner as Prime Minister. A few days later the Revolution had spread to Berlin. On Feb. 21, 1919, Eisner was assassinated by an army officer. The murder was attributed to the well-known separatist policy of the Bavarian Premier who had violently attacked Prussia and had broken relations with Berlin. On April 6, a Soviet republic was declared in Munich but was promptly suppressed by the calling in of Prussian troops. After the short triumph of the Reds, the Conservative and Clerical elements regained power and completely crushed their former adversaries. The leader of the reactionary majority was General von Ludendorff. A systematic campaign was carried on under him in the interests of the old militarist and monarchical elements. Anti-Prussian propaganda, resistance to the payment of the reparations, and opposition to disarmament were characteristic features of this activity. On Nov. 8, 1923, the Bavarian reactionary elements, in open defiance of the central authorities, seized the Government at Munich, but their attempted *coup d'etat* to set up a dictatorship was unsuccessful. With this failure, the monarchists lost their control over the government.

MUNICIPAL ENGINEERING. See CITY PLANNING; GARBAGE AND REFUSE DISPOSAL; MUNICIPAL GOVERNMENT; MUNICIPAL OWNERSHIP; ROADS AND PAVEMENTS; SEWAGE AND SEWAGE DISPOSAL; WATERWORKS AND WATER PURIFICATION.

MUNICIPAL GOVERNMENT. Sweeping changes in the framework of municipal government have taken place in the United States in the first thirty years of the twentieth century. These began with the widespread adoption of the commission plan in the first part of the period, subsequently succeeded by almost as extensive adoption of the commission or council-manager plan. Both plans comprise a small council or commission, generally five, but sometimes seven or more, in number. In the commission plan, this body exercises both legislative and administrative functions, each commissioner heading a city department. In the newer plan, the commission or council is limited to legislation but controls administration through the employment of a manager who, so long as in office, is the chief administrator of the city. Growth of the straight commission plan declined with the rise of the council-manager plan, partly through changes from the commission to the commission-manager type.

Among the States, the chief exception was New Jersey, where it was not until 1923 that the Legislature authorized the adoption of council-manager charters, and where, up to 1929, very few places had availed themselves of the enabling act. Of the two largest cities that adopted the plain commission plan, New Orleans and Buffalo, the latter changed back to the old mayor-and-council type on Jan. 1, 1928 (see *New International Year Book*, 1927), but kept the number in the council down to 15. The small or relatively small council was general in 1929, even where neither the commission nor commission-manager charter prevailed. Two-chamber councils had almost disappeared, a striking change in this respect having been effected at Philadelphia on Jan. 1, 1920, when a single council of 21 members was substituted for a bi-cameral body with a combined total of 144 members. Manager cities had risen to over 400 in 1929, as detailed further on.

City and county consolidation was to the front in various parts of the country up to the close of 1929, with few, if any, additions to examples of long standing here and there—Philadelphia, Denver, and San Francisco, with each of the five boroughs composing New York City co-terminous with a county of the same name. Two notable proposals for the consolidation of all the minor civil divisions within a county into a single government, controlling all county-wide services but leaving local autonomy largely untouched, were pending early in 1929: one covering Pittsburgh and other places in Allegheny County and the other embracing Cleveland and Cuyahoga County. The former was authorized by a State constitutional amendment approved at the general election in November, 1928, and detailed in a charter drafted by a commission for introduction in the Pennsylvania Legislature early in March, 1929. Under this amendment, some 120 cities, boroughs, and townships included within Allegheny County would become the Consolidated City of Pittsburgh, governed in matters of county-wide concern by seven commissioners, but with four municipal divisions, including one for the Pittsburgh of 1929, and with certain powers of the 120 existing communities left undisturbed. The plan was defeated at a special election of the municipalities, boroughs, and townships concerned held on June 23, 1929.

For the 59 cities, villages, and townships, and 33 school districts in Cuyahoga County, the Regional Government Committee of 400, through a fact-finding committee, made public in January, 1929, a constitutional amendment which failed to pass the 1929 Legislature. The proposed plan would give unified control of highways, water supply, sewage disposal, transit, public health and parks, so far as these are of country-wide concern, but would leave undisturbed the activities of the various local governing bodies. In California, a two-county consolidation, at least as to some functions, was proposed late in 1928 in a report on a survey of San Mateo and San Francisco counties. See also CITY AND REGIONAL PLANNING.

Charters and Municipal Home Rule. One by one, the various State Legislatures of the Union have given up the early and long-prevailing practices of enacting separate charters for individual cities. In some places, it is still within the power of the Legislature to do this, although the power is rarely exercised. A number of State constitutions prohibit all legislation applying to one city only. Some years ago, New York State made such legislation subject to local veto by the mayor or in smaller places by the local legislative body. New York in 1914 and Massachusetts in 1915 passed optional charter acts under which municipalities can by popular vote choose between six types of charter in New York and four types in Massachusetts. The three main types in each State are the federal or mayor-and-council type, with varying degree of separation between legislative and executive functions; the commission plan, and the commission-manager plan. In 1924 the Legislature of New York State passed the Home-rule Enabling Act (Chapter 363, Laws of 1924) authorized by a constitutional amendment adopted in 1923, which extends broadly to all kinds of strictly local legislation, including the making and amending of municipal charters, but leaves unaltered the power of the Legislature to pass certain kinds of laws applicable to all municipalities. The amendment also authorizes the Legislature to pass special legislation by a two-thirds concurrent vote of each house, on receipt of an emergency message from the Governor. Every city is granted constitutional power to adopt and amend local laws not inconsistent with the constitution and laws of the State. These laws may relate to a wide range of subjects. The amendment makes it the duty of the Legislature to provide by general law for putting the amendment into effect. The Enabling Act authorizes any local legislative body to pass local acts superseding existing State legislation applying to the municipality in question alone. The act makes compulsory a referendum vote on certain charter changes and local ordinances such as those changing the veto power of the Mayor, creating a new executive office, abolishing a branch of the legislative body, or alienating city property. Other kinds of local acts are subject to referendum on petition. Provision is made for local drafting of new charters.

In the case of New York City, and in recognition of the large legislative powers vested in the Board of Estimate and Apportionment, the Enabling Act gives the power to enact local laws to a bicameral body known as the Municipal Assembly, consisting of the Board of Estimate and Apportionment and the Board of Aldermen. Before they are approved by the Mayor, he must give a hearing on all local laws passed by the Assembly. The Mayor's veto of such laws may be reconsidered by the Municipal Assembly and passed over the veto by a two-thirds vote. On reconsideration, the Mayor is not allowed to vote.

The New Jersey Legislature of 1923 granted to any municipality in that State the right to adopt the commission-manager form of city charter. A plain commission-plan enabling act was passed some years earlier and had been widely adopted in the State, but repeated efforts to secure the manager plan were defeated until 1923.

GROWTH OF CITY-MANAGER CITIES
(From *Public Management*, March 1, 1929, tentatively revised to end of 1929)

Effective	By charter	By ordinance	Total
1908	1	0	1
1912	1	2	3
1913	7	1	8
1914	14	5	19
1915	18	4	22
1916	12	2	14
1917	16	0	16
1918	18	8	26
1919	24	5	29
1920	22	10	32
1921	45	4	49
1922	26	7	33
1923	29	4	33
1924	14	2	16
1925	22	6	28
1926	16	6	22
1927	16	6	22
1928	12	6	18
1929	6	0	6
Totals	319	78	397
Not definitely known			2
			399

Rapid Progress of City-Manager Plan. Up to 1914, the city-manager plan had been adopted by only 23 municipalities; the first of these was Staunton, Va., which created the office of business manager by ordinance in 1908. From 1915 on, there was first slow and steady and then more rapid progress in the adoption of the manager plan. Records kept by the International City Managers Association showed that to Jan. 1, 1929, about 410 cities had adopted the manager plan. About 400 were in the United States, a dozen in Canada, and two in New Zealand.

In the United States, all but 12 States had one or more manager cities, Michigan leading with 44. The 12 largest cities which had adopted the manager plan up to the end of 1929, with their populations as of July 1, 1928 (U. S. Census Bureau estimates) were: Cleveland, 1,010,000; Cincinnati, 413,000; Kansas City (Mo.) 391,000; Indianapolis, 382,000; Rochester, 328,000; Dayton, 185,000; Norfolk, 184,000; Fort Worth, 171,000; Grand Rapids, 164,000; Fall River, 134,000; San Diego, 119,000; Knoxville, 105,000.

In the Irish Free State, a city-manager bill was enacted by the Legislature early in 1929. The plan had been recommended for Dublin by a government commission and a bill to put it in effect was scheduled for enactment by the close of 1929.

The total number of manager cities given does not include those that have abandoned the plan. Of these, there are about 80 that were reported as having adopted the plan, but of that number, the reports were unfounded in many cases. Over 70 either never really adopted the plan or else adopted and abandoned it under ordinance. The plan has been abandoned by only seven cities that adopted it under charter. The largest of these was Akron, Ohio, which adopted a manager plan not wholly standard in 1920 (population then 208,000) and gave it up four years later. The other charter cities which abandoned the manager plan by vote of the people are Waltham, Mass., Tampa, Fla., Albion, Mich., Collinsville, Ark., Lawton, Okla., and Santa Barbara, Calif. In 1927, 1928, and 1929, Cleveland voted against abandoning the manager plan, as did Norfolk, Va., in 1928. Cleveland, Ohio, where the plan went into effect Jan. 1, 1924, pays its manager $25,000 a year and a number of other cities pay from $10,000 to $20,000.

Bibliography. Among the recent books in this field are Anderson, *American City Government* (New York); Griffith, *Modern Development of City Government in the United Kingdom and the United States*, a comparative study, arranged chronologically and topically (London); Maxwell, *Contemporary Municipal Government in Germany* (with particular relation to changes since the World War (Baltimore); Munro, *The Government of American Cities and Municipal Government and Administration*, rev. ed. (New York); National Municipal League Committee on Municipal Programme. *A Model City Charter*, 1927 revision of council-manager type of Charter (New York); Thompson, *Urbanization* (New York); Upson, *Practice of Municipal Administration* (New York); White, *The City Manager* (Chicago); Buck, *Municipal Budgets* and *Municipal Finance* (New York); Lutz, *Public Finance* (New York). For annuals, see *The Municipal Index* (New York); *Municipal Year Book* (London); *Empire Municipal Directory* (London); and municipal information in government publications of various countries. For monthlies devoted to municipal affairs generally, see *American City* and *National Municipal Review* (New York); and for a British weekly, see *Municipal Engineering* (London). Consult also various journals covering either the whole field or some branch of municipal engineering. See CITY PLANNING; GARBAGE AND REFUSE DISPOSAL; MUNICIPAL OWNERSHIP; SEWERAGE; WATERWORKS.

MUNICIPAL LEAGUE, NATIONAL. An organization for the study of municipal problems and the dissemination of information on subjects relating to them, founded in 1894, and incorporated in 1923. The League meets annually, and during the year its work is carried on under the following committees: Committee on Government for Regional Areas; Committee on Municipal Budget Law; Committee on Revising Model City Charter; and Committee on Election Administration. At the thirtieth convention, in Boston, 1924, held jointly with the Governmental Research Association and the National Association of Civic Secretaries, the topics discussed included methods of financing public improvements, governmental research, transportation, and municipal home rule. Frank L. Polk became president. In 1925 the League met, with the American Civic Association, at Pittsburgh, Pa., also holding sessions with the Governmental Research Conferences, and the National Association of Civic Secretaries; the main subjects under consideration were the technique of influencing public opinion, enlisting interest in public affairs, and planning and managing metropolitan regions. By 1926 the League had published a model municipal bond law, a model system of election registration, and monographs on municipal budgets, and on depreciation in public utilities. Various civic problems were debated at the annual convention at St. Louis in 1926. The following year, at the meeting in New York, interest centred around questions of finance, and of crime, joint sessions on various phases of those subjects being held with the Governmental Research Conference, and the National Association of Civic Secretaries. A monograph, *The Merit System in Government*, was added to the list of important publications. Richard S. Childs succeeded Mr. Polk as president. The League publishes monthly the *National Municipal Review*, under the editorship of H. W. Dodds. Headquarters are at 261 Broadway, New York.

MUNICIPAL OWNERSHIP. Throughout the United States, waterworks lead public utilities in percentage of plants municipally owned. Electric-light-and-power plants come next. There is then a big drop to gas works, and a further drop to electric railways. Telephones are practically, if not wholly, privately owned. Of sewerage systems, not generally classed as public utilities, there are about as many privately owned systems as there are gas works municipally owned. In size of cities and total population, municipally supplied waterworks are far in the lead. Most of the many municipally owned electric and gas plants supply relatively small cities. This is also true of the privately owned sewerage systems. A few passenger ferries are municipally owned, notably by New York and Boston.

Private toll bridges, once common, had been almost entirely superseded by free bridges publicly owned until about 1925, when toll bridges of both classes of ownership began to come back to meet the rapidly growing motor traffic demands. These were generally large and costly bridges, considered to be beyond financing as free bridges. Notable instances are the publicly owned Philadelphia-Camden Bridge over the Delaware, opened to use in 1926, and the Hudson River Bridge between New York City and Fort Lee, N. J., construction of which was started in 1927. It is expected that toll on these bridges, as on the publicly owned Holland Vehicular Tunnel, between New York City and Jersey City, will be discontinued or reduced when the bonds for their construction have been paid off. Where a wise policy prevails, the new privately owned toll bridges are subject to public control of rates and ultimate public ownership.

All of the largest ten cities of the United States owned their waterworks in 1929 and the eleventh, San Francisco, had been engaged for several years in the construction of supply works and in 1928 voted bonds to buy the works of the Spring Valley Water Company. Of the largest 100 cities of the United States, only 12 were supplied by private water companies at the close of 1928: San Francisco, Indianapolis, Birmingham, New Haven, Bridgeport, Scranton, Paterson (municipal acquisition in progress), Elizabeth, Utica, St. Joseph, Wichita, and Johnstown (purchase of private works proposed). No figures showing waterworks ownership for the whole country have been compiled since those given in the *McGraw Waterworks Directory* for 1915. Of 4400 works there listed, 3045, or 70 per cent, were municipally owned. The probable number of waterworks in the United States early in 1929 was 10,000, of which it was estimated 75 per cent were municipally owned, serving 85 to 90 per cent of the population supplied. In Canada, the corresponding percentages were probably equally high. Montreal, in 1928, bought a private waterworks that supplied a considerable part of the city and some outlying municipalities. In Great Britain and Germany, most of the cities own their waterworks.

Of 4063 electric-light plants in the United States in 1928, 47 per cent were municipal and 53 per cent private, the actual numbers being 1910 and 2153. See *Electrical World*, New York, Jan. 5, 1929. Only some 25 of the publicly owned plants were in places of over 25,000 population, while the total population supplied by the municipally owned plants was only some 7,500,000. In terms of generator capacity, the municial and private plants stood at about 1 to 20. Of 1000 or less gas works in the United States, only about 5 per cent were municipally owned in 1929. The largest plant, owned by Philadelphia, recently had been leased for a second 25 years to a private company for operation. The largest municipally owned and operated gas works in the United States were those supplying the Omaha, Nebr., metropolitan district (which also owns and operates waterworks and ice plants), Richmond, Va., and Duluth, Minn. See *McGraw Central Station Directory* for details of individual electric-light-and-power plants; also *Brown's Gas Directory* and *McGraw Electric Railway Directory*.

Street railways are but rarely under municipal ownership in the United States, but more commonly in Canada, and still more generally in Great Britain. In point of magnitude of works and capital investment, the subways and other railways forming part of the rapid-transit system of New York City lead the country. These, however, are privately operated, as were the municipally owned subways and elevated lines of Boston until after the World War, since when they have been publicly operated. The municipally built rapid transit lines of Philadelphia are operated by a private company. San Francisco, Seattle, and Detroit have gone extensively into municipal ownership of street railways.

In Ontario, Canada, there is a large mileage of publicly owned and operated railways, largely supplied and partly operated by the Ontario Hydroelectric Commission. Of 40 to 50 American cities having privately owned sewerage systems, most are located in Texas and New Jersey, the largest being at Atlantic City, N. J.

Municipal ownership in Germany (according to *Zeitschrift für Kommunalwirtschaft*, Sept. 25, 1928, abstracted in *The National Municipal Review*, February, 1929) prevailed as to waterworks in the majority of cities. In 1925 some 60 per cent of the electric energy generated was produced by municipal plants, while for gas in 1926, the corresponding figure was 90 per cent. Most of the street railways were under "communal control." The Public Ownership League of America, with national headquarters in Chicago, is devoted to the promotion of public ownership and democratic control of public utilities and natural resources. For some of the material gathered under its auspices, see Thompson, *Public Ownership* (New York).

MUNICIPAL TAXATION. See TAXATION IN THE UNITED STATES.

MUNITIONS OF WAR. See ORDNANCE.

MUNSEY, FRANK ANDREW (1854–1925). An American publisher (see VOL. XVI). During the decade 1914–24, he was especially active in the newspaper field and established and acquired by purchase several newspapers, including the Washington *Times*, Baltimore *News*, New York *Sun*, New York *Globe*, New York *Mail*, New York *Telegram*, and New York *Herald*. The last, he sold in 1924 to Ogden Reid, who consolidated it with the New York *Tribune*.

MURDOCK, VICTOR (1871–). An American legislator (see VOL. XVI). In 1917 he was appointed a member of the Federal Trade Commission. He was reappointed for the term expiring 1925 and resigned in 1924, becoming editor-in-chief of the Wichita *Daily Eagle*. In 1914–16 he was chairman of the Progressive National Committee. He wrote *China, the Mysterious and Marvelous* (1920) and *Folks* (1921).

MUR'RAY, (GEORGE) GILBERT (AIMÉ) (1866–). An English philologist (see VOL. XVI). He was Charles Eliot Norton professor of poetry at Harvard University (1926). After the World War, he worked for international understanding, publishing *Faith, War, and Policy* (1918) and *Problems of Foreign Policy* (1921), and acting as president of the League of Nations' Union (1923–), and of the Students' International Union since its formation in 1924. He wrote *Stoic Philosophy* (1915); *The Foreign Policy of Sir Edward Grey* (1915); *Euripides and His Age* (1918); *Satanism and the World Orders* (1920); *Collected Essays and Addresses* (1922); *The Rise of the Great Epic* (1907, 1911, 1924); *Five Stages of Greek Religion* (1913, 1925); *The Classical Tradition in Poetry* (1927); *The Ordeal of This Generation* (1929). To his list of verse translations of Greek plays, he added *The Alcestis of Euripides* (1914); *The Agamemnon of Æschylus* (1920); *Choephoroe* (1923); and *Eumenides* (1925).

MURRAY, John Gardner (1857–1929). A presiding bishop of the Protestant Episcopal Church in the United States, who was born at Lonaconing, Md., and trained for the ministry at Wyoming Seminary, Kingston, Pa., and Drew Theological Seminary, N. J. To aid in the support of his family, he interrupted his ecclesiastical training for eleven years (1881–92) and engaged successfully in business. Ordained in 1894, he assumed charge of missionary work in Southern Alabama for several years and then served as rector of churches in Birmingham, Ala., and Baltimore, Md. (1896–1909). In the latter year, he was consecrated Coadjuter Bishop of Maryland and in 1911 became Bishop of Maryland. He was elected presiding bishop of the Protestant Episcopal Church in October, 1925, for the term 1926–31 inclusive. He died of an apoplectic stroke Oct. 3, 1929, while presiding over a national convention of the House of Bishops at Atlantic City, N. J.

MURRAY RIVER WORKS. See Canals.

MURRY, John Middleton (1889–). A British journalist and writer, editor of the *Adelphi*, who was born at Peckham, London, and educated at Christ's Hospital and Brasenose College, Oxford. He was on the Staff of the *Westminster Gazette* (1912–13), art critic for it (1913–14), reviewer on the *Times Literary Supplement* (1914–18), editor of the *Athenæum* (1919–21), and later of the *Adelphi*. He was connected with the War Office in the political intelligence department (1916–19), and was chief censor in 1919. In 1913 he married Katherine Mansfield, and in 1920 he was made an officer of the Order of the British Empire. Besides articles in magazines and several translations from the Russian, his works include *Still Life* (1917); *Fyodor Dostoevsky* (1917); *Poems* (1919); *The Evolution of an Intellectual* (1920); *Cinnamon and Angelica,* a play (1920); *The Things We Are,* a novel (1922); *The Problem of Style* (1922); *Pencillings* (1923); *Discoveries, essays* (1924); *To the Unknown God* (1924); *Keats and Shakespeare* (1925); *Life of Jesus* (1926); *Things to Come* (1928), and *God,* a sequel to his *Life of Jesus* (1929). He edited the *Journal of Katherine Mansfield* (1927), and *Letters of Katherine Mansfield* (1928).

MUSCLE SHOALS. A location on the Tennessee River 2.7 miles above the railway bridge at Florence, Ala., and a few miles from Sheffield. During the War, the United States put under way a notable development there for the manufacture of nitrates for use in military explosives and also a large power plant involving the construction of a 100-foot dam across the river. (See Dams, *Wilson Dam.*) Under the terms of the National Defense Act of 1916 the site for the dam at this point was acquired, and in the following year United States Nitrate Plants No. 1 and No. 2 were planned, the latter directly at Muscle Shoals. This was done in order to secure an adequate supply of nitrate for the manufacture of munitions in case the United States should be cut off from the material imported from Chile. The reason for locating such plants at Muscle Shoals was the great power to be obtained from the Tennessee River, the fourth in size of the rivers of the United States, having a flow of 8000 to 500,000 cubic feet per second and in this vicinity a fall of over 134 feet in 37 miles. The Tennessee River is navigable from its mouth to the foot of Muscle Shoals, and the completion of the No. 2, or Wilson Dam at this point with its lock and the construction of No. 1 Dam, a small dam for navigation, only two miles below the Wilson Dam, would extend navigation for a distance of 15 miles. The building of the proposed Dam No. 3, 50 feet high, would extend navigation 65 miles further and supply additional power. Up to 1924, navigation of the river had been slight, but much interest centred in the development of power, particularly at Dam No. 2, the Wilson Dam. Here, for 12 months in the year, there would be available 87,300 horse power and for 97 per cent of the time, 100,000 horse power, while for 2½ months the available power would increase up to 600,000 horse power. The United States No. 2 Nitrate Plant at Muscle Shoals was completed so that operation could begin on Oct. 27, 1918, and it continued for a sufficient time after the Armistice to show that it could be run successfully. It had a capacity of 220,000 tons of cyanamid or 110,000 tons of ammonium nitrate per annum. This plant was of course operated by steam power; there is a 60,000 kilowatt steam-power plant at Muscle Shoals. Electricity was supplied over a 90-mile transmission line from a 30,000-kilowatt steam plant on the Warrior River. The plant at Muscle Shoals cost approximately $70,000,000 and the Warrior River plant and transmission line about $5,000,000 additional. The raw materials required for nitrogen fixation were coke from the Birmingham district or eastern Tennessee, limestone from the Waco quarry, 30 miles distant, and nitrogen from the air. The principal item was the cost of power; 85,000 kilowatts were required, and the steam plants were used pending the completion of the large dam across the river. The No. 2 plant could supply the nitrogen for 12 infantry divisions at the rate it was used in the War, or more than one-third of the inorganic nitrogen used in the production of fertilizers in the United States at this time. Consequently, in the latter connection after the end of the War, the farmers became interested in the utilization of the plant as an agency to increase the supply and decrease the cost of fertilizer. Accordingly, after the War, the future of this great power and manufacturing development aroused debate.

After a curtailment of the construction work on the Wilson Dam in 1921, it was decided to proceed vigorously with its completion, but no decision was reached as to the method of utilizing the power that would be developed. Offers were made by various interests. In and out of Congress, different schemes have been actively discussed but the question of what is to be done with the government-owned property at Muscle Shoals in 1929 was still undecided. In general, Congress has been opposed to the sale or lease of this property to private interests. On the other hand, a bill providing for the operation of the property by a corporation, consisting of five members to be appointed by the President, for fertilizer production with the right to sell surplus power, was killed by President Coolidge in 1928 by a pocket veto. This was clearly on the ground that the Government should not embark in the power business. In the meantime, the need for great amounts of power in the nitrate business has passed, the South is undergoing a rapid industrial development. See Fertilizer; Water Power.

MUSIC. About the beginning of the second decade of the present century, Futurism was just making its appearance, and the majority of musicians, as well as music lovers, then regarded the new movement as an aberration of taste not worthy of serious consideration. A few short years, however, witnessed such a rapid and general spread of the new cult that Futurism was no longer to be ignored. To understand the situation, it is necessary to distinguish between Impressionism and Futurism. Impressionism began as a reaction against the all-pervading influence of Wagner. To the direct, vivid, and concentrated expressiveness of the Bayreuth master, the Impressionists, under the leadership of Debussy, deliberately opposed mere suggestiveness, vague moods, and intangible atmosphere. For the fundamental principle of thematic development, they substituted the mere statement of themes, which followed one another in kaleidoscopic succession, without systematic repetition or development; but the necessity of themes as basic material was still recognized.

The conscious employment of the higher overtones, while extending the possibilities of harmonic combinations and progressions for the attainment of special effects, was carried to excess from the very beginning, with the result that impressionistic music rests not on the foundation of consonance, which was formerly the foundation of all music, but on dissonance. Taking Debussy as their starting point, a group of younger composers sprang up who soon made a caricature of Impressionism, and whose tendencies were dubbed Futurism. These innovators, dispensing altogether with thematic invention, employed mere rhythmical figures. Regularly defined rhythm was soon scorned as monotonous, and constant variation of rhythm was adopted as a fundamental principle. Different instruments played different rhythms simultaneously, so that each instrumental part was entirely independent of all the others. This brought with it the complete and intentional disregard of the harmonic relations of sounds. The preponderant use of dissonance by the Impressionists had already obliterated the dividing line between euphony and cacophony, and now the Futurists denied the essential difference between consonance and dissonance, proclaiming a system of "free harmony" which permitted the combination and juxtaposition of all sounds, irrespective of relationship.

This system frankly adopted cacophony as its basic principle. As compositions were no longer written in a recognizable tonality, key signatures disappeared and each accidental was marked individually, with the result that the printed page is as bewildering to the eye as the actual sounds to the ear. This method of writing soon became known as Atonalism. Some Futurists, however, insist on a distinction between Atonalism, the negation of the diatonic scale and the triad, and Polytonalism, the superposition or interlocking of various tonalities. Thus, in a string quartet, by Casella, the first violin plays in E♭ minor, the second violin in B♭ major, the viola in F♯ minor, and the 'cello in D minor The constant change of rhythm quite naturally led to the abolition of time signatures and bar lines. The next step was the introduction of quarter-tones; the scores of Alois Hába were actually published in the new quarter-tone notation. The craze for novel effects also led to an abnormal augmentation of the mechanical means of sound-production. Orchestral instruments were exploited in unusual registers and in still more unusual combinations. As an extreme example of overloaded orchestration may be cited Schönberg's *Gurrelieder*, scored for six solo voices, two choruses of 8 and 12 parts, respectively, and 114 different orchestral parts —altogether 140 distinct parts! In the employment of this huge apparatus, Schönberg defeats his very purpose and produces less startling and grotesque effects than Stravinsky does in his *Histoire du Soldat*, scored for an absurdly inadequate orchestra of one violin, one clarinet, one bassoon, one cornet, one trombone, and several drums.

The outbreak of the World War created conditions exceedingly favorable to the spread of Futurism, especially in Europe. It happened that Impressionism had already made great headway in Russia, England, and the Latin countries, whereas in Germany and Austria, the traditions of the classic and romantic masters had proved an effective check against the new influence. With German music banished, or at least considerably curtailed, in all countries politically arrayed against Germany, the Impressionists assumed undisputed leadership, and in their wake the Futurists developed such an active campaign that in a very short time they succeeded to the dominating position. Debussy, who until two or three years before his death (1918) had been acknowledged leader of the Radicals or Ultramodernists, was deposed as too conservative, and his place was taken by the Futurists Skriabin and Stravinsky. The Futurists now became the Ultramodernists, while the Impressionists were relegated to the rank of mere Modernists.

In Germany and Austria, the new gospel began to spread, and Schönberg, whose partisans before then had made some futile attempts at recognition, suddenly found himself elevated to a place by the side of Skriabin and Stravinsky. As early as 1915, an Italian, Pratella, formulated the new futuristic creed, which may be summarized briefly as follows:

The classic and romantic composers have arbitrarily confined music within narrow, artificial bounds rendering all further development impossible. Hence, the necessity of a new music free from the "decayed" formalism of the past. This new music the modern composer can create by implicitely following the dictates of his personal will, that is, the impulse of the "futuristic equilibrium."

This programme was accepted by all Futurists, irrespective of nationality, with the same result as in the case of the Impressionists, that all traces of nationality and individuality were completely obliterated.

After the War, the new movement continued throughout Europe with unabated vigor. A host of writers now appeared who effectively aided the composers, and in almost every country were established periodicals devoted exclusively to the cause of Futurism. Theorists wrote books formulating new systems of acoustics and esthetics to explain the new music and a special *Dictionary of Modern Music and Musicians* (1924) appeared, giving exhaustive information regarding the aims of modernism, together with a formidable array of biographical and appreciative sketches of all modernistic musicians born since 1880. Through these persistent and systematic efforts, a new public was recruited, sufficiently numerous to insure the success of a futuristic festival held in Salzburg in August, 1922. The immediate result of this festival was the formation of the International

Society for Contemporary Music (I. S. C. M.), with headquarters in London, for the purpose of spreading the new cult by means of annual festivals. At the first official festival, which took place according to schedule at Salzburg in August, 1923, 35 composers of 14 different nationalities were represented on the programme. Successive festivals were held at Prague (1924), Venice (1925), Zurich (1926), Frankfort (1927), Siena (1928), and Geneva (1929). In 1929 there were 20 national sections in as many countries, including the United States.

It must not be inferred from all this, however, that the Modernists have succeeded in sweeping away all the music of the past. Throughout the musical world, the programmes of organizations and individual artists still show a vast preponderance of the works of recognized masters. The recent Beethoven and Schubert centennial celebrations gave unmistakable evidence how securely these masters are intrenched in the affections of all lovers of music. Then, there are still living among us a few eminent composers of an older generation who have kept themselves entirely free from any modernistic influence. This is true especially of the greatest of them, Richard Strauss, who thirty years ago was regarded as the "modernist" par excellence, in the same sense as Beethoven, Chopin, Schumann, and Wagner had been the "modernists" of their time; but what was called "modernism" in those days has nothing in common with the Modernism of today. The innovators of the last century, including even the impressionist, Debussy, willingly acknowledged their indebtedness to their predecessors, on whose foundations they continued the natural process of evolution; whereas, the present Modernists absolutely repudiate the art of the past. Strauss, the last of the great innovators, recognizes these facts and, for that reason, he is the implacable and outspoken enemy of all modernistic tendencies. Unfortunately, in his case, his inspiration seems to have died with the close of the last century (*Ein Heldenleben*, 1899), for none of the works written in the present century rises to the high level of his great symphonic poems. Whatever may be the cause of this decline, the same eclipse of creative power, dating from the same period, is noticeable in the works of other eminent composers now dead, Bruch, Saint-Saëns, Grieg, Massenet, Mahler, Reger, and Puccini, and also in those of Bruneau, Sinding, Elgar, and Sibelius, who are still living and writing.

Quite different and unique is the case of Rachmaninov (born in 1873), whose development has taken place mainly within the present century. Here, we have the only composer of great talent and pronounced individuality who, amidst most unfavorable conditions, goes his solitary way, develops and proves conclusively that, in the hands of a master, the classic and romantic forms are still capable of new and vital content. Then suddenly, without having given any indication of declining powers, he deserted the career of the creative artist for that of the virtuoso (1916). For 10 years, his muse was silent. When, in 1926, he gave the world his fourth piano concerto and the Russian choruses with orchestra, he showed that the divine fire is still burning within him.

In the musical development of the United States, Futurism played a secondary rôle. Futuristic tendencies, it must be admitted, were quite noticeable among the younger American composers; but as yet, with a few exceptions, such as Ornstein, Sowerby, Hanson, Griffes, Cowell, and Whithorne, these manifestations avoided the furthest extremes and could still be regarded as advanced Impressionism. The chief reason why the influence of these composers on the public taste was negligible is the conservative attitude of the general public and of our great musical institutions, whose programmes, in the main, were still drawn from the works of recognized masters. While Impressionists had frequent hearings, Futurists were represented but sparingly, and only very rarely by extreme works. Of the musical centres, New York, the most important, is also the most conservative. Bach, Beethoven, Schubert, Brahms, Wagner, and Tchaikovsky still held undisputed sway, and despite determined efforts on the part of certain conductors, the New York public had not yet become convinced of the merits of Bruckner, Mahler, or Reger. This state of affairs led a small group of Futurists to establish, in 1921, the International Composers' Guild for the purpose of producing exclusively works of extreme tendencies, because "the standard symphony orchestras present only the most timid and anæmic of contemporary productions, leaving absolutely unheard the composers who represent the true spirit of our time."

In spite of very active and noisy propaganda, this group made few converts and the works produced at their special concerts did not find their way to the programmes of our recognized institutions. The organization was dissolved in 1927, but before that date two other societies with similar aims were established, and since then, Philadelphia, San Francisco, and Chicago have special societies for the propagation of Modernism. Although, since the beginning of the century, there had arisen in all parts of the United States numerous composers whose efforts had been duly recognized and encouraged by the leading orchestras and choral societies, they had not succeeded in reaching their common goal, the creation of a national school of music that should be recognized as typically American. Numerous and earnest attempts to force such a consummation by means of prizes, competitions, and special organizations producing exclusively works of native composers had not yielded the expected results. Nevertheless, the efforts put forth by this generation of composers were by no means futile; they were preparing the soil from which, at some future day, will spring the longed-for national art. As a natural consequence of the War, a vast number of the world's most famous interpretative artists sought and found success in extended tours of the United States. The presence of so many celebrities at the same time compelled managers to extend the field of operation, so that even smaller towns were visited, with the result that interest was stimulated throughout the country. Tangible proof of this new interest is found in the large number of newly established musical organizations of all kinds in towns which had formerly never considered such institutions a necessity.

Chamber Music. The widespread interest in chamber music throughout the United States during the decade furnishes conclusive evidence of the steadily growing appreciation of the best music. In all parts of the country numerous new organizations not only had been formed but also successfully maintained themselves. The most notable event was the establishment of the annual Berkshire Festival, which was inaugurated Sept. 16–18, 1918. During the summer of 1917, Mrs. F. S. Coolidge began the erection on South Mountain, near Pittsfield, Mass., of the Temple of Music, a small concert-hall with a seating capacity of 500, to be devoted exclusively to the performance of chamber music. At the same time, she offered a prize of $1000 for the best string quartet to be performed at the inaugural festival. Not less than 82 manuscripts, many from European composers, were submitted. After the success of the first festival, the $1000 prize was made a regular feature. The programmes of the festivals are given by famous chamber-music organizations from all parts of the Union.

On two occasions, European quartets participated, the London String Quartet (1920) and the Stuttgarter Streichquartett (1922). The programmes offered were remarkable for variety and catholicity of taste, favoring no nation and no period, and ranging from Bach to the Moderns of the day. At the conclusion of the festival of 1922, announcement was made that the cash prize thereafter would be awarded biennially in the even years. In the odd years, new works were to be commissioned from prominent composers. The first composers to be honored with such commissions were Eugene Goossens (string sextet) and Rebecca Clarke (*Rhapsody,* for 'cello and piano), both performed at the festival of 1923. The list of prize winners was as follows: 1918, Tadeus Iarecki, string quartet; 1919, Ernest Bloch, suite for viola and piano; 1920, Francesco Malipiero, string quartet; 1921, H. Waldo Warner, piano trio; 1922, Leo Weiner, string quartet; 1924, Wallingford Riegger, *La Belle Dame Sans Merci,* for vocal quartet and chamber orchestra. In 1925 the festival was transferred to Washington and the name was changed to The Washington Chamber Music Festival. The time also was changed from September to April. In 1926 the $1000 prize was awarded for the last time, Albert Huybrechts being the winner with a violin sonata. The poor quality of scores submitted led to the withdrawal of the prize.

An event that should not pass unrecorded is the dissolution of the famous Kneisel Quartet, which played its last concerts at Boston (Mar. 13, 1917) and New York (April 3). Founded in 1886, with Franz Kneisel, Otto Roth, Louis Sveeenski, and Fritz Giese as its original members, it played 32 consecutive seasons in Boston and 25 in New York, besides making numerous tours of the United States and two of Europe. Its influence in practically creating and then cultivating taste for chamber music in America can scarcely be overestimated. For many years, it had enjoyed the reputation of one of the finest quartets in the world. Another world-famous organization, the Flonzaley Quartet, of New York, was disbanded after a most distinguished career of 25 years, the last concert being given in New York on Mar. 17, 1929. The original members were Adolfo Betti, Alfred Pochon, Ugo Ara, and Ivan d'Archambeau. The only changes in the membership occurred in 1917, when Ara was succeeded by Louis Bailly, and in 1924, when the latter's place was taken by Félicien d'Archambeau.

Community Music. Community music, at least as the term has come to be understood, was a direct result of the War. Previously, there had existed, especially in Philadelphia and Chicago, isolated associations of factory workers organized into choral societies, some of which had attained sufficient proficiency to appear in public concerts. During the War, the soldiers, under regular leaders, were trained in choral singing, and the practice developed a genuine liking for music. Many ex-soldiers, after return to civil life, communicated the enthusiasm aroused in them by the camp songs to their fellow workers, with the result that in an incredibly short time employees of the larger companies in many industrial centres banded together for the cultivation of singing. Community choruses sprang up even in the smaller towns and villages throughout the country. The interest in music was not confined to singing; it immediately embraced the field of instrumental music, and numerous amateur orchestras and bands were established. By the end of 1920, the Bethlehem steel workers had recruited from among their own numbers not only a large chorus but also a complete symphony orchestra of almost 100 players. In the same year, the employees of the Federal Reserve Bank in New York gave a complete stage performance of *The Bohemian Girl* without the assistance of an outsider even in the principal rôles or orchestra. In some of the larger cities, where musical appreciation naturally had been spread before the War, the new movement led to the establishment of community opera (Washington, Philadelphia, St. Louis, Cincinnati). In 1920 New York celebrated its first Music Week (February 1–7), when all musical organizations, churches, hotels, theatres, and many individuals combined to bring music, in some form or other, home to everybody. At the Grand Central Palace, an exhibition of musical instruments was held throughout the entire week, with lectures and recitals. The interest aroused was so general that Music Week was made a regular annual institution, and a permanent committee of eminent musicians was appointed. The example was followed immediately by almost all neighboring communities, who had their Music Week before the end of the year. Within three years, the idea had been adopted by the entire country. This widespread interest in music induced several municipalities to appropriate public funds for furthering various musical projects. Baltimore established a special department of Municipal Music, St. Louis a municipally subventioned summer opera, Chicago and Philadelphia municipal symphony orchestras, etc. In New York, a movement was proposed in 1924 for the erection of a municipal conservatory, and the Musical Alliance of the United States had launched a movement for the establishment of a ministry of fine arts and a national conservatory in Washington.

Festivals. After the sudden interruption of the performances in the summer of 1914, the theatre dedicated to Wagner in Bayreuth remained closed for 10 years. During 1923 Siegfried Wagner gave concerts in many German cities, raising funds for the restoration of the theatre and the resumption of the performances. For the same purpose, he made a concert tour of the United States early in 1924. In the summer of 1924, the festival was resumed (July 22–August 20) with performances of the *Ring* dramas, *Meistersinger,* and *Parsifal.* After 1914 the chorus of the Bethlehem (Pa.) Bach Festivals was gradually augmented, until in 1924 it numbered 250. Up to 1920 the programmes had been selected exclusively from the choral works of Bach, but in that year instrumental works were included. The innovation was received with favor and was adopted as a fixed policy. In 1917 the chorus participated in a Bach-Beethoven festival in New York arranged by the Philharmonic Society, and in the following year in a Bach-Wagner festival of the Symphony Society.

Albert A. Stanley, conductor of the Ann Arbor festivals since their inception (1893), resigned in 1921 and was succeeded by Earle V. Moore. An annual festival lasting four days was founded in Newark in 1915 by Mortimer C. Wiske and conducted by him thereafter. At the North Shore Festival in Evanston, Ill., a prize of $1000 was established in 1921. It was to be awarded annually for the best orchestral score submitted by an American composer, the successful work to have its first performance at the festival and then to be included in one of the regular concerts of the Chicago Symphony Orchestra during the following winter. The winners were Camille Zeckwer with *Jade Butterflies* (1922), Felix Borowski with *Youth* (1923), Charles M. Loeffler with *Memories of Childhood* (1924), Herman H. Wetzler with *St. Francis of Assisi* (1925), and Edward Collins with *A Tragic Overture* (1926). After that, the prize was discontinued.

For the first time in its history, the annual festival at Worcester, Mass., was omitted in 1918, on account of an epidemic of influenza that swept the Eastern States in the fall of that year. There was no festival in 1922, because the time was changed from September to April. Arthur Mees resigned as conductor in 1919 and was succeeded by Nelson P. Coffin, who died shortly before the festival of 1923. The latter was under the direction of Arthur J. Bassett and J. Vernon Butler. In 1924 Henry Hadley conducted the festival, and in 1925 Albert Stoessel was elected permanent conductor.

In 1927 William R. Chapman, founder, and for thirty years conductor, of the Maine Festival, resigned and was succeeded by Albert Sprague. In 1924 the San Francisco Festival, under the direction of Alfred Hertz, was established, and in the following year the Westchester County Festival, was held at White Plains, under Albert Stoessel. Both immediately took their rank among the important annual festivals.

Opera. The recent history of Opera, since 1914, is a record of feverish activity practically barren of artistic results. Of the enormous number of new works produced throughout the world, it would be difficult to enumerate a meagre half-dozen that achieved such emphatic or continued success as to promise a permanent addition to the standard repertory. In the vast majority of cases, an opera has its première, followed by a few repetitions, and is then consigned to the limbo of forgotten things. The following list gives a fairly complete view of the more important dramatic composers and their works:

Eugen d'Albert: *Die toten Augen* (1916); *Der Stier von Olivera* (1918); *Die Revolutionshochzeit* (1919); *Sirocco* (1921); *Marieken von Nymwegen* (1923); and *Der Golem* (1926).—Franco Alfano: *Leggenda di Sakuntala* (1921) and *Madonna Imperia* (1927).—Alban Berg; *Wozzek* (1926).—Julius Bittner: *Die Kohlheimerin* (1921); *Der Bergsee* (new version, 1922); *Das Rosengärtlein* (1924; new version, 1926); and *Mondnacht* (1928).—Arrigo Boito; *Nerone* (posth., 1924).—Rutland Boughton; *The Immortal Hour* (1914); *The Birth of Arthur and the Round Table* (1920); *Alkestis* (1922); *Bethlehem* (1923); and *The Queen of Cornwall* (1924).—Walter Braunfels; *Die Vögel* (1920) and *Don Gil von den grünen Hosen* (1924).—Alfred Bruneau, *Le Roi Candaule* (1920); *Le Jardin du Paradis* (1921); *Angelo, tyran de Padoue* (1928).—Ferruccio Busoni: *Arlecchino* (1918); *Doktor Faust* (posth., 1925).—Frederick Delius: *Fennimore und Gerda* (1919).—Ernst von Dohnányi: *Der Turm des Wojewoden* (1922) and *Der Tenor* (1929).—Henri Février: *Ghismonda* (1919); *La damnation de Blanchefleur* (1920); and *L'île désenchantée* (1925).—Alberto Franchetti: *Giove a Pompei*, (with U. Giordano, 1921) and *Glauco* (1922).— Umberto Giordano: *Giove a Pompei*, (with A. Franchetti, 1921); *La Cena delle Beffe* (1924); and *Il Rè* (1929).—Eugene Goossens: *Judith* (1929).—Enrique Granados: *Goyescas* (1916).—Paul Gräner: *Schirin und Gertraude* (1920) and *Hanneles Himmelfahrt* (1926).—Reynaldo Hahn: *Nausicaa* (1919) and *La Colombe de Bouddha* (1921).—Paul Hindemith: *Cardillac* (1926).—Joseph Holbrook; *Bronwen* (1928).—Gustave Holst: *The Perfect Fool* (1923); *Savitri* (1923); and *At the Boar's Head* (1925).—Engelbert Humperdinck: *Gaudeamus* (1919).—Georges Hue: *Dans l'Ombre de la Cathédrale* (1921).—Leos Janaček: *The Adventures of Mr. Brueck* (1920); *Katya Kabanova* (1921); *The Sly Little Vixen* (1924); *Sarka* (1925); *The Makropoulos Case* (1926); and *The House of the Dead* (posth., 1929).—Hugo Kaun: *Der Fremde* (1920) and *Maenandra* (1925).—Wilhelm Kienzl: *Das Testament* (1916) and *Hassan der Schwärmer* (1924).—Erich Korngold: *Violanta* and *Der Ring des Polykrates* (1916); *Die tote Stadt* (1920); and *Das Wunder der Heliane* (1927).—Ernst Krenek: *Orpheus* (1926); *Johnny spielt auf* (1927); *Der Diktator; Die Ehre der Nation* [or *Der Meisterboxer*] and *Das geheime Königreich* (1928).—Gino Marinuzzi; *Jacquerie* (1918).—Pietro Mascagni: *Lodoletta* (1917) and *Il piccolo Marat* (1921).—André Messager: *Monsieur Beaucaire* (1919).—Italo Montemezzi: *La Nave* (1918). Hans Pfitzner: *Palestrina* (1917) and *Christelflein* (1921).—Riccardo Pick-Mangiagalli: *Basi e Bote* (1927).—Gabriel Pierné: *La Cydalise* (1919) and *Sophie Arnould* (1927).—Ildebrando Pizzetti: *Debora e Jaële* (1922) and *Fra Gherardo* (1928).—Giacomo Puccini: *La Rondine* (1917): *Il Tabarro, Suor Angelica* and *Gianni Schicchi* (1918); and *Turandot* (*posth.*, 1926).—Maurice Ravel; *L'Enfant et les Sortilèges* (1925).—Ottorino Respighi: *Belfagor* (1923) and *La Campana sommersa* (1927).—Primo Riccitelli; *I Compagnacci* (1923).—Victor de Sabata: *Il Macigno* (1917) and *Lisistrata* (1929).—Max Schillings: *Mona Lisa* (1915).—Othmar Schoeck: *Erwin und Elmire* (1916); *Don Ranudo* (1919); *Venus* (1922); and *Penthesilea* (1927; rev. version, 1928).—Franz Schreker: *Die Gezeichneten* (1918); *Der Schatzgräber* (1920); *Irrelohe* (1924); and *Der singende Teufel* (1928).—Antonio Smareglia: *Pittori flaminghi* (1928).—Richard Strauss: *Ariadne auf Naxos* (rev. version, 1916); *Die Frau ohne Schatten* (1919); *Intermezzo* (1924); and *Die ägyptische Helena* (1928).—Donald Tovey: *The Bride of Dionysius* (1929).—Siegfried Wagner: *Schwarzschwanen-*

reich and *Sonnenflammen* (1918) and *Der Schmied von Marienburg* (1923).—Felix Weingartner: *Dame Kobold* (1916) and *Meister Andrea* and *Die Dorfschule* (1920).—Vaughan Williams: *The Shepherds of the Delectable Mountains* (1922); *Hugh the Drover* (1924); and *Sir John in Love* (1929).—Ermanno Wolf-Ferrari: *Gli Amanti sposi* (1925; in German as *Das Liebesband der Marchesa*, 1926); *Veste di Cielo* (1927); *Sly* (1927); and *Der Schläfer erwacht* (1928).—Riccardo Zandonai: *La Via della Finestra* (1919); *Giulietta e Romeo* (1922); *I Cavalieri di Ekebù* (1925); and *Giuliano* (1928).

In spite of the fact that in the United States opera received a large share of public attention, New York and Chicago until quite recently were still the only cities supporting a permanent operatic institution. Other cities were dependent on short visits from traveling companies, some of which, especially the San Carlo Opera Company and the Society of American Singers, were notable for the excellence of their ensemble. The taste of the general public showed a decided preference for the standard works, so that the production of novelties was left almost exclusively to the two permanent organizations. Neither of these institutions was fortunate with new works; not one of their novelties maintained itself in the repertoire. Quite recently, there were established in Philadelphia two operatic companies that give promise of becoming really permanent institutions, the Philadelphia Civic Opera (1924) and the Pennsylvania Grand Opera Company (1926). Both companies have the necessary guarantee fund to cover the inevitable deficit and a season of sufficient length to insure adequate preparation of new works. Thus, the Civic Opera gave the American premières of Strauss, *Feuersnot*, and Gluck, *Maienkönigin* (1927), and of Strauss, *Ariadne auf Naxos* (1928); while the Pennsylvania Opera brought out for the first time in America Mussorgsky, *Chovantchina* (1928).

Chicago Opera Association. After the death of the general manager, Cleofonte Campanini (1919), his duties were divided between H. M. Johnson and Gino Marinuzzi, as executive and artistic directors, respectively. Complications arising from this dual directorship led, early in 1921, to the appointment of Mary Garden as sole director. Under her management, the friction became even more acute, and a deficit of $800,000 at the end of the season brought about the dissolution of the company (1922), after 12 years of splendid artistic achievement. Immediately, the Chicago Civic Opera Company, with Samuel Insull as president, was organized and acquired all the properties and practically the entire personnel of its predecessor. While there was no change in regard to artistic policies, a radical departure in administration was inaugurated by vesting the executive power in the finance committee rather than in a single individual. Giorgio Polacco was made artistic director. The closing performance of the season 1928–29 (*Roméo et Juliette*, Jan. 26) was also the last performance given in the Auditorium, which had been the home of the Chicago Opera Company since its beginning in 1910. In the fall of 1929, the company inaugurated its own magnificent new home.

During the War, the works of Wagner were excluded from the repertoire. In 1920 *Lohengrin* was restored, in an English version, and was followed by *Die Walküre* (1921). After that, these and other works were sung again in the original German. During 1918–22 the regular season included a four weeks' visit to New York. The year 1922 is memorable for a transcontinental tour (January–April), which was as brilliant artistically as it proved disastrous financially. Three operas by foreign composers had their world première in Chicago: Lazzari, *Le Sauteriot* (1918); Février, *Ghismonda* (1919); and Prokofiev, *Love for Three Oranges* (1921). Native composers were encouraged by the production of Buchhalter, *A Lover's Knot* (1916); Hadley, *Azora* (1917); Nevin, *The Daughter of the Forest* (1918); De Koven, *Rip Van Winkle* (1920); Stearns, *The Snow Bird* (1923); Harling, *A Light from St. Agnes* (1925); and Cadman, *The Witch of Salem* (1926). Two ballets by American composers were given in 1919: Borowski, *Boudour* and Carpenter, *The Birthday of the Infanta.* The following foreign works were given for the first time in the United States: Gnecchi, *Cassandra* (1914); Saint-Saëns, *Déjanire* (1915); Massenet, *Cléopâtre* (1916); Gunsbourg, *Le Vieil Aigle* (1917); *Catalani*, *Lorelcy* and Montemezzi, *La Nave* (1919); Ravel, *l'Heure Espagnole*, Messager, *Madame Chrysanthème*, Erlanger, *Aphrodite*, Marinuzzi, *Jacquerie*, and Leoncavallo, *Edipo Rè* (1920); Grovlez, *La Fête à Robinson* (1922); Franchetti, *Namiko San* and Alfano, *Risurrezione* (1925); and Honegger, *Judith* (1927).

Metropolitan Opera House (New York). The last two decades at the Metropolitan Opera House, under Giulio Gatti-Casazza as general manager, was a period of unexampled prosperity. There was no annual deficit to be met. Year by year the number of subscribers increased. No promises were made that were not strictly fulfilled. During the period of the War, the works of Wagner and Strauss were temporarily withdrawn, but, beginning in 1920, they were restored, one after the other, to the repertoire. The policy of producing every season a work by an American composer, inaugurated in 1910, was maintained until 1920, except for the years 1915 and 1916. Thus, the following operas were brought out: De Koven, *The Canterbury Pilgrims* (1917); Cadman, *Shanewis* (1918); Breil, *The Legend*, and Hugo, *The Temple Dancer* (1919); and Hadley, *Cleopatra's Night* (1920). A ballet by an American, Gilbert, *The Dance in Place Congo*, was performed in 1918. Four world premières of works by foreign composers are to be recorded: Giordano, *Madame Sans Gêne* (1915); Granados, *Goyescas* (1916); Puccini, *Il Tabarro*, *Suor Angelica* and *Gianni Schicchi* (1918); Wolff, *L'Oiseau Bleu* (1919). Following are the foreign operas given their American Premières: Montemezzi, *L'Amore dei tre Rè*, Charpentier, *Julien*, and Wolf-Ferrari, *L'Amore Medico* (1914); Leoni, *L'Oracolo* and Borodin, *Prince Igor* (1915); Bizet, *Les Pêcheurs des Perles*, Gluck, *Iphigenie auf Tauris*, and Zandonai, *Francesca da Rimini* (1916); Rabaud, *Marouf* (1917); Liszt, *The Legend of St. Elizabeth*, and Mascagni's *Lodoletta* (1918); Leroux, *La Reine Fiammette* (1919); Leoncavallo, *Zaza*, and Tchaikovsky, *Eugen Oniegin* (1920); Weiss, *The Polish Jew*, and Korngold, *Die tote Stadt* (1921); Mozart, *Così Fan Tutte* (1922); Vittadini, *Anima Allegra*, and Schillings, *Mona Lisa* (1923); Riccitelli, *Compagnacci*, and Janaček, *Jenufa* (1924); Montemezzi, *Giovanni Gallurese* (1925); Giordano, *La Cena delle Beffe*, de Falla, *La Vida breve*, Stravinsky, *Le Rossignol*, and Puccini, *Turandot* (1926); Taylor, *The King's Henchman*, Casella, *La Giara*, and Korngold, *Violanta* (1927); Alfano, *Madonna Imperia*, Puccini, *La Rondine*, Respighi, *La Campana sommersa*, and Strauss, *Die ägyptische Helena* (1928); Krenek, *Johnny spielt auf*, Pizzetti, *Fra Gherardo*, and Rimsky-Korsakov, *Sadko* (1929). The following operas, produced by other organizations than the Chicago and Metropolitan companies, complete the list of American premières since 1914: 1914, Mozart, *Bastien et Bastienne* (New York); 1915, Parker, *Fairyland* (Los Angeles); 1916, Moniuszko's *Verbum Nobile* (Philadelphia) and Mozart's *The Impresario* (New York); 1917, Donizetti, *Campanella di Notte*, Pergolesi, *La Serva Padrona*, Gounod, *Le Médecin malgré Lui* (all in New York); 1918, Hadley, *Bianca* (New York); 1919, Vives, *Maruxa* and *Los Bohemios* and Messager, *Monsieur Beaucaire* (both in New York); 1922, Dargomyzhsky, *Russalka* and Rimsky-Korsakov, *Tsarskaya Neviesta* (San Francisco); 1923, Moniuszko, *Halka*, d'Albert, *Die Toten Augen*, and Kienzl, *Der Evangelimann* (all in Chicago); 1924, Fourdrain, *La Légende du Point d'Argentan* (Ravinia Park, Chicago); 1926, Monteverdi, *L'Incoronazione di Poppea* (Northhampton); 1927, Korngold, *Der Schneemann* (Seattle), Handel, *Julius Cæsar* (Northhampton, Mass.); 1928, Vaughan Williams, *Hugh the Drover* (Washington), Monteverdi, *Combattimento di Tancredi e Clorinda*, and Handel, *Xerxes* (both at Northampton); 1929, Monteverdi, *Orfeo*, and Handel, *Apollo e Dafne* (both at Northhampton).

Orchestras. While in the United States the opera formerly engaged the principal interest of the general public, the period after 1914 wrought a change in favor of orchestral music. All the older organizations vastly increased the number of their concerts, so that the orchestral season extended from October to May. In 1914 the Boston Symphony Orchestra had no rival in this country. Even then, it was no secret that the perfection of its ensemble was due to daily rehearsing. Unfortunately, no other orchestra at that time had a patron like Colonel Higginson who would bear the enormous expense involved. The longer musical season provided the natural solution of the problem, so that in 1924 we could boast not one but several premier orchestras unsurpassed anywhere in the world. Daily rehearsals had produced the identical result in all cases. Visits of orchestras to other cities and exchange of conductors had engendered a spirit of rivalry, which makes for supreme efficiency. The soloist, formerly an indispensable attraction at every symphony concert, had come to occupy a secondary position. In 1912 the Boston Symphony Orchestra, under Dr. Muck, made the first successful experiment in giving concerts without the aid of soloists. From that time, the practice became so common that in 1924 soloists were engaged for perhaps not more than half of the season's concerts. This widespread and intelligent interest in the music itself, rather than in the executant, had created a new, collective method of subventioning orchestras. The cost of maintaining a first-class organization is so heavy that the income from admissions is in every case insufficient to meet expenses. The burden of the inevitable annual deficit, formerly borne by some wealthy patron especially interested (e.g., Higginson, Carnegie, Flagler), was being assumed by several guarantors, each contributing a relatively small amount. In the latter years, more than one of our premier orchestras was threatened with dissolution because of inability to meet the high cost of maintenance. In every case, a sufficient number of public-spirited citizens came forward to avert a serious loss to the community; and when one considers that, from the conclusion of the War, every year new symphony orchestras were established throughout the country, one cannot but be impressed with the development of public taste.

Boston Symphony Orchestra. The refusal of Dr. Muck, in the fall of 1917, to play the national anthem before the concert, was the beginning of a period of storm and stress. He resigned at the end of the season. At the same time, Colonel Higginson severed his relations with the orchestra, delegating his powers and responsibilities to a board of nine directors. More than 20 German players, who had failed to take out naturalization papers, were dismissed. In 1918–19 Henri Rabaud was the conductor; under him the orchestra rapidly deteriorated. When Pierre Monteux, in the fall of 1919, assumed control, he found a demoralized body of men, many of whom rebelled and deserted before the end of the season, so that out of a total of 100 performers only 67 remained for the final concert. In addition, a deficit of $131,000 brought the organization to the verge of dissolution (April, 1920). An appeal by the directors secured not only this amount but also a guarantee fund, pledged by 200 contributors, for five years. With a thoroughly reorganized and practically new orchestra, Monteux began the difficult task of regaining the lost prestige. When Sergei Kussevitsky became conductor in 1924, he found that his predecessor's efforts had been crowned with success. With Kussevitsky's pronounced sympathy with modernistic music, the programmes immediately reflected his personal taste. Since 1926 it has become a fixed custom to devote one-half of each programme exclusively to the Moderns. The policy of inviting guest-conductors for a few concerts was not adopted until 1923, when Bruno Walter appeared. Those that have thus been honored since then are Georg Schneevoigt (1924), Michael Press and Eugene Goossens (1926), Ottorino Respighi (1927), and Maurice Ravel and Sir Thomas Beecham (1928).

Chicago Symphony Orchestra. In 1914 a pension fund was established through the gift of $100,000 by Mrs. E. S. Coolidge, who donated the same amount also the next year. In 1923 Clyde M. Carr bequeathed to the organization $1,000,000 to be used at the discretion of the trustees. In the spring of 1923, a number of music lovers saved the orchestra from disbanding by assuming responsibility for a considerable increase in the salary of the men demanded by the musical union. The same difficulties arose every successive year until the climax was reached in 1927, when the orchestra was actually disbanded. This brought about immediate action by a number of public-spirited citizens, through whose efforts the orchestra was placed on a secure financial basis and could be reassembled in time for the opening of the fall season.

Cincinnati Symphony Orchestra. After the internment of the conductor, Dr. Kunwald (January, 1918), the remaining concerts of the season were given under guest-conductors. In

1918–22 Eugène Ysaÿe was conductor. His successor was Fritz Reiner. In 1925 the series of regular home concerts was increased from 24 to 40.

Cleveland Symphony Orchestra. Under the auspices of the Musical Arts Association, this orchestra of 85 performers, under Nikolai Sokolov, was established in 1918 and soon was recognized as one of the leading symphony orchestras of the country. On the occasion of its tenth anniversary, Mr. and Mrs. John L. Severance donated to the board of directors a million dollars, on condition that another million and a half be raised by popular subscription, toward the erection of a permanent hall and the establishment of an endowment fund to defray the annual deficit.

Detroit Symphony Orchestra. This body was organized in 1914 by Weston Gales, who directed the concerts until 1918, when Ossip Gabrilowitsch became his successor. Under him, the orchestra was increased to 86 performers and the regular season lengthened, until, from 1925 on, it extended over 28 weeks. Besides the series of regular concerts, there is also a series of 24 Sunday afternoon concerts, under the direction of the assistant conductor, Victor Kolar, who was appointed in 1919. In the same year, the organization inaugurated its own permanent hall.

Minneapolis Symphony Orchestra. In 1922 Max Oberhoffer resigned and was succeeded by Henri Verbrugghen. At the same time, the orchestra widened its field of activity by adding a series of 16 concerts in St. Paul, a series of 25 popular Sunday concerts and 5 educational concerts for young people.

National Symphony Orchestra. This organization was founded in New York in 1919 as the New Symphony Orchestra, under Edgar Varèse, for the exclusive production of futuristic works. The complete failure of the first concert (April 11) so alarmed the guarantors that they dismissed Varèse and engaged Bodanzky, who played only standard works at the remaining concerts. His success led to the incorporation of the orchestra as the National Symphony Orchestra, beginning its career in October, 1919. In the summer of 1920, it was engaged for the series of open-air concerts at the Stadium of the College of the City of New York, under Walter Rothwell as guest-conductor. As Bodanzky's duties at the Metropolitan Opera House did not allow him sufficient time, the directors engaged Mengelberg for the second half of the season (January–March, 1921). He made a sensational success and remained with the organization after its amalgamation with the Philharmonic Society.

New York Philharmonic Society. The amalgamation of the society with the National Symphony Orchestra in 1921 led to a complete reorganization. Many of the older men were retired on pension, the personnel was increased to 125 performers, and a new schedule for intensive rehearsals was adopted. Mengelberg was engaged as coördinate conductor with Stransky, the former directing the last half of the season, the latter the first half. In 1923 Stransky resigned and was succeeded by Willem Van Hoogstraten. From 1925 to 1927, Mengelberg and Wilhelm Furtwängler divided the season evenly between them, while Arturo Toscanini, Georges Enesco, and Fritz Reiner appeared as guest-conductors. In 1924 a series of 10 concerts for children, under Ernest Schelling as conductor, became a permanent feature. In 1928, after the dissolution of the New York Symphony Orchestra, the board of directors was increased from 22 to 28 by the election of six former directors of the Symphony Society, the orchestra reorganized by retiring a number of the older members and replacing them with men from the disbanded organization, and the name was changed to The Philharmonic-Symphony Orchestra. Likewise, the season was lengthened from 23 to 28 weeks. For the first season (1928–29), Mengelberg remained as regular conductor for half the season, while the other half was under the direction of Walter Damrosch, Ossip Gabrilowitsch, Bernardino Molinari, and Arturo Toscanini. For 1929–30 Toscanini, Molinari, and Mengelberg were appointed as regular conductors.

From 1916 to 1920, William Humiston was associate conductor; after those years, the position was filled by Henry Hadley. During the summer of 1922, the entire orchestra was engaged for the open-air concerts at the Stadium; the first half of the series was led by Hadley; the second, by Van Hoogstraten. Since 1923 Van Hoogstraten has been principal conductor of the entire series with two or three guest-conductors assisting. With the proceeds of two festival concerts celebrating the eightieth anniversary of the foundation of the Society (April, 1922), a benefit fund was established for the members.

New York Symphony Orchestra. Under its regular conductor, Walter Damrosch, the orchestra made a most successful tour of France, Italy, Belgium, and England in May and June, 1920. In 1921 and 1922 Albert Coates directed several concerts as guest-conductor. Bruno Walter appeared in the same capacity in 1923–24, and Vladimir Golschmann in 1924. Other guests were Otto Klemperer (1926), Fritz Busch (1927), and Oskar Fried and Enrique Arbos (1928). In 1927 Damrosch, after 43 years of continuous service, retired as regular conductor. In 1928 the orchestra was dissolved, after it had just finished its fiftieth seaosn.

Philadelphia Symphony Orchestra. In 1916 Edward Bok donated to the orchestra $250,000 and pledged himself to pay any deficit for the next five years. In 1918 a regular series of five concerts in New York was established, the number of which was increased to 10 in 1921. During the absence of Leopold Stokowski as guest-conductor in Paris in 1923, his place was taken by Georges Enesco, while during his leave of absence in 1927–28 the orchestra was directed by Reiner, de Sabata, Mengelberg, Gabrilowitsch, Monteux, and Rodzinski. From 1926–29 Artur Rodzinski was assistant conductor.

St. Louis Symphony Orchestra. After the death of Max Zach, in 1921, the remaining concerts of the season were led by guest-conductors. From the fall of 1921, Rudolf Ganz was regular conductor until his resignation in 1927. Since then, a policy of guest-conductors has been in vogue.

Following is a list of the more important new symphony orchestras: Los Angeles Philh. O., Walter Rothwell 1920 till 1927; since then, Georg Schneevoigt; Portland Ore. S. O., Carl Denton till 1925; since then, Willem Van Hoogstraten; Nashville S. O., F. A. Henkel; Toledo S. O., Lewis Clement; 1921: Erie S. O., Henry Vincent; Buffalo S. O., Arnold Cornelissen; 1922: Syracuse S. O., William Berwald till 1924; since then, Vladimir Shavitch; Watertown S. O., Patrick

Conway; Salt Lake City Philh. O., Charles Shepard; Wichita S. O., P. H. Flath; 1923: Rochester Philh. O., Eugene Goossens and Albert Coates as guest-conductors till 1925; since then, Howard Hanson; Civic S. O. of Philadelphia, Vassili Leps; Atlantic City Philh. Soc., Louis Colmans; American National O. (New York), Howard Barlow; 1924: Huntington (Ind.) S. O., Rex Arlington; Sacramento Municipal S. O., Franz Dicks; Omaha S. O., Ernest Nordin; since 1925, Sandor Harmati; 1925: The Orchestral Society of Rome (N. Y.), F. B. Cowell; Pennsylvania S. O. of Philadelphia, Josef Pasternack; 1926: Clendale (Calif.) S. O., J. A. Myers; Washington S. O., Kurt Hetzel; Boston Philh. O., Ethel Leginska; Dallas S. O., Paul Van Katwijk, 1927; New Brunskick (N. J.) S. O., J. E. Newton; 1928: Skalski S. O., in Chicago, André Skalski; American Symphonic Ensemble in New York, a conductorless orchestra.

Mechanical Reproduction of Music. There is not the least doubt of the fact that the introduction and rapid perfection of the player-piano and the phonograph contributed in a large measure to the development of the public taste for better music. The former had been brought practically to perfection even before the War. This is true of the Welte-Mignon, Duo-Art, and Ampico reproducing pianos and organs, which differ from the earlier mechanical instruments in that they faithfully reproduce that subtle quality termed the individuality of the artist. On Dec. 10, 1918, the Chicago Symphony Orchestra performed Saint-Saëns's concerto in G minor for piano and orchestra with Harold Bauer as soloist. The latter, however, was not actually present, but was represented by his Duo-Art record. At a concert of the New York Philharmonic Society (Apr. 23, 1919), the soloist, Leo Ornstein, sat motionless on the stage listening to his own reproduction of the first movement of Mendelssohn's *Concerto in G minor*, after which he took his seat at the instrument and played the remaining movements in person. These and many similar public demonstrations convinced music lovers of the extraordinary merit of the new invention, but the high cost of the reproducing apparatus, as well as of the perforated rolls, proved a serious obstacle in the way of making these improved automatic instruments universally popular. These records, however, are of incalculable value, because they preserve for posterity the actual art of the greatest pianists and organists, some of whom already have passed away, as Carreño, Essipov, Bloomfield-Zeisler, Reisenauer, Saint-Saëns, Guilmant, and other well-known artists.

Just as these means of recording for piano and organ had been perfected, there arose a powerful rival in the phonograph, through the rapid and marvelous development of which it ultimately became possible to achieve the same artistic results, not only with the piano and organ, but in the entire field of vocal and instrumental music, and at a much lower cost.

It may be said, up to 1914, satisfactory records had been made only of solo voices or solo instruments. The accompaniment, whether for piano or orchestra, left much to be desired in regard to tonal quality, clearness, and proper balance with the solo part. Reproductions of choruses sounded blurred, while orchestral records failed to reproduce the timbre of the different instruments. Especially wonderful is the progress made since then, even with the old acoustical method of recording, in the reproduction of orchestral masses, so that in the best records a practiced ear could detect such subtle differences in timbre as between an oboe and an English horn. The year 1925 wrought a complete revolution, when the new process of electrical recording made possible the absolutely perfect reproduction of all kinds of music, from the solo voice or instrument to the largest vocal or instrumental mass-effects. Until then, all attempts toward obtaining the genuine, full piano tone had failed, but the new process solved this vexing problem. Simultaneously with this advance in recording came an equally important advance in reproducing through the invention of the orthophonic phonograph. Several subsequent improvements affected only the details of mechanical operation (elimination of scratching, substitution of house-current for batteries, etc.). From the very beginning, tone-quality, tonal balance, differentiation of timbre, sound volume, and dynamic shading were perfect, so that further improvement in these respects seems impossible.

Almost from the day of its inception, broadcasting by radio became an important factor in the dissemination of good music. The first concert heard over the radio was broadcast by Station KDKA in Pittsburgh, on Nov. 3, 1920, and soon stations all over the country were broadcasting music. The beginning was made with dance music and popular songs of the day, but before long, in response to numerous requests, symphony concerts and entire operatic performances were broadcast. The demand for the better music rapidly assumed such proportions that managers, especially those of famous artists, fearing a decrease of attendance at concerts, inserted a clause in all contracts restraining their artists from giving their services gratis. Composers and publishers also began to demand payment of the usual fees on all works controlled by them. These demands the radio companies declared themselves unable to meet, as they derived no income whatever from the host of listeners. The result was that, during the last months of 1923, there was a decided dearth of good music transmitted by radio. The broadcasting companies, however, soon developed a new and very lucrative system of advertising by radio, which enabled them not only to maintain a regular staff of artists for serious concerts, but also to pay handsome fees for the services of world-famous artists. In 1927 Walter Damrosch resigned the conductorship of the New York Symphony Orchestra to accept the post as general musical director of the National Broadcasting Company, devoting his entire time to giving symphony concerts over the radio. Among the great symphony orchestras who regularly broadcast a certain number of their concerts are those of Boston, Cleveland, Detroit, Chicago, New York, Philadelphia, and San Francisco, while the Chicago Opera Company, during its regular season, has arranged for a certain night every week to put on the air an act or two of its regular performance.

MUSICAL RECORDS. See MUSIC, *Mechanical Reproduction.*

MUSIC WEEK. See MUSIC, *Community Music.*

MUSIL, mŏŏ'sĭl, ALOIS (1868–). A Czechoslovak Orientalist (see VOL. XVI). In 1914–15 he continued his explorations in the deserts of northern Arabia and southern Mesopotamia, and in 1919 he became a professor in the University of Prague. The American Geographical Society published his accounts of his explorations, in English, in seven volumes (1926–28); *The Northern Hegâz; Arabia Deserta; The Middle Euphrates; Palmyrena; Northern Negd; The Manners and Customs of the Rwala Bedouins;* and *Topographical Itineraries of Exploration in Arabia and Mesopotamia.* He also wrote *Zur Zeitgeschichte von Arabien* (1918).

MUSSOLINI, mŭs′sō-lĭ′nĭ, Benito (1883–). An Italian statesman who was born at Predappio, near Forli, and educated at the normal schools of Forlimpopoli and the University of Lausanne (Switzerland). A Marxian socialist, he was expelled from Switzerland because of his propaganda in 1904, and later from Austria, where he aided Cesare Battisti in the editing of *Il Popolo* of Trent. He returned to Forli, started *Lotta di Classe* (1911), and then edited *Avanti* in Milan (1912–14). A director of the Italian Communist Party, he was expelled from it in 1914 when he urged that Italy enter the World War against the Central Powers. He started the *Popolo d'Italia* the next year to spread his ideas, and fought in the War as a corporal in the *bersaglieri* until February, 1917, when he was severely wounded, decorated, and later discharged. On Mar. 23, 1919, he founded the first "Fascio di Combattimento," later to be known collectively as the Fascisti, to suppress the wave of Bolshevism that was sweeping over the country. Many returning officers and soldiers rallied to his support, and by 1922 there were 4,000,000 Fascisti. Throughout 1922 conditions bordering on anarchy prevailed, due to the Fascist-Communist battle and the friction between the Fascists and the Government. At the Fascist congress at Naples (October 24), the party demanded that Mussolini head the government, whereupon the cabinet resigned and the King chose him Premier on Oct. 30, 1922. At first, his policies were conciliatory, his cabinet including members of the other parties. He soon concentrated power in the hands of the Fascist Party, however, himself becoming Minister of Foreign Affairs and of the Interior. By 1927 he had added the portfolios of war, marine, aviation and corporations, giving him seven of the 13 posts in the cabinet.

He changed the electoral law so that the majority party received two thirds of the seats in Parliament, thus assuring Fascist control of the government, suppressed the opposition press and organizations, socialism and freemasonry, and limited the right of free speech. On the other hand, he lessened direct taxes, made laboring conditions more reasonable, inspired the people to save, and everywhere insisted on efficient and punctual service, which transformed Italy into an up-to-date and prosperous state. In foreign affairs, he occasionally aroused foreign criticism, as in his occupation of Corfu in 1923, but in general, he was active in making treaties of friendship and commerce, and enlarging Italy's influence in the countries around the Mediterranean.

On Feb. 11, 1929, he and Cardinal Gasparri, the Papal Secretary of State, signed a treaty settling the 59 year dispute between Italy and the Papacy, and ending the "imprisonment" of the Pope. The concordat was later ratified by both parties. It provided for the establishment of the Vatican City, as an independent territory, considered neutral and inviolable and governed solely by the Pope. On Sept. 12, 1929, he yielded seven of his nine cabinet posts, retaining the Premiership and the portfolio of Foreign Affairs. Mussolini wrote *Giovanni Huss; Trentino visto da un Socialista; Diario di guerra* (1920); *Diuturna* (1924); *La nuova politica dell' Italia* (3 vols., 1925); *Il nuova Stato unitario italiano* (1927); *and My Autobiography* (1928); published many volumes of his speeches; and edited, with Margherita Sarfatti, *Gerarchia*, a Fascist monthly in which he usually wrote the leaders. Consult *The Life of Benito Mussolini*, by Margherita Sarfatti (trans. 1925); *The Fascist Dictatorship in Italy*, by Gaetano Salvemini (1927); *Benito Mussolini—the Man*, by V. J. Bordeaux (1927); *Mussolini and the New Italy*, by Alexander Robertson (1928); and *Mussolini the Man of Destiny*, by Vittorio E. de Fioriti (1928). See Italy, *History*, and Fascism.

MUSTAPHA KEMAL PASHA. See Kemal Pasha.

MUTATION THEORY. See Evolution; Zoölogy.

MUZZEY, David Saville (1870–). An American historian and author, born at Lexington, Mass., and educated at Harvard University, Union Theological Seminary, New York and Columbia universities, and in Berlin and Paris. After serving as tutor in mathematics at Robert College in Constantinople for one year, he became a teacher of Latin and Greek in the Ethical Culture School of New York. In 1905 he was appointed head of the department of history at Barnard College and was successively associate, associate professor, and professor (1920–23). After 1923 he was graduate professor of American History at Columbia University. He was a member of several learned societies and wrote *Rise of the New Testament* (1900); *Spiritual Heroes* (1902); *Beginners' Latin Book* (1907); *American History* (1911); *State, Church, and School in France* (1911); *Life of Thomas Jefferson* (1918); *The United States of America* (1922–24); *History of the American People* (1927); *The American Adventure*, 2 vols. (1927).

MYCENÆ. See Archæology.

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NANKING INCIDENT. See CHINA, under *History.*

NANSEN, nän'sen, FRIDTJOF (1861–). A Norwegian Arctic explorer (see VOL. XVI). He was chairman of the Norwegian Association for the League of Nations in 1918, and in 1920 he was asked by the Council of the League to investigate problems in connection with the repatriation of prisoners of war. On this subject, he prepared an exhaustive report and then supervised the work of returning 450,000 prisoners to their homes. From 1921 to 1923, he had general charge of the direction of relief for Russian refugees, and in 1921–23 was in charge of famine relief work in Russia, receiving the Nobel Peace Prize for this work (1922). The League of Nations again called on him to supervise its relief work among 1,500,000 Greek and Armenian refugees expelled from Asia Minor after the war between Greece and Turkey in 1922. In 1925 he was elected rector of St. Andrew's University, Scotland. He worked for international arbitration, and in 1927 became Norway's representative on the disarmament committee of the League of Nations. He visited the United States in 1928, where he announced plans for further explorations of the Arctic regions by dirigible. His later works include *Spitzbergen* (1922); *Sporting Days in Wild Norway* (1925); *Hunting and Adventure in the Arctic* (1925); *Adventure and Other Papers* (1927); *and Armenia and the Near East*, the result of his study of the Armenian problem for the League of Nations (1928).

NAPHTHA. See PETROLEUM.

NAPLES. The largest city and most important seaport of Italy. The population in 1928 was estimated to be 966,423. Under the Fascist regime, the aspect of the city has greatly changed. The squalor and poverty, characteristic of Naples for centuries, have been outwardly abolished, and slum sections are giving place to broad, new streets lined with lofty buildings of ferro-concrete. The old, picturesque quarter of San Lucia has vanished entirely. On the site of the old fish market is the Via Nazario Sauro, and a fine new thoroughfare, the Via Santa Lucia, is lined with modern shops. Ambitious building schemes have been put into execution to take care of the dispossessed tenants of the slum sections, and in the suburbs garden cities consisting almost entirely of workmen's dwellings are springing up. These improvements have been largely the result of the law passed in June, 1925, authorizing the Government to regulate the unification of various departments for the purpose of carrying out public works and of adopting measures for "the improvement of the economic, hygienic, and social condition of the south of Italy and the islands."

Vast port improvements have been undertaken in order that Naples might retain her title as the most important seaport of Italy. The programme which was inaugurated in 1924 included prolongation of the outer wall of the S. Vincenzo mole and the construction of new docks for large transatlantic liners. In 1927, 8586 vessels of 9,071,731 tonnage entered the port, and 8597 vessels of 9,082,322 tonnage were cleared. In carrying out the Fascist programme of the development of electrical resources, industry has prospered. The Società Meridionale di Elettricità has undertaken harnessing the mountain streams of the Sila in Calabria, and a central station of 30,000 horse power has been established at Vigliena to furnish additional energy to Naples. Staple industries, such as hemp and cotton, have improved plants, and the manufacture of steel and silk has been revived.

The Biblioteca Nazionale, formerly housed in the Museo Nazionale, has been removed to the Royal Palace which in 1920 was presented to the nation. It contains 400,000 volumes, 8000 manuscripts, and many rare specimens of early German and Italian printing. The Lucchesi-Palli Library, consisting mainly of music and dramatic works, also has been installed in the palace. A gallery of modern art has been established in the reconstructed Castel Nuovo, the historic fortress of the Angevin and Aragonese dynasties. The nucleus of the collection, consisting of 39 pictures and 10 pieces of modern sculpture, was presented by King Victor Emanuel. In 1928 the municipality of Naples appropriated 2,000,000 lire so that the excavation of Herculaneum might be resumed.

NASHVILLE. The capital of Tennessee. The population rose from 110,364 in 1910 to 118,342 in 1920 and to 139,600 in 1928, by estimate of the Bureau of the Census. The area is 21.5 square miles. In 1924–27 the city, in coöperation with Davidson County and the State of Tennessee, erected a $2,225,000 War Memorial. In addition to housing many State offices, this building serves as a museum of the Tennessee Historic Society and the Daughters of the Confederacy. It occupies two blocks in the centre of the city and is surrounded by two additional blocks which have been turned into a park. Between 1921 and 1925, an exact replica of the Parthenon at Athens (except in the material employed) was erected in Centennial Park, replacing the temporary structure which had been constructed for the Tennessee Centennial Exposition of 1897. The cost of the building was approximately $2,500,000; the interior is being prepared to house an art gallery. Nashville is a city of diversified industries, leading the South in the manufacture of wheat products, stoves, shoes, furniture, lumber, rayon, and many other products. In 1925, 10,549 persons were employed in approximately 600 manufacturing establishments and received $9,691,000 in wages; the value of products manufactured was $79,331,000. Nashville prints more religious periodicals than any other city in the United States and is the leading printing centre of the South. Old Hickory, an industrial city of 12,000 persons, is located on the site of the powder plant erected by the United States government during the War. Nashville is important as an educational centre, being known as "the Athens of the South." In 1928 it had 40 public schools and 38 universities, colleges, and preparatory schools, the latter group having combined assets of more than $28,000,000. Bank clearings in 1928 amounted to $1,199,465,000. The assessed valuation of property in 1927 was $165,235,000; the net debt was $14,831,000.

NATAL PROVINCE. See SOUTH AFRICA, UNION OF.

NATHAN, GEORGE JEAN (1882–). An American author and dramatic critic, born in Fort Wayne, Ind., and educated at Cornell University and the University of Bologna, Italy. He was dramatic critic, with Huneker, of *Puck* (1915–16), and of the *Smart Set Magazine* (1908–23). During 1914–23 he was editor of *Smart Set* with H. L. Mencken, and in 1924 he started with Mencken a new magazine, *The American Mercury,* of which he has been contributing editor since 1925. His knowledge of the French, German, and English stage, and his keen observation, perspicacity, and discriminating sense of humor, have made him one of the leaders in criticism in the United States. He has been an editorial contributor to the London *Daily Mail* and the London *Sunday Chronicle.* Some of his books are *The Eternal Mystery* (1913); *Another Book on the Theatre* (1916); *Bottoms Up* (1917); *Mr. George Jean Nathan Presents* (1917); *A Book Without a Title* (1918); *The Popular Theatre* (1918); *Comedians All* (1919); *Heliogabolus,* with H. L. Mencken (1920); *The American Credo,* with H. L. Mencken (1920); *The Theatre, the Drama, the Girls* (1921); *The Critic and the Drama* (1922); *The World in Falseface* (1923); *Materia Critica* (1924); *The Autobiography of an Attitude* (1925); *The House of Satan* (1926); *The New American Credo* (1927); *Land of the Pilgrims' Pride* (1927); *Art of the Night* (1928), and *Monks are Monks* (1929).

NATHAN, ROBERT (1894–). An American author, born in New York City. He was educated in private schools in the United States and Switzerland and took graduate courses at Harvard. His published writings include *Peter Kindred* (1919); *Autumn* (1920); *Youth Grows Old* (1922); *The Puppet Master* (1923); *Jonah* (1925); *The Fiddler in Barly* (1926); *The Woodcutter's House* (1927); *The Bishop's Wife* (1928). He also composed songs and a sonata for the violin.

NATIONAL ACADEMY OF SCIENCES. A body of American scientists, incorporated in 1863, for the purpose of investigating, examining, experimenting in, and reporting on any subject of art, when called on by any department of the government. The activities of the Academy during the period from 1914 were varied and important. The National Research Council, with John J. Carty as chairman, was established in 1916 as a result of a movement to mobilize the nation's science for industrial progress and military efficiency. An investigation of the Panama Canal slides also was made in 1916. At the annual meeting at Johns Hopkins University in 1918, the principal subjects of discussion were technical, and pertained to chemistry, astronomy, medicine and other sciences. In the autumn of 1919, a meeting was held at Yale, and was addressed by W. M. Davis on the subject of four cliff islands in the coral seas; by C. B. Davenport and A. J. Love, on defects found in drafted men; and by John M. Clarke, on some restorations of distinct vertebrates. At the annual meeting in 1921, which was held in Washington, an interesting paper was read by Maude Slye on the influence of heredity on the incidence of cancer. In the following year, H. F. Osborne read a paper entitled "Recent Discoveries on the Antiquity of Man," and J. S. Ames addressed the meeting on the subject "Recent Progress in Aëronautics." The Carnegie Corporation of New York, which appropriated $5,000,000 in 1922, and friends of the Academy and Council, made possible the erection of a building for the National Academy and the National Research Council in Washington. At the autumn meeting in 1928, held at Union College, Schenectady, New York, C. F. Ketterding, vice president of the General Motors Company, and a newly elected member of the Academy, discussed combustion experiments in explosion-type engines, which were being carried out in the hope of doubling the efficiency of the coal supply. Dr. E. F. W. Alexanderson, consulting engineer of the General Electric Company, described experiments which had been carried on to determine a method of depth sounding in the air by means of a radio echo, to enable aviators to know their exact altitude over mountains, tree tops, or buildings, and to land in fogs; and Professor Harlow Shapley of Harvard Observatory announced his discovery of the centre or nucleus of the universe, which is in the constellation Sagittarius. In 1928 the academy also indorsed the calendar of thirteen months, which would be more simple than the Gregorian calender now in use.

The Academy awards several prizes and medals in recognition of prominent contributions to science, and grants in aid of researches are made from the income from trust funds administered by the Academy. Its publications include *Memoirs, Bibliographical Memoirs,* and *Proceedings.* The president in 1928 was T. H. Morgan.

NATIONAL AËRONAUTIC FEDERATION. See AËRONAUTICS.

NATIONAL ARMY. See ARMIES AND ARMY ORGANIZATION.

NATIONAL CATHOLIC WELFARE COUNCIL. See ROMAN CATHOLIC CHURCH.

NATIONAL DEFENSE ACTS. See ARMIES AND ARMY ORGANIZATION.

NATIONAL EDUCATION ASSOCIATION OF THE UNITED STATES. An organization composed of persons actively engaged in educational work and others interested in education. The association was organized at Philadelphia, Aug. 26, 1857, as the National Teachers' Association, incorporated by Congress on June 30, 1907, under its present name, and reorganized in June, 1920, at the annual meeting, to provide for a representative assembly of delegates from State and local educational associations. During the years 1914–1928, the association worked actively for the establishment of a Department of Education in the Government, with a Secretary of Education in the President's cabinet. It also sponsored legislation providing for increased educational opportunities for American children; higher standards of training for teachers; and gave assistance to State and local affiliated associations in securing needed legislation and in promoting their interests.

The association published: the monthly *Journal,* established in 1921, to set forth its policies and programmes and to bring before the public and those interested in education the new national and international movements in education; *Research Bulletins*, containing statistical information on educational subjects; *Proceedings*, the annual report, and numerous other reports on its activities. The work of the association was carried on by 18 departments, each having its own officers, and by 20 committees actively at work on professional problems. Two conventions are held annually, a summer meeting which serves as a clearing house for educational ideas, and reviews the progress of the year in education, and a winter meeting of the Department of Superintendence which convenes the last week in February. The 1928 winter meeting was held in Boston, Mass., the summer meeting in Minneapolis, Minn., July 1–6, with an attendance of more than 10,000. The 1929 convention was held during the first week in July, at Atlanta, Ga., while the Department of Superintendence held its convention at Cleveland, Ohio. The finances of the Association were embodied in two funds, the current and the permanent, the latter amounting in 1928 to $433,828.60, the receipts for the year ending May 31, having been $433,842.93. The enrollment as of Jan. 1, 1928, was 181,350. The headquarters of the Association were maintained at 1201 Sixteenth Street, Washington, D. C. Officers elected for 1928–29 were President, Uel W. Lamkin, Maryville, Mo.; secretary, J. W. Crabtree, Washington; and treasurer, Henry Lester Smith, Bloomington, Indiana.

NATIONAL FORESTS. See FORESTRY.

NATIONAL GUARD. See ARMIES AND ARMY ORGANIZATION.

NATIONAL ORIGINS. See IMMIGRATION.

NATIONAL PARKS. See PARKS, NATIONAL.

NATIONAL RESEARCH COUNCIL. See NATIONAL ACADEMY OF SCIENCES.

NATIONAL SAFETY COUNCIL. A coöperative, noncommercial organization established in 1913 as an outgrowth of the safety congress held under the auspices of the Association of Iron and Steel Engineers in Milwaukee the previous year. The council consists of an association of companies and individuals active in promoting safety in industrial establishments, on the streets, and in the homes. Annual meetings are held in which matters relating to this object are discussed. With an enlarged membership in 1924, the circulation of the monthly magazine, *National Safety News*, rose, as did that of the various pamphlets of the organization. The engineering section merged with the American Society of Safety Engineers during the year. In behalf of public safety, Secretary of Commerce Hoover arranged for seven national committees to study and report upon street and highway problems. The annual meeting was held at Louisville, Ky. In 1925 the council, which made a particular effort to establish community safety organizations, issued a report of its public accident statistics. Carrying on the work of local organizations, eight community safety surveys were made during 1926. The education division, with the aid of the National Bureau of Casualty and Surety Underwriters, employs thousands of specialists to teach accident prevention in schools and universities. The annual meeting of the council was held in Chicago in 1927. By 1928 the council published, in addition to the *National Safety News*, *Public Safety*, for public officials, *Safety Education*, for schools, and *Safe Worker*, which was distributed monthly among workers. The industrial paper reaches nearly 10,000,000 persons, representing about 150 occupations. The council is supported by membership dues, the income in 1928 being approximately $600,000, and it also received contributions from the Rockefeller Foundation. At the annual conference in New York in 1928, Henry A. Reninger was elected president, and W. H. Cameron managing director; the latter is also in charge of the executive officers at 108 East Ohio Street, Chicago, Ill.

NATIONAL SYMPHONY ORCHESTRA. See MUSIC, *Orchestras*.

NATURAL GAS. The natural-gas industry has been the target of conservation pessimists for a number of years. Dire prophecies as to the life and stability of the industry have been made from its earliest history. In spite of the prophecies, the industry has continued to grow. Each year since 1922 has marked the establishment of a new high record of consumption. In 1929 more than 2500 miles of new high-pressure long-distance gas mains were under construction. Reserves of natural gas were considerably enlarged in 1927 and 1928 by important discoveries in northern Louisiana, east and west Texas, the Texas Panhandle, and California. Montana recently entered the list of important natural-gas producing States with the discovery of gas in the vicinity of Sweet Grass and the starting of a pipe line to Great Falls.

In 1913 the consumption of natural gas in the United States was 581,898,239,000 cubic feet. By 1928 this total had increased to 1568 billion cubic feet. Of the 1928 total, 321 billion cubic feet were purchased by domestic consumers, compared with 1247 billion cubic feet purchased by industrial consumers. In 1914 the leading producing States were West Virginia, Oklahoma, Pennsylvania, Ohio, and California. By 1928 Louisiana, Texas, and Montana had become of corresponding importance. Statistics indicated that the largest proportion of natural-gas production was shifting from the Eastern Middle-Atlantic States to the Southwestern, mid-continent States. The leading producing States in 1928 with their output in billion cubic feet were: Oklahoma, 321; Texas, 302; California, 246; Louisiana, 228; and West Virginia, 163.

In addition to domestic and industrial uses of natural gas as fuel, an important branch of the industry was the manufacture of gasoline from natural gas. The natural-gas gasoline industry firmly established itself during 1927 as an important source of motor fuel, 8.51 per cent of the total motor fuel produced during 1927 being natural-gas gasoline. In 1911, when the U. S. Geological Survey collected its statistics for gasoline from natural gas for the first time, it was reported that the year's production of gasoline thus obtained amounted to 7,425,839 gallons. The output of natural-gas gasoline in 1927 was 1,627,600,000 gallons, an increase of 20 per cent over the output of 1926, whereas the corresponding increase in production of gasoline by refineries amounted to but 10 per cent.

California was the largest contributor to the increase in output, the increase for this region being 25 per cent over that of 1926. The deep sands, with rich gas, in the Los Angeles Basin were the principal sources of this increased production. A total of 1102 plants were engaged in the production of natural-gas gasoline in 1926. This gasoline was produced by what is known as the compression process, which in 1926 accounted for 243,084,000 gallons; but the absorption and combined compression-absorption processes, which accounted for 1,099,891,000 gallons; and by the drip and miscellaneous other processes, by which 20,115,000 gallons were manufactured.

The production of carbon black from natural gas also is an important industry, the output of the United States in 1927 amounting to 198,429,000 pounds valued at the plants at $10,955,000, or an average of 5.5 cents per pound. This production of carbon black used natural gas estimated at 144,087,000 M cubic feet. Louisiana, or more specifically the Monroe district of that State, with 124,188,000 pounds, and Texas with 56,396,000 pounds of carbon black were the leading States in production. Carbon black is the basis of printing ink.

NATURAL SELECTION. See Zoölogy, Evolution.

NAUMANN, nou'mån, (Joseph) Friedrich (1860–1919). A German publicist, prominent in the war literature of his country (see Vol. XVI). His last works were *Bulgarien und Mitteleuropa* (1914); *Deutschland und Frankreich* (1914); *Mitteleuropa,* the famous work in which he outlined a vast central European empire for Germany (1915); *Wie Wir Uns im Kriege Verändern* (1916); *Kriegs und Heimats Chronik,* in collaboration with Dr. Gertrud Bäumer (1916–17); *Der Weg zum Volkstaat* (1918); and *Gestalten und Gestalter* (1919).

NAURU. See Pacific Ocean Islands.

NAVAL AËRONAUTICS. See Navies of the World, *United States;* Aëronautics.

NAVAL ARCHITECTURE. See Shipbuilding and Naval Architecture.

NAVAL PROGRESS. See Navies of the World; Vessel, Naval; Gun, Naval; Gunnery, Naval; Navigation; Projectile.

NAVAL VESSEL. See Vessel, Naval.

NAVIES OF THE WORLD. In the following paragraphs, all of the navies of the world possessing any fighting value are briefly described as regards national status, personnel, and average budget (where an average can be given). When the condition of the service seems to require it, some comment is made. In all cases, a list of ships is supplied. The dates in parentheses, following the words, "battleship," "cruiser," destroyer," etc., are the years in which the vessels were launched. Unless otherwise stated, the tonnages are the normal designed displacements as given out officially by the various navy departments and are supposed to represent the displacement of the vessels in light seagoing trim. In some countries, this means that only half, or less, of the full amount of fuel and stores are on board; in other countries, such as the United States, more than two-thirds. Full-load tonnage means the displacement when all fuel and stores that can be carried are on board. Standard tonnage is the same as full load except that no fuel or reserve feed water is on board; in some cases, it is less than 80 per cent of the full-load displacement. The tonnage given for submarines is the displacement when cruising on the surface. The submerged displacement is 20 to 50 per cent greater than this.

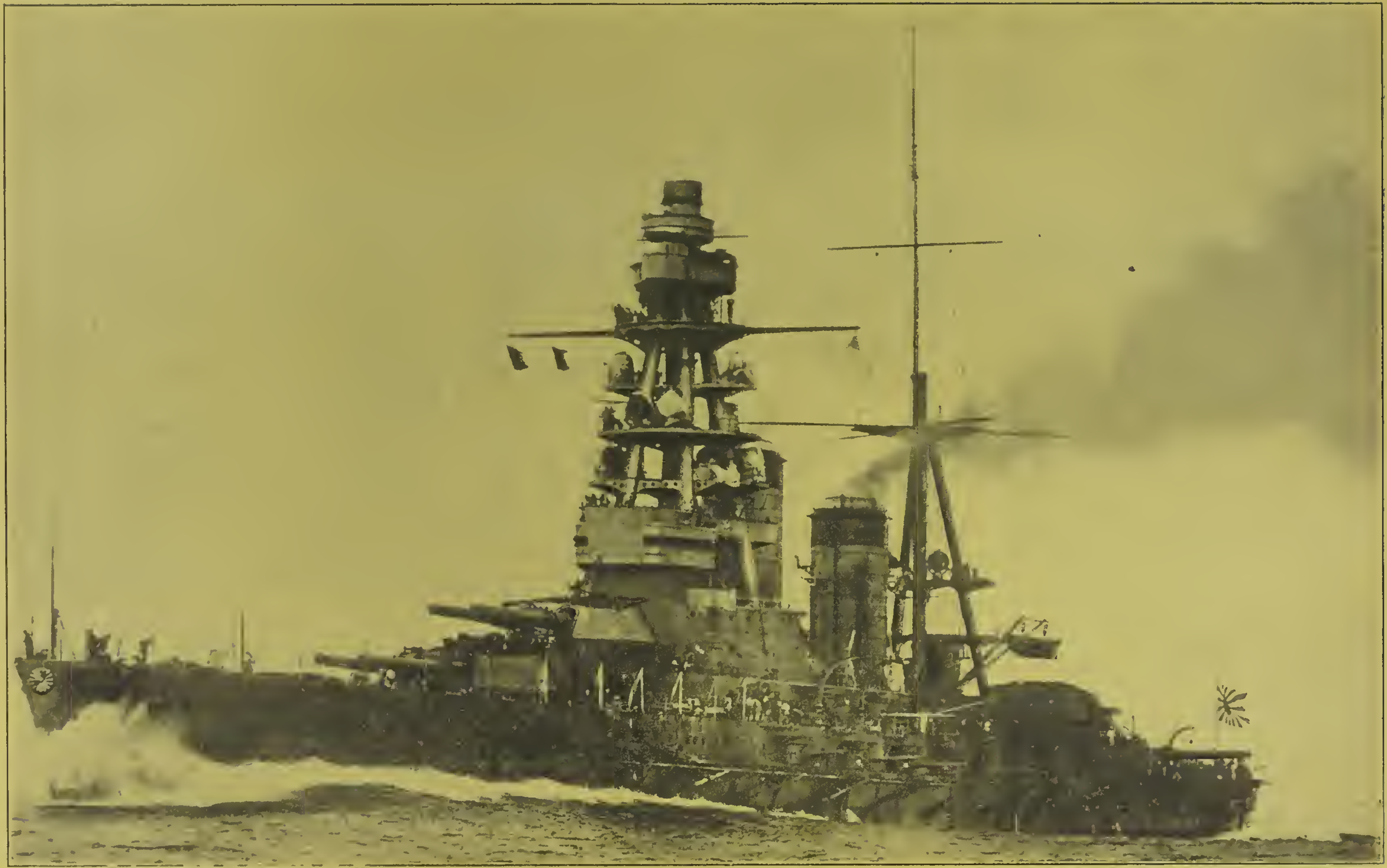
Argentina. The navy is a department of the Government under the control of the Minister of Marine. The personnel consists of about 800 officers and petty officers and 8500 men. The reserve is reported to include about 8000 officers and men and the special reserve, 10,000. The navy yards are at Buenos Aires, Puerto Belgrano (Bahia Blanca), and Rio Santiago. The fleet consists of 2 dreadnaught battleships of 27,600 tons, armed with 12 12-inch guns, completed in 1914, repaired and partly modernized in 1924–25; four armored cruisers of 6840 to 700 tons, launched 1895–97, but repaired, refitted, and partly modernized 1927–29; two new light cruisers of 6800 standard tons, building (1929) in Italy; one old protected cruiser of 4780 tons, launched 1895, recently repaired and refitted; one training ship of 2850 tons, launched 1898, repaired and refitted in 1926; two old coast-defense ships of 2300, launched 1890–91, recently repaired; five destroyer leaders of 1520 to 1650 tons, 4 launched 1925–1928, 1 building; 4 destroyers of 950 tons and 3 of 340 tons; 3 submarines of 775–920 tons, 3 gunboats of 1100 tons; and a large number of transports as well as small craft.

Australia. Since the reorganization of the British colonial system, the Australian naval force has become the Royal Australian Navy. Upon the conclusion of the World War, as a measure of economy, the fleet was rapidly reduced. In 1924 the public attitude changed and a new naval programme was adopted. This consisted of 2 10,000-ton light cruisers, 2 large submarines, of 1400/1800 tons, and an aircraft carrier. The cruisers and submarines were built in England and arrived in Australia in 1928. The aircraft carrier was built at Sydney and completed early in 1929. The other vessels of the navy are 2 light cruisers of 5400 and 5560 tons, launched 1915 and 1918; 3 seagoing mine sweepers of 1200 to 1250 tons, launched 1915; 1 destroyer leader of 1666 tons (1917); 11 destroyers of 700 to 1075 tons (1909–19); 1 depot and repair ship of 3476 tons (1916); 2 fuel ships of 7806 and 9700 tons (1916 and 1920); 1 depot and receiving ship of 5880 tons (1902); 1 surveying ship of 1320 tons (1918); some small craft. The navy yard on Cockatoo Island, Sydney, is being enlarged and an aviation field and station added. The total personnel of the navy, officers and men, is said to be 5000, of which about 300 are officers.

Austria. The navy is a branch of the Ministry of Defense. The only vessels are 4 patrol boats on the Danube.

Belgium. The Belgian Navy was disestablished in 1927. One gunboat is retained for fishery protection.

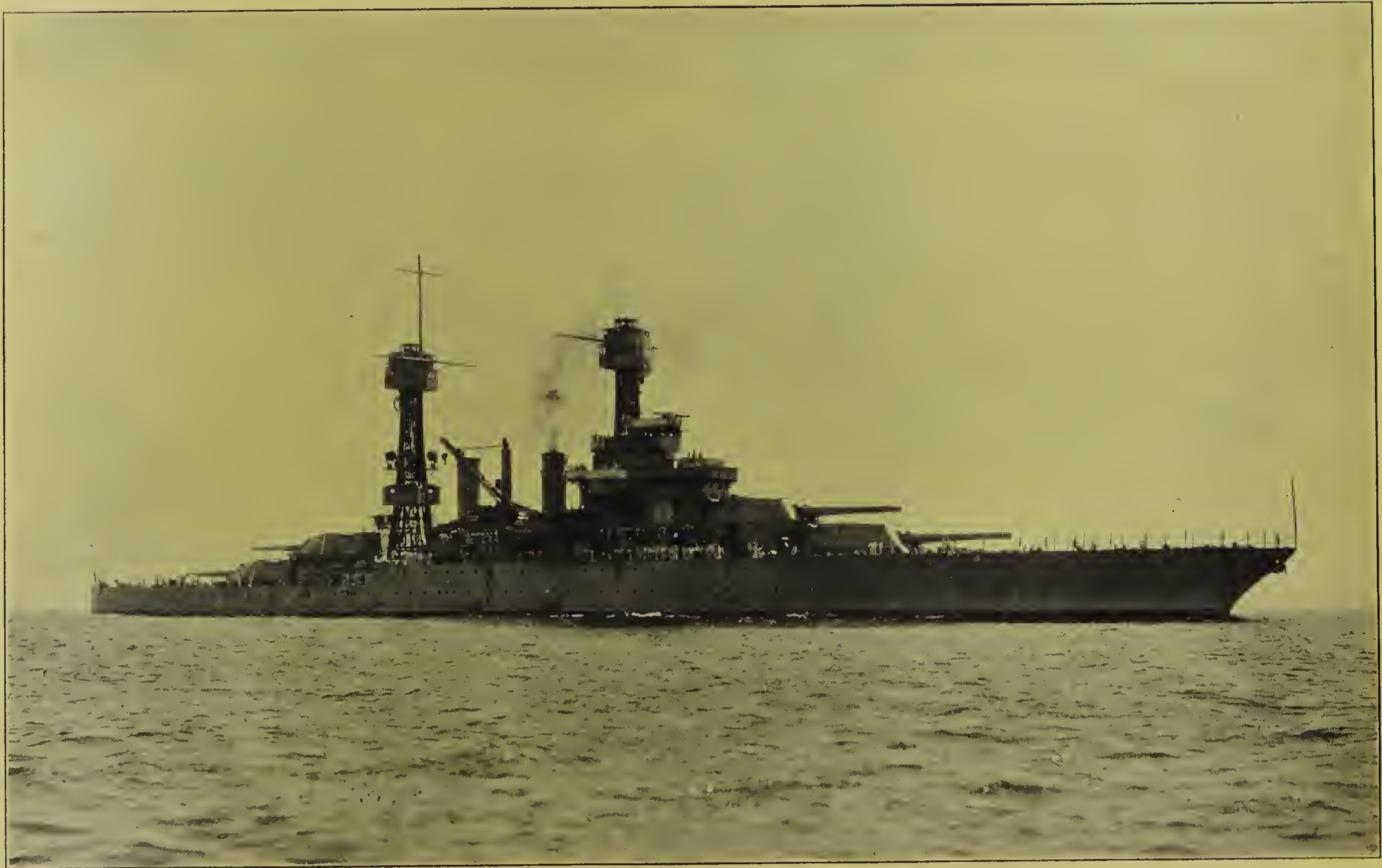
Brazil. The head of the navy department is the Minister of Marine. Following the recommendation of the recent commission, composed of officers of the U. S. Navy, the department has been reorganized and is now divided into the bureaus of ordnance, marine engineering, material, personnel, communications, health, and supplies. The personnel consists of about 207 commissioned officers, 254 junior and warrant officers, and 3075 petty officers and men. The fleet is composed of 2 battleships of 19,500 tons (12 12-inch guns), launched in 1908–09 but quite recently repaired and modernized; 1 armored coast defense ship of 3200 tons (1899); 3 protected cruisers of 3100 to 3450 tons, launched 1896–1909 but recently repaired and modernized; 11 destroyers of 560 to 950 tons (1908–13); 1 submarine of 1390/1884 tons (1927); 3 submarines of 250/305 tons (1913–14); 1 submarine carrier, depot, docking, and salvage ship of 4100 tons; 2 fuel ships (1 building); 1 river monitor of 470 tons; a number of river gunboats and other small craft.



Photograph Underwood & Underwood, N. Y.

BATTLESHIP "MUTSU" OF THE JAPANESE NAVY

Displacement, 33,800 tons Speed, 23.5 knots Battery, eight 16-inch guns



From Ewing Galloway, N. Y.

UNITED STATES BATTLESHIP "WEST VIRGINIA"

Bulgaria. The navy is a branch of the Ministry of War and Marine. Under the terms of the Treaty of Peace, Bulgaria is permitted to maintain no armed naval force except 4 fast patrol and 6 vedette boats on the Danube for police and preventive duties.

Canada. The head of the Royal Canadian Navy is the Director of the Naval Service, one of the branches of the Ministry of National Defense. The personnel of the navy in 1928 consisted of 70 officers and 500 men in the active force; 70 officers and 430 men in the naval reserve; and 70 officers and 830 men in the naval volunteer reserve. Seven officers and 26 petty officers and men are lent by the British Navy. Ten officers and 150 men will be added to the active force when two new destroyers, building in England, are received. The vessels of the navy comprise 2 destroyers of 1075 tons (1918–19) and 4 mine sweepers of the trawler class of 136 net registered tons, and built in 1918.

Chile. The head of the Chilean Navy is the Minister of Marine. The principal dockyard is at Talcahuano, where are located large dry docks, repair shops, the training establishment, and the gunnery, torpedo, and submarine schools. The other navy yard is at Valparaiso, where are located the naval academy and schools for coast artillery, communications, navigation, and artificers. The law of February, 1924, fixed the personnel of the navy at 662 officers, 5771 enlisted men, and 969 volunteers. The fleet consists of the battleship, *Almirante Latorre* (1913–28,000 tons—10 14-inch guns); 1 old coast defense battleship (1890—reconstructed 1909) of 6902 tons; 1 armored cruiser (1896—rebuilt 1910) of 7050 tons, and 1 of 8500 tons (1897—rebuilt 1919–20); 3 old protected cruisers of 3400 to 4500 tons (1893–97—partly rebuilt since); 1 training ship of 2500 tons (1898—rebuilt 1923–24); 3 submarines of 1400/1800 tons (building 1929); 6 submarines of 364/435 tons (1915–17); 6 destroyers of 1430 tons (building 1929); 2 destroyers of 1430 tons (1911–14); 3 destroyer leaders of about 1730 tons (1911–15); 3 transports of 1124 to 6010 gross tons; and several gunboats and other small vessels.

China. Until the Nationalist or some other government absolutely controls the entire seacoast of China, the navy will probably continue to exist in its present inefficient condition. There is not now, and never has been, a navy department worthy of the name. The fleet is supposed to consist of 6 cruisers (1897–1911) of 2800 to 4500 tons; 3 destroyers (1895–1912) of 400 tons; 6 or 8 torpedo boats of 50 to 100 tons; 3 torpedo gunboats (1895–1902); about 25 gunboats and river gunboats (1903–20) of 150 to 850 tons; 1 transport and 1 training ship—each of 1700 tons. Probably, the hulls, engines, boilers, and guns of these vessels are in very poor condition.

Colombia. The navy is a branch of the Ministry of War. It consists of gunboats which are designed to assist in the suppression of incipient revolution or to effect coast-guard patrol These are 1 seagoing gunboat (1896) of 643 tons; 2 river gunboats (1897 and 1905) of 400 tons; 3 coast-guard patrol vessels (1925) of about 300 tons, and a number of small coast-guard boats.

Cuba. The administration of the navy constitutes one of the branches of the Ministry of War and Marine. The personnel consists of about 1200 officers and men. The recent reports give the following figures: line officers, 65; engineer officers, 49; paymasters, 8; surgeons, 8; judge advocates, 2; enlisted force, about 1050. The fleet consists of 2 small cruisers (1911) of 2050 and 1200 tons; 6 gunboats (1900–1912) of 80 to 500 tons; 1 transport (1890) of 3000 tons; 6 coast-guard boats (1890–1912) of 40 to 450 tons; and 6 fast coast-guard boats (ex-submarine chasers—1917–18) of 77 tons. A new building programme is proposed; it consists of 2 cruisers of 2500 and 5000 tons and 16 gunboats of 200 to 900 tons.

Denmark. The head of the navy is the Director General, Ministry of Marine, under the Minister of National Defense. The personnel consists of about 4000 of all ranks. The fleet comprises 5 armored coast-defense vessels (1896–1918) of 2200 to 4200 tons; 3 small cruisers (1909–29) of 1300 tons; 23 torpedo boats (1907–29) of 105 to 300 tons; 14 submarines (1911–27) of 164 to 325 tons (surface displacement); a royal yacht of 1100 tons and several auxiliary vessels and small craft.

Ecuador. The navy department is a part of the Ministry of War. The naval force consists of 1 gunboat (1896) of 750 tons, 1 (1884) of 300 tons, and a few smaller vessels.

Egypt. The naval force is under British control but operated under direction of the Egyptian government. It consists of 3 coast-guard gunboats (1902–26) of 610 to 947 tons and a small cruiser (1917) of 1290 tons.

Estonia. The navy department is a part of the Ministry of War. The personnel is said to consist of about 2100 officers and men, but this is probably an exaggeration. The naval force is composed of 2 destroyers (1915) of 1585 and 1800 tons; 1 torpedo boat (1915) of 228 tons; 5 gunboats of 144 to 1100 tons; 2 small mine layers of 50 tons; and some tugs and other small craft.

Finland. The navy department is a part of the Ministry of Defense. The personnel is composed of about 1300 officers and men. The naval force consists of 2 gunboats (1918) of 342 tons and 2 (1892) of 420 tons; 2 torpedo boats (1899–1901) of 250 and 270 tons; 3 submarines (1929) of 450 tons (surface); and some small craft.

France. The navy department is the Ministry of Marine. The Minister has general control of the navy except as regards naval aviation which, together with the army aviation service, in 1928 was suddenly transferred to the newly constructed Air Ministry in a wave of dissatisfaction because the army and navy air services no longer held most of the aviation records, many being captured by Italy—the French being very jealous of that country's successes. Recent French naval budgets have been steadily expanding from $52,000,000 in 1925 to $113,000,000 in 1929, largely due to construction of new 10,000-ton cruisers, destroyer leaders, destroyers, submarines, and auxiliary vessels, as well as the modernization of existing ships, building of the new naval academy, and the development of naval aviation. The French complained bitterly of the provisions of the Washington Conference of 1921 which restricted the tonnage of French capital ships to 175,000; and the French Parliament did not give its assent—a grudging approval—until 1923. And yet France was saved by the Washington Pact from descending to relative naval impotence. Furthermore, although the Pact permitted the French to replace the battleship, *Paris* (wrecked in 1922), and to lay down a 35,000-ton battleship in 1927 and another in 1929, no plans have been made to do so; instead of this, the navy has expended its money on the vessels mentioned (of which the tonnage is unrestricted by the Pact) and in attempting to modernize and improve old and ineffective ships.

The authorized personnel of the navy in 1929 consisted of 3832 officers and 57,500 men. The officers were: 16 vice admirals, 31 rear admirals, 117 captains, 259 commanders, 360 lieutenant commanders, 800 lieutenants, 540 sub-lieutenants, 428 engineer officers of various ranks, 183 naval constructors and designing engineers, 135 ordnance engineers, 25 hydrographic engineers, 214 commissariat officers, 341 medical officers, 49 pharmacists, and 335 warrant officers. The vessels of the navy, including those under construction, are 3 battleships (1913) of 23,550 tons (carrying 10 13.4-inch guns); 3 battleships (1919) of 23,467 tons (12 12-inch guns); 3 old battleships (1909) of 18,890 tons; 1 aircraft carrier (1927) of 21,800 tons; 1 aircraft carrier (no flying deck—1929) of 10,000 tons; 5 old armored cruisers (1899–1908) of 9700 to 14,100 tons; 7 light cruisers (3 completed, 4 building) of 10,000 tons; 3 light cruisers (1923–24) of 7880 tons; 4 light cruisers (1911–15) of 3500 to 5500 tons; 2 colonial service cruisers (building) of 2500 tons; 54 gunboats and despatch vessels (1916–21) of 500 to 1490 tons; 5 river gunboats (1909–23) of 45 to 232 tons; 19 mine sweepers (1916–17) of 300 to 350 tons; 1 cruiser mine layer (building) of 5600 tons; 25 destroyer leaders (1916–29) of 2380 to 2900 tons; 62 destroyers (1911–29) of 340 to 1495 tons; 55 first-class submarines (1912–29) of 837 to 3250 tons surface displacement; 37 second-class submarines (1913–30) of 415 to 720 tons; 1 cadet training ship (building) of 6600 tons; 1 submarine depot ship (building) of 6000 tons; 1 repair ship (1894) of 11,000 tons; 10 transports, supply ships, etc. (1913–20) of 485 to 3160 tons; 9 patrol boats (1912–19) of 80 to 460 tons; 12 fuel oil ships (1920–1929) of 4000 to 24,000 tons when loaded; 1 armed yacht (1896) of 1400 tons; and various small torpedo boats, coastal motor boats, surveying ships, tugs, etc.

Germany. The German Navy is a branch of the Ministry of National Defense. The amount of the budget increased from 104,200,000 marks (1 mark equals 23.8 cents) in 1924 to 210,000,000 in 1928; but the statements of the budget are so drawn as to make its meaning doubtful to foreigners. About half the appropriations are "provisional," which means that they may be applied to any other purpose than that for which they are voted. Also, according to French critics, the allotments for new construction are two to three times the proper figures. The organization and development of the German Navy seem to be planned for building, maintaining, and operating a great force when the present treaty restrictions are removed. The naval general staff is said to be composed of 17 sections, each headed by an officer of rank, with several juniors. The bureaus into which the navy department is divided are maintained on a similar scale. The active list of officers of the navy is reported to be as follows: the executive branch consists of 1 admiral, 3 vice admirals, 8 rear admirals, 39 captains, 24 commanders, 85 lieutenant commanders, 164 lieutenants, and 200 junior lieutenants and ensigns; the engineer officers comprise 1 rear admiral, 4 captains, 4 commanders, 19 lieutenant commanders, 44 lieutenants, 55 junior lieutenants, and 27 ensigns. The medical corps has 4 officers with the rank of rear admiral. The members of the pay, construction, and legal departments are "officials" and not officers. The total number of officers and men on the active list permitted by the peace treaty is 15,000. The vessels of the navy are 8 old battleships (1902–03) of 13,200 tons—all of which have been thoroughly repaired and partly modernized: 1 battle cruiser (laid down 1928) of 10,000 tons—the first of 4 to be built; 5 new light cruisers (2 building) of 6000 tons; 5 old cruisers of 2900 to 3650 tons; 27 destroyers (1909–27) of 564 to 800 tons; 5 torpedo boats (4, 1907–08—1 building), of 200 to 554 tons; 9 gunboats, tenders, repair ship, etc., of 550 to 1200 tons; and 33 mine sweepers (1917–18) of 481 to 511 tons.

Great Britain. The navy department is styled the British Admiralty and its head, a cabinet minister, is the First Lord of the Admiralty. The average budget from 1922–23 to 1928–29 has been about £58,000,000. The average building programme for several years has been 3 cruisers, 8 destroyers, 6 submarines, 1 or 2 large vessels, and several gunboats or other small craft. The personnel averages about 102,000, divided about as follows: commissioned officers in active service, 5324; subordinate officers, 727; warrant officers, 948; petty officers, men, and boys, 86,122; marine officers, 360; marine warrant officers, 33; marine non-commissioned officers and men, 10,045; cadets at the naval academy, 550; officers of the enrollment service, 75; boys and apprentices under instruction, 3311; miscellaneous services, 1779.

The control of the aviation service is divided between the Air Ministry and the Admiralty—an arrangement which interferes with efficiency and for that reason is bitterly opposed by the navy.

The British naval force consists of the following vessels: 2 battleships (1925) of 35,000 tons (standard—full load about 40,000 tons—guns, 9 16-inch); 5 battleships (1914–16) of 29,350 tons (normal—full load, about 33,000 tons—guns, 8 15-inch; 5 battleships (1913–15) of 27,500 tons (normal—full load, about 32,500 tons—guns, 8 15-inch); 4 battleships (1912–13) of 25,000 tons (normal—full load, about 28,800 tons—guns, 10 13.5-inch); 1 battle cruiser (1918) of 41,200 tons (normal—full load, 45,200 tons—guns, 8 15-inch); 2 battle cruisers (1916—rebuilt 1918–22) of 26,500 tons (normal—full load, about 37,000—guns, 6 15-inch); 1 battle cruiser (1913—rebuilt 1922–23) of 28,500 tons (normal—full load, about 35,000 tons—guns, 8 13.5-inch); 1 aircraft carrier (1919) of 10,950 tons (normal—full load, about 13,000 tons); 1 aircraft carrier (1918) of 22,600 tons (normal—full load, about 26,200 tons); 1 aircraft carrier (1917) of 14,450 tons (normal—full load unknown); 3 aircraft carriers (1916—rebuilt 1924–29) of 19,000 tons (normal—full load, 22,500); 2 light cruisers (building) of 8400 tons (standard—full load, about 11,500 tons); 9 light cruisers (1926–28) of 10,000 tons (standard—full load, about 13,800 tons); 4 light cruisers (1917–21) of 9800 (normal—full load, about 13,000 tons); 2 light cruisers (1919–20) of 7600 tons (normal—standard, 7100—full load, about 9000 tons); 6 light cruisers (1917–19) of 4700 tons (normal—about 6000 at full load); 13 light cruisers (1916–19) of about

4150 tons (normal—about 5200 tons at full load); 11 light cruisers (1914–16) of 3750 tons (normal—about 4650 tons at full load); 2 light cruisers (1913) of 5440 tons (normal—about 6500 tons at full load); 1 light cruiser (1911) of 5250 tons (normal—about 6400 at full load); 3 monitors (1915–16) of 6670 to 8000 tons; 17 destroyer leaders (1914–28) of 1600 to 2000 tons; 146 destroyers (1917–28) of 930 to 1350 tons; 1 submarine (1923) of 2780 tons (normal, surface); 1 submarine (1922) of 2140 tons; 2 submarines (1919) of 1600 tons; 13 submarines (1926–30) of 1346 to 1540 tons; 29 submarines (1917–25) of 890 to 960 tons; 15 submarines (1918) of 440 tons; 29 mine sweepers of 800 to 945 tons; 25 sloops (gunboats) of 1200 to 1290 tons; 1 cruiser mine layer (1924) of 7260 tons (normal—standard, 6740 tons); 6 mine layers of 325 to 535 tons; 19 river gunboats of 180 to 645 tons; 1 depot ship for mine sweepers, 7080 tons; 3 depot and repair ships for destroyers, 6600 to 11,500 tons; 8 depot and repair ships for submarines, 935 to 13,000 tons; 1 large repair ship (building); 1 repair ship of 9600 tons; 1 royal yacht of 4700 tons; 1 admiralty yacht of 3470 tons; 22 oil fuel ships of 6300 to 8100 tons dead weight carrying capacity; 42 oil fuel ships of 200 to 10,000 tons dead weight capacity; 1 fleet supply ship of 5865 tons; 1 distilling ship of 3500 tons; 1 hospital ship of 10,100 tons, 8 surveying vessels of 800 to 1320 tons; 1 target service ship (ex-battleship) of 23,000 tons; 15 trawlers of 500 to 665 tons; 32 drifters of 150 to 199 tons; 19 fleet tugs; and a large number of small vessels of miscellaneous character.

The navy of each of the principal British colonies is controlled by the colony and is styled the Royal Australian Navy, the Royal Canadian Navy, etc. Each is here listed under the name of the colony—Australia, Canada, India, New Zealand, and South Africa.

Greece. The navy department is the Ministry of Marine. The navy is of much importance to the country because of the great extent of seacoast and the relatively large sea-borne trade. The total number of officers and men is reported as 14,000 but this probably includes the reserves not actually in service. The vessels of the navy are 2 battleships—formerly U.S.S. *Idaho* and *Mississippi* (1905) of 13,000 tons; 3 coast-defense battleships (1889–90, rebuilt in 1900) of 4808 tons; 1 armored cruiser (1910) of 9960 tons; 1 cruiser mine layer (1912—rebuilt 1926–27) of 2600 tons; 11 destroyers (1905–12) of 400 to 980 tons; 11 torpedo and patrol boats (1913–15) of 120 to 250 tons; 6 new submarines (1924–28) of 605 to 730 tons (surface); 4 mine layers (1916–26) of 380 to 520 tons; 4 old gunboats (1881–84) of 86 to 469 tons—used as tenders; 1 oil fuel ship (1889) of 4175 tons capacity; 2 colliers (1906) of 4200 gross tonnage; 1 repair and supply ship (1920) of 4549 gross tonnage; 1 water carrier of 750 tons capacity; 1 new training ship (1927) of 1870 tons; 1 hospital ship (1876—rebuilt 1918); a number of patrol boats and other small craft.

Hungary. Under the terms of the Peace Treaty, the only force permitted is a river guard of 8 patrol vessels of 128 tons, 2 motor launches of 20 to 30 tons; 10 motor boats of 12 to 20 tons; the personnel not to exceed 96 officers and 1524 petty officers and men. The existing force consists of 4 patrol boats of 60 to 140 tons and some motor boats. The Royal Hungarian River Guard is under the control of the Minister of the Interior.

India. Previous to 1926, the Indian Marine had, for many years, consisted of a sort of inspection, police, and patrol service. In February of that year, the Royal Indian Navy was formed with the approval of the King. The name has since been changed to Royal Indian Marine. Its head is the Flag Officer Commanding and Director of the Royal Indian Marine, and the plans of reorganization are being carried out in most respects. Much difficulty is said to be experienced with the caste system among the Hindus and the mixture of the three great religions. The vessels of the Marine are 5 small cruising vessels (1 building, 2 fitted for mine sweeping, 2 for marine survey work) of 1290 to 2100 tons, 2 patrol gunboats of 755 to 838 tons, and 1 depot ship of 1966 tons.

Italy. The navy department is the Ministry of Marine. Its head is a cabinet minister—in 1929, Premier Mussolini. The amount of the naval budget steadily increased from $31,300,000, in 1922–23, to $65,800,000 in 1927–28; in 1928–29 it fell to $60,600,000. The personnel is approximately as follows: executive officers, 1031; naval engineers, 313; naval constructors, 117; surgeons, 184; commissary officers, 217; chaplains in chief, 5; warrant officers, 350; petty officers, 6000; other enlisted men, 37,000. No battleships or battle cruisers have been commenced since the War, most of the new construction being devoted to light cruisers, destroyer leaders, destroyers, and submarines. Much attention is, and has been, devoted to mine laying and aviation, but the expenses of the latter are chiefly borne by the Air Ministry, of which naval aviation is a branch. The vessels of the navy are 5 battleships (1911–13) of 23,000 tons (normal—guns, 13 12-inch); 1 battleship (1910) of 19,600 tons (normal—guns, 12 12-inch); 4 armored cruisers (1902–08) of 7350 to 11,000 tons (normal); 4 light cruisers (2 1926–27, 2 building) of 10,000 tons (standard); 5 light cruisers (building) of 5250 tons (standard); 8 light cruisers (1911–14) of 2530 to 5300 tons (normal); 15 mine layers (1909 to 1927) of 120 to 700 tons; 41 mine sweepers (1918) of 200 to 515 tons; 16 destroyer leaders of 1985 to 2435 tons; 4 mine-laying destroyers (1925–26) of 1300 tons, 12 mine-laying destroyers (1914–19) of 850 to 1556 tons; 4 destroyers (building) of 1450 tons; 10 destroyers (1925–28) of 1150 to 1350 tons; 41 destroyers (1911–23) of 670 to 980 tons; 41 torpedo boats (1911–18) of 125 to 424 tons; 10 submarines (building) of 850 to 875 tons (surface); 12 submarines (1926–28) of 780 to 1390 tons (surface); 33 submarines (1915–18) of 260 to 840 tons (surface); 1 aircraft tender (1923) of 5400 tons; 2 submarine depot ships (1921–22) of 2400 tons; 21 gunboats (1910–22) of 230 tons; 1 river gunboat (1921) of 220 tons; 1 royal yacht (1925) of 5800 tons; 1 government yacht (1904) of 1429 tons; 4 fuel oil ships of 6000 to 8000 tons capacity; 6 fuel oil ships of 1080 to 4000 tons capacity; 1 submarine salvage vessel (1914) of 2100 tons; 1 repair ship (1924) of 8140 tons; 4 high-sea tugs of 840 to 1500 tons; 6 transports (1913–15) of 770 to 12,235 tons; 3 transports (1923–4) of 1035 tons; 7 surveying ships (1911–17) of 370 to 2050 tons; 4 water carriers of 960 to 3000 tons and 30 small carriers; 95 armed motor boats and submarine chasers.

Japan. The navy department is the Ministry of Marine. The average budget in the last few years has been about 250 million yen (1 yen is about 46 cents—par 49.8 cents). The total personnel, officers and men, is about 75,000. As in Great Britain, the navy is of vital importance and all possible means to further its power and efficiency are sought. Feeling unable to measure naval expenditure with the United States, and having persuaded the United States diplomats at Washington to give up the development and armament of the American possessions in the Western Pacific, Japan signed the Five Power Pact with approval and gratification. Since that time, she has continued to increase her fleet in all directions not restricted by the Pact—especially as regards cruisers, in which class her strength much exceeds that of the United States. Japanese naval aviation is being developed upon the same plan as that of the United States—complete naval control of design and operation of naval aircraft. As in the United States Navy, all capital ships and large cruisers of Japan are being fitted to carry two or more seaplanes.

The vessels of the navy are (tonnage, normal, except when given as standard): 2 battleships (1919–20) of 33,800 tons (guns, 8 16-inch); 2 battleships (1916–17) of 31,260 tons (guns, 12 14-inch); 2 battleships (1914–15) of 30,600 tons (guns, 12 14-inch); 4 battle cruisers (1912–13) of 27,500 to 29,300 tons (guns, 8 14-inch); 1 aircraft carrier (1925) of 28,100 tons (standard); 1 aircraft carrier (1921—rebuilt 1924–28) of 28,100 tons (standard); 1 aircraft carrier (1921) of 9458 tons; 1 aircraft carrier (building) of unknown tonnage; 4 light cruisers (1927–28) of 10,000 tons (standard), 4 (building) of 10,000 tons (standard), 2 (to be built) of 10,000 tons (standard), and 4 (1925–26) of 7100 tons (standard); 6 coast-defense vessels (ex-armored cruisers—1898–1900) of 7628 to 9826 tons; 3 light cruisers (1923–25) of 5765 tons, 6 (1921–23) of 5570 tons, 5 (1919–20) of 5500 tons, 1 (1923) of 3100 tons, 2 (1915) of 3500 tons; 3 protected cruisers (1911) of 4950 tons, 1 (1907) of 4100 tons, and 1 (1902) of 3420 tons; 6 gunboats (2 building—others 1901–21) of 620 to 1250 tons; 7 river gunboats (1902–23) of 126 to 340 tons; 24 destroyers (14 building—others 1927–28) of 1700 tons, 24 (1919–25) of 1400 to 1445 tons, 9 (1910–18) of 1000 to 1300 tons, 38 (1916–23) of 850 to 900 tons, and 12 (1912–14) of 600 to 665 tons; 13 mine sweepers of 381 to 700 tons; 7 submarines (building) of 1650 tons or more, 9 (completed 1924–28) of 1650 tons, 10 (completed 1925–28) of 1150 to 1970 tons, 25 (completed 1923–26) of 750 to 998 tons, 19 (completed 1919–22) of 689 to 740 tons, and 8 (completed 1910–20) of 290 to 480 tons; 2 destroyer depot ships (1923–24) of 8500 tons and 3 (1896–1913) of 1230 to 7600 tons; 2 mine layers (building) of 800 tons, 3 (1898–1916) of 2000 to 9700 tons, and 12 (1911–19) of 430 tons; 10 fuel oil ships (1920–23) of 8000 tons capacity and 2 (1917–18) of 1100 and 5000 tons; 2 colliers (1918–19) of 8750 tons capacity; 1 fuel ship (1922) of 2000 tons coal capacity and 7500 tons oil, 1 supply ship (1923) of 17,500 tons; 3 transports (1901–06) of 3844 to 4746 tons; 1 salvage vessel of 1040 tons; 8 training ships; 1 ice breaker; 2 surveying ships; and 4 anti-submarine net layers (laid down 1927–28—no details known).

Jugoslavia. The navy is one section of the Ministry of War and Marine (sometimes called the Ministry of Defense). The navy department is divided into the bureaus of (a) General Service, which is in charge of operations, organization, armaments, and matters not confided to other bureaus; (b) Personnel: (c) Technical, which has charge of navy yards, shipbuilding, machinery, etc.; (d) Naval Aviation; (e) Administration, which has charge of the budget and other financial matters; (f) Health; (g) Law, which has cognizance of disputes, naval justice, etc. The personnel in 1928 consisted of 256 officers and 2000 petty officers and men of the active force; reserve, 164 officers and 570 petty officers and men. The vessels of the navy consist of 1 ex-German cruiser of 2600 tons, completed in 1900, purchased in 1926, rearmed and extensively refitted; 4 ex-Austrian lightly armored Danube River monitors (1892–1915) of 443 to 550 tons; 12 torpedo boats (1906–15) of 200 to 266 tons; 4 submarines (1927)—2 of 975 tons and 2 of 620 tons; 6 mine layers (1917–18) of 520 tons; 4 mine sweepers of 78 tons; 1 submarine depot ship of 2700 tons; 1 training ship of 554 tons; and 8 small auxiliary vessels.

Latvia. The navy is a branch of the Ministry of War. The personnel consists of about 450 officers and men of the permanent force and 200 yearly conscripts. The vessels are 2 submarines (1926) of 390 tons; 1 gunboat (1917) of 525 tons; 2 mine sweepers (1926) of 255 tons; and a surveying vessel (1918) of 285 tons.

Mexico. The navy department is a branch of the Ministry of War and Marine. The vessels of the navy are 1 coast-defense battleship (1898) of 3162 tons; 1 transport (1907) of 1590 tons; 3 gunboats (1891–1903) of 1227 to 1293 tons; 6 patrol vessels (1918) of 486 tons and 2 (1917) of 77 tons.

Netherlands. The navy department is the Ministry of Marine. The average naval budget in recent years has been about $16,500,000. The personnel of all ranks, including the marine infantry, is about 7500; reserves, about 5000. The vessels of the navy are 4 coast-defense battleships (1902–09) of 5080 to 6530 tons; 2 light cruisers (1920–21) of 7050 tons; 1 training ship (1898) of 4030 tons; 8 destroyers (building) of 1620 tons; 4 (1909–14) of 510 tons; 7 torpedo boats (1906–16) of 103 to 322 tons; 6 submarines (building or projected) of about 600 tons, 15 (completed 1914–25) of 515 to 670 tons, 9 (completed 1909–15) of 130 to 370 tons; 2 submarine depot ships (1915–21) to 800 to 2487 tons; 2 small cruisers (1925) of 1676 tons; 2 gunboats (1896–98) of 800 tons; 18 mine layers (1875–1924) of 210 to 1100 tons; 3 armored gunboats (1912–13) of 540 tons; 4 surveying ships, 6 old gunboats.

New Zealand. The navy department is part of the Ministry of Defense and is governed by the Naval Board of which the Minister of Defense is president. The other members are First Naval Member, Second Naval Member and Chief Staff Officer, and the Naval Secretary; all are officers of the British Navy. The vessels are 2 cruisers (1918–19) of about 4700 tons; 1 fuel oil ship (1906) of 6000 tons capacity; 1 training ship (1890) of 2575 tons; and 1 mine sweeper (1917) of 547 tons.

Norway. The navy department is called the Direction of Marine and is a branch of the Ministry of Defense. The permanent personnel is about 1050; the yearly conscripts, 1000; the reserve includes all seafaring men. The average naval budget is about $2,750,000, excluding cost of new construction. The vessels of the navy are 4 armored coast-defense battleships (1897–1900) of 3858 to 4166 tons; 3 destroyers (1910–13) of 540 tons; 26 torpedo boats (1896–1917) of 45 to 220 tons; 6 submarines (4 completed, 2 building) of 413 tons, 3 (1913) of 250 tons; 1 submarine depot ship (rebuilt 1918) of 1920 tons; 10 old gunboats of 233 to 1382 tons; and 3 mine layers (1916–17) of 335 to 755 tons.

Persia. The naval department is a branch of the Ministry of War and Marine. The vessels of the navy are 3 gunboats (1899–1917) of 200 to 1200 tons.

Peru. The navy department is the Ministry of Marine. The fleet is being reorganized with the advice and assistance of a mission from the U. S. Navy. The vessels of the fleet are 2 cruisers (1906) of 3200 tons; 1 destroyer (1909) of 490 tons; 6 submarines (4 completed, 2 building) of 576 tons; 1 old transport of 1790 tons; and 2 river gunboats (1904) of 183 tons.

Poland. The navy department is a branch of the Ministry of War. The personnel consists of 240 officers and 2064 men. A naval base, with docking, repairing, and building facilities, is under construction in the Harbor of Gdynia; completion in 1930 is expected. The vessels of the navy are 1 depot and training ship—ex-French *D'Entrecasteaux* (1896) of 800 tons; 1 station schoolship for officers—ex-French *Desaix* (1901) of 7600 tons; 2 gunboats (1918–19) of 342 tons; 7 river gunboats (bullet-proof gun-houses) of 100 to 200 tons; 8 river monitors (1920–28, bullet-proof turrets) of 70 to 110 tons; 2 destroyers (1928) of 1500 tons; 5 torpedo boats (1914–17) of 335 to 365 tons; 3 submarines (1928) of 980 tons; 1 transport of 8400 tons; 1 surveying ship of 275 tons; and 4 mine sweepers (1917–19) of 171 tons.

Portugal. The navy department is the Ministry of Marine. The personnel consists of 725 officers and 4445 men. The vessels of the navy are 1 old armored coast-defense ship (1876—rebuilt 1902) of 3000 tons; 1 cruiser (1896—refitted 1919–22) of 1729 tons; 2 small cruisers (1915) of 1200 tons; 5 destroyers (1911–23) of 526 to 660 tons; 4 torpedo boats (1913–15) of 266 tons and 1 old boat of 66 tons; 4 submarines (1910–17) of 245 to 260 tons; 1 training ship of 2000 tons; 1 salvage vessel of 1100 tons; 17 gunboats (1878–1928) of 250 to 626 tons; 3 small river gunboats of 38 to 133 tons; 5 transports of 266 to 1775 tons; 1 mining vessel of 78 tons; and 1 mine layer of 151 tons.

Rumania. The navy is a branch of the Ministry of War. The personnel consists of 289 officers and 3700 men. The average naval budget is about $1,000,000. The vessels of the navy are 2 destroyer leaders (1929) of 1850 tons; 2 destroyers (1918–19) of 1391 tons; 8 Danube River monitors of 450 to 680 tons; 8 torpedo boats (1913–15) of 264 tons; 1 submarine (1929) of 650 tons; 1 submarine depot ship (1929) of 2300 tons; 4 gunboats (1916–17) of 390 to 450 tons; 3 old gunboats of 95 tons; 12 Danube River vedettes and patrol vessels of 43 to 50 tons; 28 river motor launches; and 1 royal yacht of about 650 tons.

Russia. The navy is a branch of the Ministry of War and Marine. In czarist days, the efficiency of Russian war vessels was regarded as inferior to that of similar ships in almost any European navy. Under the Bolshevik rule, even this inferior condition rapidly declined. From recent reports, there seems to be some improvement, due to better instruction and greater control by ex-czarist officers, but the fighting capacity of the navy is still at a low ebb and must remain so until the Soviet government can evolve some method to secure real discipline, permanent rank of officers, and promotion of the capable—all of which actual communism renders impossible. The personnel, according to Soviet reports, consists of 530 officers and 23,650 men. Of the former, 130 are ex-officers of the Imperial Navy and some others are thought to be ex-German naval officers. Of the men, only 10,120 are serving afloat. The principal naval force is the Baltic fleet which consists of 3 battleships of 24,000 tons, 12 destroyers, and 8 to 10 submarines.

Siam. Under the military-service law of 1917, the navy is recruited from the maritime population; about 5000 are available for service afloat. Many of the officers are Danes or Norwegians. The vessels of the navy are 3 destroyers (1908–17) of 375 to 1035 tons; 4 torpedo boats (1913) of 120 tons; 1 armored gunboat (1925) of 1000 tons; 4 gunboats (1887–1901) of 530 to 700 tons; 1 training ship (rebuilt 1923) of 840 tons; 1 royal yacht (1918) of 2400 tons gross; 1 transport of 850 tons; 8 small river-despatch, coast-guard, transport, and water-tank vessels of 110 to 250 tons.

South Africa, Union of. The South African Naval Service is a branch of the Department of Defense. The vessels are 1 surveying vessel (1919) of 800 tons, 2 mine sweepers (1918) of 325 tons, and a large ocean-going tug of 668 tons.

Spain. The navy department is the Ministry of Marine. The active personnel consists of 1946 officers, 14,000 men, and 3450 marines, and there are about 310 officers in the reserve. Many reports indicate a continuous improvement in recent years—in general organization, dockyards, aviation, and the fleet. The vessels of the navy are 2 battleships (1913–14) of 15 and 452 tons (guns, 8 12-inch); 2 armored cruisers (1895–1900) of 7405 and 9903 tons; 3 light cruisers (building) of 10,000 (standard) tons, 3 (1925–28) of 7880 tons, and 3 (1920–23) of 4725 to 5590 tons; 2 protected cruisers (1898–1900) of 1920 and 2100 tons; 7 destroyers (2 completed—5 building) of about 1650 tons, 3 (1922–24) of 1145 tons, and 4 (1913–16) of 467 to 548 tons; 22 torpedo boats (1912–18) of 177 tons; 12 submarines (4 completed, 1923–29—2 building—6 authorized) of about 915 tons, and 10 (1915–25) of 260 to 556 tons; 7 gunboats (1910–23) of 800 to 1335 tons and 3 of 114 to 158 tons; 12 mine sweepers (1917–18) of 342 to 665 tons; 1 surveying vessel of 2450 tons; 1 new training ship of 3420 tons; 1 aircraft carrier (rebuilt 1922) of 10,800 tons; 1 submarine salvage ship of 2550 tons; 2 fuel oil ships (building) of 6000 tons capacity; 1 collier (1920) of 5000 tons capacity; 8 motor patrol boats; and 5 seagoing tugs.

Sweden. The Swedish Navy Department is a branch of the Ministry of National Defense. The Naval Staff consists of the divisions of mobilization, operations, communications, organization, and intelligence. The active personnel comprises about 5100 officers and men; the reserve is composed of about 340 officers and a variable number of men. The vessels of the navy are 3 coast-defense battleships (1915–18) of 7600 tons (guns, 4 11-inch) and 8 (1896–1905) of 3600 to 4600 tons (guns, 2 10-inch or 2 8.3-inch); 1 armored cruiser (1905—now used as a training ship) of 5000 tons; 1 aircraft carrier, mine layer, and torpedo transport (building) of 5500 tons; 4 destroyers (2 1926–28—2 building) of 974 tons, and 9 (1905–18) of 460 to 560 tons; 26 torpedo boats (1906–10) of 58 to 124 tons; 17 submarines (1 building—others 1914–28) of 250 to 700 tons, and 3 (1909–12) of 180 tons; 1 cruiser mine layer (1914) of 1800 tons; 3 gunboats (1896–1900) of about 800 tons, and 1 (1891) of 394 tons; 4 depot ships—old battleships (1886–89—later rebuilt) of 3000 to 3370 tons, and 4 (1878–1908) of 500 to 600 tons; 1 hospital ship (1879) of 514 tons; 20 vedette boats (1898–1918) of 55 to 227 tons; 4 sailing training ships of 138 to 1493 tons.

Turkey. The Department of the Navy is now one of the two branches of the recently established Ministry of National Defense. Its head is the Under-Secretary of Defense for the Navy and the department is divided into the Cabinet of the Under-Secretary, the Bureau of Ships, the Bureau of Armaments, the Office of Pay and Pensions, the Office of Supply, and the Office of Medicine. The General Staff includes the former army and navy general staffs. The new naval base and dockyard at Ismid is being steadily developed. The naval establishments at Smyrna and Samsoun have been abolished and that on the Golden Horn has been ceded to another department. The vessels consist of 1 battle cruiser—ex-*Goeben* (1911) of 22,640 tons (guns, 10 11-inch); 1 old battleship (1891—rebuilt 1903—used as training ship) of 9900 tons (guns, 6 11-inch); 2 cruisers (1903) of 3300 and 3800 tons; 1 torpedo gunboat (1906) of 1014 tons; 4 gunboats (1911–12) of 413 to 502 tons; 3 destroyers (1907) of 290 tons; 1 torpedo boat (1905) of 160 tons; 2 submarines (1927) of 505 tons; 1 training ship of 2263 tons; 2 yachts (1903) of 188 and 964 tons; 13 motor launches of 25 tons; 2 seagoing tugs; and 1 mine layer (1912) of 365 tons.

United States. The head of the Navy Department is the Secretary of the Navy. The average budget (exclusive of costs of new construction and modernization of the older ships, which costs vary within wide limits) is about $300,000,000. The average personnel of the active force for a number of years has been about as follows, the actual figures given being those for 1928–29: officers, 8745; midshipmen at the Naval Academy, 1746; enlisted men, 83,250; nurses, 525; total, 94,266. The Marine Corps consists of 1176 officers and 18,000 men. The retired list consists of 1690 officers and 1498 enlisted men. The naval reserve is being constantly increased. The latest reports of the fleet reserve (officers and men who have served in the fleet) indicate somewhat more than 900 officers and 4500 men in 149 divisions. The number of officers in the merchant marine naval reserve that were commissioned in 1928 was about 1500. About 850 college students are in the various reserve officers' training corps. Aviation, in which the United States Navy leads all others, absorbs about 9800 officers and men.

The total number of airplanes on hand is about 800; in 1931, when the present building programme is completed, the number should equal, or exceed, 1000. Four airships of the "rigid" type are in service or under construction; one, built in Germany, has a gas volume of about 2,470,000 cubic feet; two, which were commenced in 1928 and have a gas volume of 6,500,000 cubic feet, are much the largest airships ever built; the fourth is a small airship of the "metal-clad" type and is experimental.

The vessels of the Navy are 3 battleships (1921) of 32,600 tons (guns, 8 16-inch); 5 battleships (1917–19) of 32,000 to 32,300 tons (guns, 12 14-inch); 2 battleships (1915) of 31,400 tons (guns, 12 14-inch); 4 battleships (1912–14) of 27,000 to 27,500 tons (guns, 10 14-inch); 2 battleships (1911) of 26,000 tons (guns, twelve 12-inch); 2 battleships (1909–10) of 21,825 tons (guns, 10 12-inch); 2 aircraft carriers (1925) of 33,000 tons (standard), 1 aircraft carrier (authorized—tonnage not settled—to cost more than $19,000,000), and 1 (1912) of 12,700 tons; 11 armored cruisers (1903–06)—not of much value in war but retained for special peace services—3 are of 14,500 tons, 5 of 13,680 tons, 2 of 9700 tons, and 1 of 8150 tons; 15 light cruisers of 10,000 standard tons (authorized—5 to be laid down in the fiscal year 1928–29, 5 in 1929–30, and 5 in 1930–31), 8 light cruisers (building) of 10,000 tons (standard), 10 (1920–24) of 7500 tons, and 3 (1907) of 3750 tons; 7 old cruisers (1896–1903—useful for peace service only) of 3200 to 3400 tons; 262 destroyers (1912–18) of 1040 to 1215 tons, and 8 (1909–12) of 742 tons; 14 destroyer mine layers (1918) of 1191 tons; 6 fleet submarines (4 completed—2 building) of 2164 to 3000 tons; 53 submarines (1914–24) of 800 to 1106 tons; 65 submarines (1913–19) of 358 to 569 tons; 52 patrol boats (1918–19) of 500 tons, and 36 (1917–22) of 8 to 77 tons; 8 destroyer tenders (1901–23) of 750 to 13,925 tons; 8 submarine tenders (1890-1925) of 3580 to 13,400 tons; 2 aircraft tenders (1919-20) of 11,500 to 16,800 tons; 4 large mine layers (1899–1907) of 3800 to 4400 tons; 3 repair ships (1908–23) of 8100 to 10,000 tons; 5 supply ships (1913–20) of 8500 to 15,200 tons; 2 ammunition and cold-storage ships (1919) of 10,600 tons; 5 fuel ships, capacity 10,500 tons coal and 3000 tons oil; 16 fuel oil ships (1914–21) of 8000 to 11,100 tons capacity; 6 cargo ships (1905–25) of 3000 to 11,450 tons; 2 transports (1916–20) of 10,000 and 13,400 tons; 3 hospital ships (1896–1919) of 5917 to 10,100 tons; 35 fleet tugs of 450 to 1100 tons; 45 mine sweepers (1918–19) of 950 tons; 5 miscellaneous vessels of 1115 to 11,450 tons; and many old ships of no military value used for the training of seamen and naval reserves.

Uruguay. The navy department is a branch of the Ministry of War and Marine; its head is the Director of the Navy. The average personnel is said to be about 700. The vessels of the navy are 1 cruiser (1890) of 2050 tons; 1 torpedo gunboat (1910) of 1150 tons; 2 gunboats of 300 and 678 tons; 7 armed tugs of 60 tons and several smaller harbor craft.

Venezuela. The navy is a branch of the Ministry of War and Marine. The vessels of the navy are 1 small cruiser (1886—rebuilt 1900) of 1125 tons; 1 armed yacht of 750 tons; 2 gunboats of 200 and 300 tons, a sailing transport, and some small patrol vessels.

NAVIGATION. The art of navigation has been greatly improved in recent years by the invention of new devices and the further development of old ones. The net result is increased safety for shipping, especially in the vicinity of land, and greater ease and economy in handling it everywhere. Some of the most noteworthy of the newer devices are described in the following paragraphs. Much progress also has been made in the computations for determining the latitude and longitude of a ship's position at sea.

Radio Compass. This is a device for the reception of the electromagnetic waves used in radio telegraphy and for determining the direction of their source. Its operation is based on the fact that radio waves have most effect on an antenna or loop when its plane is in the direction of the propagation of the waves. If the waves are not deflected by intervening land or other objects, the plane will point toward the source. Great care is taken to prevent such deflection, but some always exists. This is eliminated from the final result in well-placed and carefully screened stations by determining a curve of error which gives the proper correction to apply to each observed bearing. The compass itself consists of a vertical coil pivoted on a vertical axis rising from the centre of a dumb compass which is set with its zero pointing north. The operator rotates the vertical coil until in the position which gives the minimum of sound in the head telephone. The pointer over the dumb compass then gives the direction of the transmitting station, subject to correction for error. Radio compasses are installed on board ship, as well as ashore, but the shore stations give the best results, as the deflecting objects on large vessels are numerous and troublesome. A ship may thus determine the direction of a shore station, or a shore station may determine the direction of a ship and give her the information by radio. Simultaneous reports from two shore stations may be plotted on a chart; gnomonic projection must be used if over 50 miles away; and the exact location of the ship may be determined, a most important matter in a heavy fog. A large number of shore stations, established on the east and west coasts of the United States and on the Great Lakes, are of great use in foggy weather or when a ship is beyond visual range of definable shore objects but within 150 miles of a compass station. See remarks on the Langevin device in the following paragraph on *Sonic Sounding*.

Sonic Sounding. Deep-sea sounding was, until about the end of the World War, effected by means of a long wire and a detachable sinker. The sonic sounding apparatus or automatic depth recorder was developed and perfected by Dr. Harvey C. Hayes, sound aide and physicist of the Naval Experiment Station at Annapolis, Md. It consists of an oscillator mounted in a tank in the stern of the ship and a hydrophone installed in the bow. Wires from both lead to the bridge or charthouse. Oscillator sound signals are made by the operator. The sound wave, traveling about 4840 feet per second, goes to the ocean bed, is reflected back, and is caught by the hydrophone receiver, which measures the elapsed time. This time interval, referred to a scale, gives the depth in fathoms. The United States Navy was the first to put the device to practical use. The U.S.S. *Stewart* ran a line of soundings from Newport, R. I., to Manila, P. I., and many other naval vessels have done similar work in the Atlantic and Pacific oceans. Apparatus of this sort will probably be applied in the near future to all large vessels as its value is so great they cannot afford to be without it. A sonic sounding apparatus, devised in 1927 by U. Langevin of the Collège de France, uses ultra sound waves (i.e., sound waves of too high frequency to be perceived by the ear). A tube set produces electric oscillations in a first circuit; these induce a similar condition in a second circuit connected to a plate of quartz. The latter, with its piezo-electric properties, acts as a condenser and transformer, changing electric oscillations to ultra-sound waves and the reverse. The orientation of the quartz plate gives the direction of an obstacle and the time element determines the distance. It thus acts as a radio compass as well as a sonic sounding device.

Earth Induction Compass. This is an instrument devised by Dr. L. J. Briggs and Dr. Paul R. Heyl of the U. S. Bureau of Standards. It is a development of their airplane compass but is larger and driven by an electric motor instead of wind cups. Two direct currents are generated by revolving two pairs of brushes at a velocity of 1400 revolutions per minute in the magnetic field of the earth. The instrument is so adjusted that when it is set for a compass bearing, the currents flowing from both pairs of brushes are equal and produce no effect on a galvanometer. If the instrument turns even slightly, one current becomes stronger, and the dial needle is deflected. On board ship, the generator is placed aloft or as far as possible from the magnetic field of the ship, but the control is in any convenient location. This compass, including its fittings, is comparatively inexpensive.

Gyro-Pilot. This apparatus, designed and developed by Elmer A. Sperry, the inventor of the Sperry gyro-compass, the Sperry gyro-stabilizer, and other important instruments, is a device for automatically steering a ship on any desired course. The course is set on the gyro-compass, and the gyro-pilot not only takes the place of the helmsman in steering but notes each yaw of the vessel as it begins and anticipates the movement by helm change more quickly than a helmsman can. Moreover, it takes cognizance of the speed of the yaw, when increasing and when dying away, and corrects the rudder angle accordingly. The sum total of its efficiency is considerable. It reduces the angle of yaw and the necessary helm angle, on both counts effecting an increase of speed with the same power, and in reducing the yaw cuts down the distance which the ship travels in steering a course between two fixed points.

Flettner Rudder. This is a German invention designed to do away with expensive steering gears and to replace them by a simple form of rudder worked by the streamline pressure exerted on the rudder by the water through which the vessel is moving. This is accomplished by a small auxiliary rudder, or deflector, which is set in a long jog in the after edge of the main rudder and operated independently of it. The combined effect of the deflector and the current of water imparts to the main rudder a large turning movement enabling it to act with prompt and efficient steering effect. The device has not yet found general application.

NEBRASKA. The fifteenth State in size (77,520 square miles) and the thirty-first in population; capital, Lincoln. The population increased from 1,192,214 in 1910 to 1,296,372 in 1920, a gain of 8.7 per cent; estimated population, 1928, 1,408,000. The white population rose from 1,180,293 (1910) to 1,279,219 (1920); Negro, from 7689 to 13,242. The State has a very large proportion of native white inhabitants and these increased from 1,004,428 to 1,129,567. The number of foreign-born whites decreased from 175,865 to 149,652. Urban and rural populations showed an increase, the former from 310,852 to 405,306 and the latter from 881,362 to 891,066. The growth of the principal cities was as follows: Omaha (q.v.), 1910, 124,096; 1920, 191,601; Lincoln, 43,973 to 54, 948; Grand Island, 10,326 to 13,947.

Agriculture. As Nebraska is one of the great agricultural States, its farms have been much affected by the World War and post-war conditions (see AGRICULTURE). The number of farms decreased from 129,678 in 1910 to 124,417 in 1920, but rose thereafter to 127,734 in 1925. The acreage in farms, however, decreased from 42,225,475 in 1920 to 42,024,775 in 1925, or by 0.5 per cent. Improved land in farms was 23,109,624 in 1920. The percentage of land used for agricultural purposes was 85.9 in 1920, and 85.5 in 1925. The total value of farm property doubled from $2,079,818,647 in 1910 to $4,201,655,992 in 1920, but declined to $2,874,477,959 in 1925. In interpreting these values, the inflation of the currency incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 67,766 were operated by owners; 669, by managers; and 59,299, by tenants. The comparative figures for 1910 were 79,250; 987; and 49,441. White farmers numbered 124,033 in 1920 and 129,216 in 1910, the native white farmers increasing from 93,509 to 99,441, while foreign-born farmers decreased from 35,707 to 24,592. Of the 384 colored farmers in 1920, 260 were Indians. Farms reported as under mortgage, 35,191 in 1920, numbered 38,279 in 1925. The number of dairy cows in 1920 was 516,716; in 1925, 229,461; "beef" cows, 1,121,564 in 1920, numbered 1,126,199 in 1925; swine, 3,435,690 in 1920, 4,235,638 in 1925; sheep, 537,217 in 1920, 646,783 in 1925. The estimated production of the chief farm crops in 1928 was as follows: Corn, 212,701,000 bushels; wheat, 69,919,000; oats, 78,936,000; rye, 3,486,000; barley, 14,018,000; potatoes, 10,080,000; hay, 5,877,000 tons; and sugar beets, 1,230,000 short tons. Comparative figures for 1913 are corn, 114,150,000 bushels; wheat, 62,325,000; oats, 59,625,000; rye, 1,740,000; barley, 1,760,000; potatoes, 5,664,000; and hay, 1,675,000 tons.

Manufactures. Nebraska is not one of the leading manufacturing States. It has, however, five cities with more than 10,000 inhabitants which in 1920 contained 21.8 per cent of the State's total population and in 1919 reported 81.7 per cent of the State's manufactured products. There were in the State, in 1909, 2500 manufacturing establishments; in 1919, 2884; in 1925, 1303; in 1927, 1277. Wage earners in manufactories numbered 36,521 in 1919; 27,108 in 1925; and 26,110 in 1927. The capital invested amounted to $99,901,089 in 1909 and $245,256,684 in 1919. The value of the products in 1909 was $199,018,579; in 1919, $596,042,498; in 1925, $442,083,752; and in 1927, $420,296,190. The large increase in value of the products about 1919 was due largely to the change in industrial conditions brought about by the War and cannot properly be used to indicate the growth in manufactures; but a normal increase in the number of wage earners and in the number of establishments indicated a decided growth in the manufacturing activities of the State. The principal manufacturing city is Omaha, which had, in 1909, 432 manufacturing establishments, with a product valued at $60,855,000; in 1919, 561 with $452,237,000; and in 1925, products valued at $339,004,000. Lincoln also is important industrially, having 167 manufacturing establishments in 1909, with a product valued at $7,010,000; in 1914, 195, with $10,025,000; and in 1919, 210, with $23,368,000.

Education. The passage of a succession of legislative acts has done much to improve educational conditions in Nebraska. The Legislature of 1919 passed a certification law standardizing the issue of teachers' certifications by establishing specific legal requirements; a law redistricting the State for the purpose of forming consolidated school districts; and a third making citizenship a necessary requirement for teachers in all public, private, denominational, and parochial schools. The Legislature of 1921 made it mandatory for every school district of the State to provide a minimum term of 9 months when it can be supported on a levy of $0.008 on $1 of the actual assessed valuation of the school district. The four State normal schools were designated as teachers' colleges by the 1921 Legislature and were authorized to confer the bachelor's degree on students completing the four years' college course. Midland College changed its location from Atchison, Kan., to Fremont, Nebr., and Bellevue College, formerly at Bellevue, Nebr., was discontinued. Enrollment in public schools in 1925–26 was: all grades, 326,934; elementary, 266,828; secondary, 60,106. Expenditure for public day schools was: current, $23,725,314; outlays, $5,623,498. Illiteracy in the State decreased from 2.5 per cent in 1910 to 1.8 per cent in 1920: among the native white population, from 0.8 to 0.5; among the foreign-born white, from 7.1 to 6.6; and among the Negro, from 8.5 to 5.7.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for departmental maintenance and operation, $10,974,948 (of which $1,314,251 was for local education); interest on debt, $37,462; permanent improvements, $9,208,833; total, $20,221,243 (of which $8,195,355 was for highways, $1,586,749 being for maintenance and $6,608,606 for construction). Revenues were $17,286,726. Of this, property and special taxes formed 37.4 per cent; departmental earnings and charges for officials' services, 10.4 per cent; sales of licenses and taxation of gasoline, 29.4 per cent. Property valuation was $3,321,741,538; State taxation thereon, $5,849,739. State funded debt was nil.

Political and Other Events. During much of the time subsequent to 1914, control was balanced closely between the Democratic and Republican parties. In 1914 John H. Morehead, the Democratic candidate, was elected governor, and the Democrats elected their candidates for Congress in three districts and the Republicans theirs in the others. A woman-suffrage amendment was defeated in this election. In 1916 the State was Democratic, both nationally and locally. Keith Neville, Democrat, was elected governor and Gilbert M. Hitchcock was reëlected to the Senate. For President, Wilson received 158,827 votes; Hughes, 117,771. The Prohibition amendment was carried. In 1918 the Republican nominees were elected to the Legislature by large majorities. Samuel R. McKelvie, Republican, was elected governor. An amendment to the constitution was adopted, depriving so-called "first-paper declarants," six months resident in the State, of the right to vote. The voters also decided in favor of holding a convention to draft and submit a new State constitution. In October, 1919, a lynching riot occurred in Douglas County during which the county courthouse was damaged by fire, with a loss of nearly $1,200,000. An administrative code, consolidating government under six department heads, was enacted in 1919. Governor McKelvie was reëlected in 1920. For President, Harding received 247,498 votes; Cox, 119,608. During 1920 a constitutional convention adopted 41 amendments to the constitution which were voted on in a special election on September 22. Under these amendments, the English language was required as a teaching medium in all common schools; the governor was empowered to appoint heads of the executive departments, with the consent of the majority of both Houses; a budget system was created; the concurrence of five out of seven judges of the Supreme Court was made necessary for declaring a law unconstitutional; and no appropriations were to go to sectarian institutions not owned and controlled by the State. In 1922 Charles W. Bryan, Democrat, brother of William J. Bryan, was elected governor. Robert B. Howell, Republican, was elected United States Senator, defeating Gilbert M. Hitchcock, Democrat. Classified taxation of intangibles was adopted in 1921, but largely modified in 1925. A bank guarantee fund commission was created in 1923 to handle the fund created in 1909. The fund was reported depleted in 1928. Adam McMullen was elected governor in 1924. For President, Coolidge received 218,585 votes; Davis, 137,289; LaFollette, 106,701. In 1926, McMullen was again elected governor. In 1928 the vote for President was: Hoover, 345,745; Smith, 197,959. Arthur J. Weaver, Republican, was elected governor.

Legislation. The Legislature of 1917 prepared the way for a revision of the State constitution. The right of women to vote was extended to all elections. Provision was made for the election of the judiciary and certain school officers by nonpartisan ballots. A special session of the Legislature was held in 1918 to deal with issues arising from the War. The so-called Mockett Law, under which the teaching of German was made compulsory in the schools, was repealed. The Legislature in 1919 passed a measure consolidating several boards and commissions. The banking laws were amended and so were the "blue sky" law and the workmen's-compensation law. A bill was passed for the erection of a new State capitol. The Legislature of 1921 passed measures designed to prohibit aliens' acquiring title to land in the State; provided for the preparation and presentation of a State budget and for the establishment of coöperative associations; and declared English the official language of the State, prohibiting discrimination against its use by religious and social bodies. The school age was raised from 14 to 16 years under certain conditions and the age of minority for women to 21 years. A special session of the Legislature was held in April, 1922, to reduce the appropriations made by the Legislature of 1921. The total amount of reduction made was about $2,500,000. In 1923 the Legislature passed a measure forbidding the marriage of persons afflicted with certain diseases. In 1927 the criminal code was made more stringent as to robbery.

NEBRASKA, University of. A State institution for the higher education of men and women at Lincoln, founded in 1869. With the exception of the War years, the student enrollment increased steadily from 4133 in 1914, to 6484 in the autumn term of 1928, with 3320 students in the summer sessions of 1928. The faculty showed a corresponding increase during the period of from 283 to 360 members, and the library from 111,000 to 223,885 volumes. The income from the university rose from $1,000,000 to $4,135,390. Among the larger number of new buildings added during the period was an animal pathology laboratory, in 1918, when a special State appropriation was made for research in animal diseases. During 1919 and 1920, the following buildings were erected or acquired: On the city campus, Social Sciences Hall, Teachers' College, Ellen Smith Hall, the chancellor's residence, and seven students' houses; and on the farm campus, quarters for an agricultural engineering department, animal pathology and hygiene, and a barn; at the medical college at Omaha, a new laboratory, a nurses' home, and a steam plant. A photographic studio was added in 1921, and in 1923 a beef cattle barn and a new stadium for athletics and public exercises, from funds raised by private subscription. During 1926–27 a new hospital unit was completed at Omaha, and the gymnasium at Curtis remodeled, while new buildings under construction in 1928 included Andrews Hall, to house the college of dentistry and the departments of English, classics, and Germanic languages, on the city campus; a nursery school, a service building, and departmental greenhouses on the agricultural college campus; dormitories at Nebraska Agricultural School at Curtis; and a residence and barns at the Agronomy Farm. An additional gift of $10,000 for the development of the University Museum was made by the Hon. C. H. Morrill in 1927–28. Chancellor, Edgar A. Burnett, D.Sc.

NEBULÆ. See Astronomy.

NEGRI SEMBILAN. See Malay States, Federated.

NEGRO, Economic Status of the. In 1910 there were 9,827,763 Negroes in the United States; in 1920 the Negro population of the country had increased to 10,463,131, when it represented 10 per cent of the country's total population. The relative numerical importance of the Negro appeared to be on the decline. In 1790, Negroes made up one-fifth of the population, but as a result of the heavy European immigration following the eighties of the last century, Negro increases from decade to decade fell off. The natural increase of the Negro in the country (surplus of births over deaths) has slowed up, too, though this increase is not smaller than that for the whites. In the decade ending 1890, the natural increase in Negro population was 14 per cent over the previous decade; by 1920, the natural increase had dropped off to 6½ per cent. It is interesting to note that during the period 1915–23, there were actually more Negro urban deaths than births, but this fact was attributed by Negro statisticians to the period of adjustment following the heavy migrations to the cities. In 1920 nine million of the ten and one-half million Negroes in the country lived in the 16 Eastern and Southern States of Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Texas, Oklahoma, and the District of Columbia. There were 15 Northern and Western States where the Negroes did not constitute as much as 1 per cent of the population; but in Alabama and Louisiana, 38 per cent of all the inhabitants was Negro; in Georgia, 42 per cent; and in Mississippi and South Carolina, more than 51 per cent.

Despite the heavy migrations to the cities following 1916, the Negro population of the United States was still largely rural. Two-thirds of all the Negroes in the country lived in rural areas; in the South, the ratio was three out of four. In fact, 6,660,000 Negroes still lived in the rural areas of the South. In the North, however, only one Negro out of six was a rural dweller. This last fact indicates the outstanding phenomenon in Negro demography since 1914. As a result of the stoppage of immigration brought on by the World War and with the heavy demands for labor made by the war-time industries, there began a trek, on the part of the Negro, from the country to the cities and from the South to the North. During the decade 1910–20, the Negro population in the cities of the North and the West increased from 830,000 to 1,309,000. The outstanding fact, however, was that the urban Negroes increased in such large numbers. By 1920 the number of urban Negroes had swelled to 3,500,000 and by 1928 the figure was estimated to be 4,000,000. During the last 25 years, the Negro population in the cities has apparently actually doubled. By 1920 there were 24 cities in the country that had more than 25,000 Negroes each. Between 1910 and 1920, the Negro population of Philadelphia, for example, had increased 50,000; that of New York had increased 61,000; that of Chicago, 65,000; and Detroit's Negro population showed an increase of 600 per cent.

Prior to the northward migrations, which became pronounced in 1918, the Negro had already found himself being hard-pressed by the competition of white labor in the Southern cities. In other words, the Negro found himself perceptibly being pushed back into the rural areas and even here his labor supply exceeded the demand. The War miraculously changed the economic status of the Negro, for he began to constitute the labor reserve that the war-time industries of the North needed so badly. The result was the movement into the cities of the North, sometimes in the rôle of strikebreaker, more often as unskilled labor. The Negro first went into the lowest kind of work: road building, railway maintenance, steel and iron, etc. At the present time, 10 per cent of all the iron molders in Chicago are Negro; in Detroit, there were 11,000 Negro workers in the Ford plants alone before 1928.

The distribution of Negro workers throughout the country would seem to show concentration in particular industries. Authorities declare that they make up 21 per cent of the building laborers, 60 per cent of the tobacco workers, 14 per cent of the iron and steel laborers, 89.5 per cent of the turpentine laborers, etc. They have, however, fewer than their population proportion of carpenters (3.8 per cent), iron molders (5.5 per cent), coal miners (7.7 per cent). It would seem that the Negro's industrial position is this: he constitutes the needed labor reserve of the country and it has been estimated that the country needs annually one million new recruits in industry. Whether the Negro will reach the status of the skilled white laborer, it is difficult to say. In the South, white labor is distinctly hostile to the Negro and it is as difficult today to find a Negro in the building trades, for example, as before the War it was hard to find a white laborer doing this kind of work. The American Federation of Labor has talked of unionizing the Negro, but achievement in this direction has been small. At the present time, the status of the Negro is determined by existing race prejudice and as long as the Negro is considered barred because of his color, so long will his economic lot be an unhappy one.

The Negro has been seeking to lift himself by the bootstraps to some extent and the census of 1920 showed a fairly large Negro middle class. In 1920 the census listed 80,183 Negroes in the professions, there being 950 lawyers, 3495 physicians, 35,563 teachers, etc. In 1927 there were in the country 28 Negro insurance companies with assets of $11,170,791; in 1926 there were 33 savings and commercial banks; and 30 to 50 building and loan associations conducted by Negroes. The 33 banks showed, as of July 31, 1927, total assets $15,292,820. An estimate in 1928 put the number of Negro business enterprises in the country at 70,000. There exist various national commercial organizations such as the National Negro Business League, the National Association of Bankers, the National Negro Hotel Association, the Negro Press Association (which represents more than 400 Negro weeklies), etc.

Some mention should be made of welfare work among the Negroes. At the present time, there exists two national organizations, the National Association for the Advancement of Colored People and the National Urban League. The first has concerned itself with the civil liberties of the race and the second with the problems of employment, housing, and recreation. The Rosenwald Fund has achieved wonders in furthering the cause of education among Negroes in rural areas. From 1913 to September 1928, as a result of the financial aid of this fund, 4148 school units were erected. The total cost of these buildings has been $20,378,472 of which the Rosenwald Fund contributed $3,342,752 and a little larger sum came from the Negroes themselves. See LYNCHINGS.

NEGRO EDUCATION. See EDUCATION IN THE UNITED STATES.

NEGROES IN AMERICA. See NEGRO, ECONOMIC STATUS OF THE; UNITED STATES, *Population*; LYNCHINGS; and RACE PROBLEMS IN THE UNITED STATES.

NEIHARDT, JOHN GNEISENAU (1881–). An American writer, born at Sharpsburg, Ill. He studied at the Nebraska Normal School and from 1901 to 1907 lived among the Omaha Indians to study their character and history. His books include *The Divine Enchantment* (1900); *The Lonesome Trail* (1907); *The Dawn Builder* (1911); *The Quest*, poems (1916); *The Song of Three Friends* (1919); *Two Mothers*, a drama (1921); *The Song of the Indian Wars* (1925); *Poetic Values* (1925); *Collected Poems* (1926); *Indian Tales and Others* (1926). *The Song of Three Friends* was awarded a prize by the Poetry Society of America as the best volume of verse of 1919. He edited several collections of verse and contributed frequently to magazines. In 1921 he was made poet laureate of Nebraska by act of the Legislature and in 1923 was appointed professor of poetry in the University of Nebraska. Since 1926 he has been literary editor of the St. Louis *Post-Dispatch.*

NEILSON, WILLIAM ALLAN (1869). An American college president, who was born at Doune, Scotland, and graduated at the University of Edinburgh (A.M., 1891). For five years he was a teacher in Scotland and at Toronto, Can. Later, he was associate in English at Bryn Mawr, instructor at Harvard, professor of English at Columbia (1905–06), and Harvard (1906–17), and president of Smith College (1917–). He served as exchange professor at the University of Paris (1914–15). He is the author of *Origins and Sources of the Court of Love* (1899); *Essentials of Poetry* (1912); *The Facts about Shakespeare* (1913); *Burns, How to Know Him* (1917); *A History of English Literature* (1920). He has edited *Milton's Minor Poems* (1899); *Shakespeare's Complete Works* (Cambridge Poets, 1906); *The Types of English Literature* (series beginning 1907); *The Tudor Shakespeare* (1911); *The Chief Elizabethan Dramatists* (1911); and *Chief British Poets in the Fourteenth and Fifteenth Centuries* (1916), and has been associate editor of *The Harvard Classics* (1909), *Harvard Classics Shelf of Fiction* (1917), *Selections from Chaucer* (1921).

NEJD, EMIRATE OF. See ARABIA.

NELSON, KNUTE (1845–1923). An American lawyer and legislator (see VOL. XVI). He was a member of the United States Senate from Minnesota for five successive terms and was reelected for the term ending 1925. At the time of his death, on Apr. 28, 1923, he was the oldest member of that body in point of service.

NEO-LAMARCKIAN THEORY. See HEREDITY.

NEON LAMP. See ELECTRIC LIGHTING.

NERNST, nĕrnst, WALTER (1864–). A German physicist (see VOL. XVI). He was awarded the Nobel Prize for physics in 1920. His later publications included *Die theoretischen und experimentellen Grundlagen des neuen Warmesatzes* (1918).

NESBIT, EDITH. See BLAND, EDITH NESBIT.

NETHERLANDS, THE, or HOLLAND. A kingdom situated on the North Sea, lying between the Kingdom of Belgium on the south and west and Germany on the east. Its area is 13,205 square miles, of which 617 consist of water. The estimated population Dec. 31, 1927, was 7,625,938, an increase of 760,624 over the census of 1921. The density of population per square mile amounted to 605.1. The urban population constituted 47.02 per cent of the whole, and the rural, 52.98 per cent. Emigrants in 1927 amounted to 3340, most of whom departed from Dutch ports for North America. The royal family and most of the inhabitants are members of the Reformed Church, which is under Presbyterian government, but complete liberty of conscience is granted to all religions. At the census of 1920, there were 2,826,633 adherents of the Dutch Reformed Church; other Protestants numbered 832,164; Catholics, 2,444,583; Jansenists, 10,461; Jews, 115,222; other known creeds, 635,241. The chief cities, with their population Dec. 31, 1927, are Amsterdam, 734,844; Rotterdam, 571,842; The Hague, 416,179; Utrecht, 151,660; Haarlem, 113,304; and Groningen, 101,310.

Agriculture. The total area of agricultural land in hectares (1 hectare = 2.47 acres) in 1927 was 2,519,393 (in 1913, 2,186,591); arable land, 890,687 (882,255 hectares in 1913); meadows, 1,272,743 (1,221,876 in 1913); gardens and orchards, 105,677 (81,460 in 1913); forests, 250,286 (257,939 in 1913); uncultivated land, 747,849 (515,143 in 1913).

Live stock and poultry (1921 and 1910): horses, 363,668 and 327,377; cattle, 2,062,771 and 2,026,943; sheep, 668,211 and 889,036; pigs, 1,519,245 and 1,259,844; chickens, 9,660,800 and 6,709,593.

CROPS: AREA AND PRODUCTION

	Area (thousands of acres)		Production (thousands of units—bushels, except as indicated)	
Crop	1909–1913	1927	1909–1913	1927
Wheat	138	150	4,824	5,096
Rye	557	482	16,047	13,594
Barley	68	66	3,271	3,027
Oats	346	366	19,434	22,873
Potatoes	411	425	87,573	90,021
Sugar beets	145	171	1,794 [a]	1,852 [a]
Flax	33	27	17,276 [b]	12,125 [b]

[a] Unit, metric ton.
[b] Unit, pound of fiber.

Mining and Manufacturing. Mining is limited in the Netherlands to coal mining in the Province of Limburg. The coal production was 10,694,000 metric tons for 1928, against 4,570,000 for 1922 and 3,018,000 in 1917. State-owned mines produced about 66 per cent of the total. In 1927 there were 987 dairies. The production of butter in 1927 amounted to 187,636,000 pounds, and of cheese, 277,667,000 pounds. The beet-sugar refineries numbered 18 in 1926, while the total sugar production amounted to 545,037 metric tons for 1926. In 1926 there were 30 potato-flour factories, 15 cardboard factories, and 17 margarine factories. The latter produced 296,263,000 pounds of margarine.

Communications. Length of railways in 1927 was 2284 miles, as compared with 2325 in 1913. All the railway lines are operated by private companies, including 1348 miles owned by the Government. In 1927 the merchant marine consisted of 1156 vessels of 100 tons or over with a capacity of 2,654,003 gross tons. In 1927, 24,710 vessels of 33,716,000 net registered tons entered the ports of the Netherlands and 24,870 of 33,637,000 tons cleared.

Commerce. Exports in 1928 were valued at $794,474,000 and imports at $1,073,556,800. The value of exports in 1927 was 74.5 per cent of the import figure, the highest ratio since 1917. The five leading imports in the order of value in 1928 were textiles, cereals and flour, iron and steel, timber, and coal; the five leading exports, cotton piece goods, butter, coal, cheese, and margarine. The value of trade with leading countries in 1928 (giving Dutch import and export figures, respectively) was: Germany, $292,058,400 and $187,095,600; Great Britain, $100,975,200 and $172,775,600; Belgium, $119,948,400 and $68,840,800; United States, $106,302,800 and $27,610,400; Dutch East Indies, $56,001,200 and $70,153,200; France, $48,339,600 and $49,006,800.

Finance. The budget for 1929 carried proposed expenditures under the ordinary service of 593,651,000 florins ($237,460,400), practically the same as those of the preceding year, while the receipts, estimated at 553,127,000 florins ($221,250,800), were somewhat higher, despite tax reductions that became effective in 1928. Since 1925 actual or anticipated receipts under the ordinary service have been well in excess of the expenditures. Under the extraordinary service, also known as the capital service, proposed expenditures for 1929 totaled 189,221,000 florins ($75,688,400)—a heavy decline as compared with those of 1928—and the estimated receipts were also lower, at 44,152,000 florins ($17,660,800). The budget provided, however, for the redemption and conversion of the 1923 "C" dollar loan, the only foreign loan outstanding.

The total public debt on Sept. 1, 1928, stood at 2,813,127,000 florins ($1,125,250,800), comprising a floating debt of 190,891,000 florins ($76,356,400) and a consolidated debt of 2,622,236,000 florins ($1,048,894,400).

History. When the World War broke out, Holland prudently decided to bring its whole military strength into the field. By Aug. 4, 1914, 200,000 men were under arms, and as hostilities progressed and the work of policing the coasts and the frontiers increased, more units were called up, so that at its height, the Dutch Army totaled 400,000 men. The expense was enormous for so small a country. In December, 1914, a loan of $100,000,000 had to be floated to meet the costs of the establishment. In all, a debt of more than $750,000,000 was incurred which could be wholly attributed to the War, i.e., for the upkeep of the army and navy, the care of refugees and interned soldiers, etc. In 1915 all workmen engaged in the manufacture of munitions were placed under martial law, and a check was put on their goings and comings; later in the year, the ever-present threat of invasion prompted the Government to declare a state of siege in some of the communes of north Holland and also in some parts of Amsterdam. The feeding of the population and the providing of industry with the raw materials necessary for its operation were perhaps Holland's most pressing problems. Normal activity was dependent on keeping the regular channels of trade clear.

Having become a country of truck farmers and cattle breeders, Holland depended on Germany for her coal and iron and on France, Great Britain, and the United States for her foodstuffs and textiles. A brisk overseas and land trade was carried on with all these, as well as with Switzerland, Italy, and Austria-Hungary. The War curtailed intercourse on land, except with Germany; and the British blockade and the German submarine policy, as well as American seizure of Dutch ships in 1918, played havoc with the Dutch merchant marine. More and more, Holland was put at the mercy of belligerents, and only the conclusion of the War checked the progress of the famine gripping her people. Extraordinary administrative measures had to be taken. In 1914 and 1915, the export of cereals and flour, cotton, rice, and linseed was prohibited. In 1915 the Netherlands Overseas Trust was formed for the purpose of handling imports. Before Great Britain and France would give their consent to the maintenance of the usual trade relations, it was necessary for the Trust to give assurances that the articles imported would not be reshipped to Germany.

In 1916 the scarcity of flour forced the prohibition of the baking of white bread; maximum prices for cereals were fixed. The dislocation of trade with the Dutch East Indies compelled the Government to maintain a strict surveillance over the distribution of foodstuffs and fodder. What little prosperity there was grew out of the maintenance of relations with the Central Powers; Germany and Austria took Holland's vegetables and dairy products, and Germany, in turn, sent coal and iron.

In a situation of such complex relations, the rise of irritations was inevitable. Clashes with Germany and the Allies were frequent. During 1915–17, notes were interchanged with Germany over the violation of Dutch neutrality by the landing of airships, the stopping of merchant vessels, and the mining and torpedoing of Dutch ships; in 1918, feeling ran high over the British and American seizure of Dutch ships. Not until the Armistice did Holland dare relax her vigilance, and then the threat of mutiny among the soldiers hastened demobilization sooner than the Government might have wished. The problem of the returning soldiers, in view of the disorganization of industry and the dearth of housing, contributed greatly to the trials of the state. (At the end of the War, there was a shortage of 35,000 houses in Amsterdam alone. However, work on new ones was quickly undertaken, and by the close of the year 1922, 20,000 had been built or were nearing completion.) Despite these local problems, the Dutch worked unsparingly in the interests of their less fortunate neighbors. The invasion of Belgium sent into Holland some 1,200,000 refugees who were clothed and fed for varying lengths of time. By the end of the War, there were still about 30,000 such refugees partaking of the hospitality of the Dutch. Interned soldiers at times numbered as many as 50,000, most of them Belgians, but also many Russian and German deserters. The Dutch Red Cross did yeoman work in facilitating the exchange of British and German prisoners. In all these humanitarian activities, the Government expended $25,000,000, while private contributions easily reached a similar amount.

The War years also witnessed civil and political developments of extraordinary importance. By the Electoral Reform Act of Dec. 12, 1917, universal suffrage and proportional representation were established. In 1917, by a constitutional amendment, the Government was ordered to provide for the upkeep of denominational as well as secular schools. As a result of an increasing labor agitation during the War, a series of enactments was promulgated in 1919 which aimed at better social and working conditions. By these laws, the eight-hour day was assured in factories and offices; workmen's insurance was extended to all industries except agriculture and navigation; the general supervision of health activities was turned over to a state health council; a council of labor was erected to advise generally all administrative departments in the conduct of labor affairs; but the inability of affairs to mend, in spite of paternalistic legislation, increased the insurgency of the labor classes.

In 1918 and 1919, under the leadership of Troelstra, the Social Democrats pressed for a political revolution, some even demanding the abdication of the Queen. Continued hard times brought on a serious dock strike during February–April, 1920, and such outbreaks were frequent in the subsequent years. The unemployed on Jan. 1, 1924, numbered 102,225, but by July 30, 1927, this figure fell to 47,200. Meanwhile, the membership of the Socialist Party increased, so that on Mar. 31, 1928, it numbered 52,206.

Incidentally, the strike situation became so serious that a law for compulsory arbitration of labor disputes was passed. It went into effect on May 4, 1926.

Politically, the threat of proletarian control forced the union of most of the elements of the Right, with the result that a Catholic government was constituted in 1918, for the first time, under Jonkheer Ruys de Beerenbrouck. The elections of 1922 for the second chamber returned 32 Catholics, 20 Social Democrats, 16 Anti-revolutionists, and some others, so that the Beerenbrouck ministry continued in power by the support of the Right bloc.

The question of the defense of the Dutch East Indies agitated the people profoundly during 1920–23. In 1921 the Queen's address from the throne included a request for the strengthening of the fleet, and the proposal was backed up by the resolution of the Indian Council. In 1922 the Government laid before the second chamber an ambitious programme of naval construction. See NAVIES OF THE WORLD. The measure was stubbornly contested in 1922 and 1923. Its opponents showed that it meant an additional cost to Holland of $14,000,000 yearly for 12 years, and to the colonies of $20,800,000 for the same term. Nevertheless, it was only after a bitter struggle that profoundly shook the whole kingdom that the naval bill was rejected, Oct. 26, 1923, by a vote of 50 to 49. The Ruys de Beerenbrouck cabinet then resigned. The inability of the three parties of the Right to reach an agreement compelled the Queen, after a three-month suspension of governmental activities, to recall de Beerenbrouck in January, 1924.

The next elections took place on July 1, 1925, and the slim majority of the bloc of Catholics, Colonist Anti-revolutionists, and Christian Historicals was cut by five more votes. Thereupon, de Beerenbrouck resigned, to be succeeded by the Anti-revolutionist, H. Colyn. On Mar. 8, 1926, Colyn was replaced as Premier by Jonkheer Dr. D. J. de Geer, leader of the Christian Historical Party. The next regular quadrennial elections, on July 1, 1929, left the relative position of the more important parties in the Lower House practically unchanged. The Catholics retained their 30 seats; the Anti-revolutionists lost one, and retained 12; the Christian Historicals kept their 11; and the Socialists again held 24.

A Frisian nationalist movement for cultural autonomy assumed importance in northern Holland during 1928. A Pan-Frisian Congress, in which the inhabitants of German Friesland were also represented, was established, and organizations for teaching the "native" language to Frisian children were formed. Demands also were made for a chair in Frisian philology at a Dutch university.

Holland's post-war foreign relations were stormy. On Nov. 10, 1918, the Dutch were unpleasantly surprised by the presence of the former Kaiser in their midst. His stay at Amerongen was unmolested, and in spite of demands from the Allies for his extradition in 1920, the Dutch government refused to yield him up. All other questions yielded precedence to the demand of Belgium for the revision of the treaties of 1839. Belgium, in effect, desired sovereignty over the western Scheldt, as well as the district of southern Limburg on the east. Belgium sought the left bank of the Scheldt for the further development of Antwerp; Limburg was desired for strategic and economic reasons. For the consideration of the question, the Supreme Council in 1919 created an international commission, but it circumscribed that body's activities by indicating that it would refuse to countenance any transfer of territory. The disputants were advised to come to an amicable understanding over the matter of waterways. In 1920 an agreement was reached on the administration of the Scheldt, the Antwerp-Meuse-Rhine canal, and two other water systems. Further difficulties arose, however, with Belgium's insistence that the disposition of the Weilingen at the entrance to the Scheldt, for the pass controlled the port of Zeebrugge, be also considered.

The Foreign Ministers of the two countries signed a convention on Apr. 3, 1925, which closed the Scheldt to warships in war time, but left it open to all other vessels both in war and peace. The Weilingen question, however, was not broached in the agreement. Then a treaty concerning navigation on the Scheldt and the Rhine was rejected by the Dutch Senate by a vote of 33 to 17, on Mar. 24, 1927. The Senate feared that the treaty would help Belgian Antwerp prosper at the expense of the Dutch city of Rotterdam.

There were other international concerns to occupy the attention of the Dutch in this period. In 1920 Holland joined the League of Nations. On Dec. 23, 1920, after heated debate, the Parliament voted to resume relations with the Vatican. These had terminated in 1907. In the same year, although it formally refused to open commercial relations with Russia, the Foreign Office indicated that it would not interfere with business transactions. In 1922 Holland welcomed to The Hague the Permanent Court of International Justice which had been created by the League of Nations. In 1926 and 1927, the authorities were faced by serious Communist revolts in Sumatra and the Dutch Indies, but relative quiet was restored in 1928. On Mar. 16, 1925, the Dutch Senate ratified a treaty of Aug. 21, 1924, giving the United States the right to search Dutch vessels for liquor outside the three-mile zone. A dispute between Holland and the United States over the sovereignty of the island of Las Palmas, situated between the Dutch East Indies and the Philippines, was referred, on Oct. 5, 1925, to Judge Max Huber (Swiss), President of the International Court, for settlement. The United States claimed the island, which is two miles long, three-quarters of a mile wide, and has a population of 700, as part of the Spanish cession of 1898. The arbitrator decided in favor of Holland on Apr. 4, 1928. See DUTCH EAST INDIES.

NETHERLANDS INDIA. See DUTCH EAST INDIES.

NEUILLY, TREATY OF. See PEACE CONFERENCE AND TREATIES.

NEUMANN, noi'män, ALFRED (1895–). A German writer of short stories, novels, plays, and essays, born in Lautenburg, West Prussia. He won the Kleist Prize with his novel *Der Teufel* (1926). His other works include *Die Lieder vom Lächeln und der Not*, poems (1917); *Lehrer Taussig*, essays (1923); *Die Brüder*, novel (1924); *Der Patriot*, drama (1926); and *Rebellen*, novel (1927). A number of his works were translated into English and several plays were produced in England and America.

NEUROSES. See PSYCHOLOGY, ABNORMAL and PSYCHOANALYSIS.

NEUTRODYNE. See RADIO TELEPHONY.

NEVADA. The sixth State in size (110,690 square miles) and the forty-eighth in population; capital, Carson City. The population decreased from 81,875 in 1910 to 77,407 in 1920, a loss of 5.5 per cent. The white population fell off from 74,276 to 70,699; Indian, from 5240 to 4907; Negro, from 513 to 346; native white, from 56,277 to 55,897; foreign-born white, from 17,999 to 14,802. The urban population of the State rose from 13,367 to 15,254, while the rural population decreased from 68,508 to 62,153. The only important city in the State is Reno, with 10,867 inhabitants in 1910, 12,016 in 1920.

Agriculture. Agriculturally, Nevada is one of the least important States, although its agriculture is second only to its mining and no other industry approaches it. The number of farms increased 17.6 per cent, or from 2689 in 1910 to 3163 in 1920 and rose farther to 3883 in 1925. The acreage in farms decreased from 2,714,757 in 1910 to 2,357,163 in 1920, but rose to 4,090,586 in 1925. The improved land in farms totaled 594,741 acres in 1920. The percentage of land used for agricultural purposes was 3.9 in 1910 and 5.8 in 1925. The total value of farm property rose from $60,399,365 in 1910 to $99,779,666 in 1920 and remained almost unchanged in 1925, at $98,086,358; the average value per farm was $22,462 in 1910, $31,546 in 1920, and $25,260 in 1925. In interpreting these values, the currency inflation incident to the World War is to be taken into consideration. Of the total number of farms in 1920, 3463 were operated by owners; 114, by managers; and 306, by tenants. The comparative figures for 1910 were 2175; 181; and 333. White farmers in 1920 numbered 2944, compared with 2528 in 1910. In 1920 native white farmers numbered 2060, compared with 1661 in 1910; foreign-born white farmers, 884, compared with 867. Colored farmers in 1920 numbered 219, of whom 208 were Indians; in 1910, 161, of whom 148 were Indians. Farms reported as under mortgage, 884 in 1920, numbered 1164 in 1925. The number of dairy cows was 16,482 in 1920; 17,380 in 1925; "beef" cows numbered 189,960 in 1920; 173,695 in 1925; sheep, 880,580 in 1920; 1,183,572 in 1925. The area under irrigation in 1919 was 561,447 acres; in 1909, 701,833. The estimated production of the chief farm crops in 1928 was as follows: Wheat, 482,000 bushels; barley, 440,000; potatoes, 840,000; and hay, 733,000 tons. Comparative figures for 1913 are wheat, 1,081,000 bushels; barley, 492,000; potatoes, 1,760,000; and hay, 646,000 tons.

Mining. The most important mineral products of the State are copper, silver, gold, and lead. Silver, which was formerly the most important mineral, showed a great decline subsequent to 1914, when the production was 15,455,491 fine ounces; 1916, 13,837,525; 1917, 11,269,969; 1918, 10,000,599; 1919, 6,863,580; 1920, 7,745,093; 1921, 7,083,782; 1922, 8,619,587; and 1926, 6,518,983. The value of the gold produced also decreased sharply in this period; the output in 1914 was valued at $11,481,188; 1918, $6,619,937; 1920, $3,566,728; 1922, $3,297,384; and 1926, $3,625,461. Copper showed an increase in the years affected by the World War, but declined sharply subsequently; the production in 1914 was 60,986,450 pounds; 1916, 105,116,813; 1918, 116,316,441; 1920, 50,559,763; 1921, 10,961,491, and 1926, 101,827,937. The small output in 1921 was due chiefly to the business depression, which caused a decrease in the demand for copper. The production of gypsum during the period ranged from 100,000 up to 350,972 short tons per year, with a value of $1,527,235 in the year 1926. In addition to the minerals mentioned, the State also produces lead, manganiferous ore, and zinc in important quantities. The total value of the mineral products in 1927 was $26,753,295; $25,648,961 in 1920; $24,457,735 in 1919; $51,080,169 in 1918, and $29,984,338 in 1914.

Education. The educational problem of Nevada is made difficult by the State's sparse population and its vast area. In spite of these difficulties, the progress of education has persisted. Efforts have been in part directed toward the consolidation of schools and the development of vocational education. The Legislature passed many measures which greatly aided the administration of the educational system. Vocational education is administered by the Director of Vocational Education and Industrial Rehabilitation, who is also supervisor of trade and industrial education. The object in vocational education has been to reach, through a coöperative spirit, as large a number as possible of persons who may be benefited by the various types of instruction offered, in order that the productive industries of the State may be encouraged and the intelligence of those employed in the trades and other industrial pursuits may be increased; and efforts toward these objects have been successful. The cost of education in the State from 1912 to 1920 increased greatly; in 1912 the cost per pupil was $76.38; in 1925–26, $125.35, a figure exceeded only in three other States. A high-school system was developed efficiently. The total enrollment in the schools in 1913 was 13,622; in 1925–26 it was 15,614; of this number, 12,804 were in elementary classes and 2810 in secondary. The expenditure on public day schools in 1925–26 was: current, $1,810,735; outlays, $146,491. The high expenditure per capita of pupils was ascribable to the sparsity of population, which rendered services costly by making it necessary in many instances that they be supplied to small groups of pupils. Illiteracy in the State decreased from 6.8 per cent in 1910 to 6.7 per cent in 1920. Among the native white population, it increased from 0.3 to 0.5 per cent; among the foreign-born white, from 7 to 8.5; among the Negro, it decreased from 6 to 4.7.

Finances. State expenditures in the year ending Dec. 31, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of departments, $2,123,925 (of which $449,664 was for local education); for interest on debt, $72,102; for permanent improvements, $1,634,662; total $3,830,599 (of which $1,847,344 was for highways, $402,723 being for maintenance and $1,443,621 for construction). Revenues were $4,062,117; of this, property and special taxes formed 33.8 per cent; departmental earnings, 6.5 per cent; licenses, including gasoline-sale tax, 12.7 per cent. Assessed property valuation was $203,070,872; State taxation thereon, $1,229,171. Net State indebtedness on Dec. 31, 1927, was $1,650,376.

Political and Other Events. In 1914 the Democratic candidate for governor, Emmet D. Boyle, was elected. Senator Newlands was reelected, while the Republicans elected a Representative to Congress. An amendment providing for woman suffrage was adopted. In 1916 the Democrats elected Key Pittman as Senator.

In the presidential voting, Wilson received 17,776 votes; Hughes, 12,127. The Democrats in 1918 reëlected Governor Boyle. Senator Newlands died in 1918 and Charles B. Henderson was appointed. The Republicans in 1920 elected Oddie as Senator. In the presidential voting, Harding received 15,479 votes; Cox, 9851. In the elections of 1922, the Democrats elected every State official except one. James W. Scrugham was elected governor and Senator Pittman was reëlected to the Senate. The Supreme Court in 1923 declared unconstitutional the Prohibition Act passed by the Legislature in that year. In 1924 the presidential vote was: Coolidge, 11,243; LaFollette, 9769; Davis, 5909. Fred W. Balzar, Republican, was elected governor in 1926. In 1928 Hoover, for President, received 18,327 votes; Smith, 14,090.

Legislation. The most important acts of the Legislature since 1914 are noted below. The Legislature, in February, 1915, passed a so-called "easy divorce bill," restoring the six months' residence requirement which had been abolished by the Legislature of 1913. The Legislature of 1919 provided for a budget and required an eight-hour day on public works, and passed statutes defining and punishing criminal syndicalism and sabotage. In 1921 enactments created town-planning commissions for incorporated cities and towns and declared oil pipe lines to be common carriers. A bill for capital punishment by lethal gas instead of by hanging or shooting became law. In 1923 the Legislature repealed the State Prohibition Law which had been declared unconstitutional and substituted a measure corresponding to the Volstead Act. It also granted equal rights to women in the guardianship of children, extended the absent-voter privilege to persons who because of physical disability should expect to be confined to their homes on election day, made the possession of drugs illegally obtained a crime, enacted a modified old-age-pension law, and created a small claims court. Old-age-pension payments were put under county control in 1925. County and municipal borrowing was regulated in 1927; the divorce residence requirement was reduced to three months.

NEVADA, University of. State institution for men and women at Reno, founded in 1874. The student enrollment of the university increased from 340 in 1914 to 849 in the autumn of 1928, in addition to which there was a summer session enrollment in the latter year of 117; during the same period, the faculty increased from 50 to 74 members; and the library from 28,000 bound volumes (1915) to 48,934. Productive funds in 1928 amounted to $358,439, and income for the year to $652,664. An agricultural building was constructed in 1918, an educational building in 1920, and a building to house the Federal Bureau of Mines' Rare and Precious Metals Experiment Station in 1921. Walter E. Clark, Ph.D., LL.D., succeeded Archer Wilmot Hendrick as president in 1917.

NEVIN, Arthur Finley (1871–). An American composer, born at Edgeworth, Pa. Having received his first musical education from his father, he entered the New England Conservatory in 1891, studying with O. Bendix (piano) and P. Goetschius (theory). From 1893 to 1897, he studied in Berlin with Klindworth, Jedliczka (piano), and Boise and Humperdinck (composition). He then returned to Edgeworth, where he lived until 1910, devoting his time to composition and teaching. In 1903–04 he spent some time with the Blackfeet Indians in Montana, collecting their melodies and legends. There he found the subject for his Indian opera *Poia*, which was produced at the Royal Opera in Berlin (1910), the first work of an American composer ever brought out at that institution. In 1915–20 he was professor of music at the University of Kansas, and in 1921–22 he was director of municipal music at Memphis, Tenn. He also wrote two other operas, *The Daughter of the Forest* (Chicago, 1918) and *Twilight* (not produced up to 1929); a masque, *A Night in Yaddo-Land;* two cantatas, *Roland* and *The Djinns;* three orchestral suites, *Miniature*, *Lorna Doone*, and *Love-Dreams; Bakawali Dances* for orchestra; a string quartet and a piano trio; and piano numbers and songs.

NEVINSON, Christopher Richard Wynne (1889–). An English painter, born at Hampstead. His training was obtained at Uppingham, St. John's Wood School of Art, Slade School, and Julien's, Paris. His first paintings were exhibited in London in 1910. Since that year, he has exhibited annually in London, Paris, New York, Washington, and Chicago. During the World War, he saw service in Flanders, exhibited war paintings at the Leicester Galleries in 1916, and returned to France as an official artist in the following year. The Imperial War Museum purchased 10 of his war paintings and the Canadian War Memorials Fund, five others. Drawings, etchings, and lithographs are owned by the British Museum, the Luxembourg, Harvard University, the National Gallery of Canada, and the National Gallery at Brussels. The Czechoslovak Republic officially invited Nevinson to represent British art at Prague in 1920. Among his publications are *Modern War*; *British Artists at the Front*; *The Great War*; *Fourth Year*; and *C. R. W. Nevinson* (*Contemporary British Artists Series*).

NEVINSON, Henry Woodd (1856–). An English newspaper corespondent and writer, educated at Shrewsbury School and Christ Church, Oxford. He was correspondent for the *Daily Chronicle* in the Greco-Turkish War of 1897, in Crete, in Spain, and in South Africa during the Boer War. He went to Central Africa (1904–05), exposed the Portuguese slave trade there in *A Modern Slavery* (1906), and was in Russia during the uprising of 1905–06. He went to India for the *Manchester Guardian* and reported the campaigns in Morocco and the Balkans (1912) for various newspapers. He was accredited by the War Office as official correspondent at the Dardanelles for several papers and was wounded during operations there. He was later correspondent with the British Armies in Saloniki, Egypt, France, and Germany. After the World War, he was frequently a special correspondent for the *Manchester Guardian.* He was on the staff of the *Nation* from its foundation until 1923. His other works include: *Books and Personalities* (1905); *Essays in Freedom* (1909); *The Growth of Freedom,* "a sketch of the development of political and personal liberty" (1912); *Essays in Rebellion* (1913); *The Dardanelles Campaign* (1918, 3d ed., 1920). *Original Sinners,* a novel (1920); *Lines of Life,* verse (1920); *Essays in Freedom and Rebellion* (1921); *Changes and Chances,* an autobiography (1924); *More Changes, More Chances* (1925); and *Last Changes, Last Chances* (1928).

NEW, Harry Stewart (1858–). A Postmaster General of the United States, born at Indianapolis, Ind., and educated at Butler University. He began as a reporter on the Indianapolis *Journal,* and from 1878 to 1903 he was editor, part owner, and publisher of that newspaper. He served in the Spanish-American War. In 1896 he was elected to the Indiana State Senate for four years, and from 1900 to 1912, he was a member of the Republican National Committee. In 1917 he was elected to the United States Senate and served till 1923, when he was appointed postmaster general by President Harding and retained the office throughout President Coolidge's administration. He gave especial attention to the extension of air-mail routes in the United States and planned a system of air communication with the Latin-American countries.

NEWARK. The largest city of New Jersey. The population rose from 347,469 in 1910 to 414,524 in 1920, and to 473,600 in 1928, by estimate of the U. S. Bureau of the Census. The latter figure is practically doubled by the adjacent cities and suburbs, including Elizabeth, Bayonne, Harrison, the Oranges, Belleville, Nutley, Bloomfield, and Montclair, which constitute Greater Newark. Since 1917 the city has operated under a commission form of government, five commissioners-at-large elected every four years constituting the governing body. Each commissioner is the director of one of five departments: public affairs, public works, finance, public safety, and parks and public property. The director of the department of public affairs serves also as mayor of the city.

In 1915 the city-planning commission offered a comprehensive plan for the city of Newark, and in 1919 a zoning plan was adopted. The 250th anniversary of the founding of the city was celebrated during five months of 1916 with a historical pageant, a prolonged music festival, and an exhibition of local industries. A memorial building was erected by the city at a cost of $1,500,000 to mark the occasion. Other important buildings erected since 1916 include a two-story city market which covers two acres, completed in 1923 at a cost of $5,100,000; the Newark Museum of Industry, Art, and Science opened in 1926, toward the construction of which Louis Bamberger contributed $500,000; the Hall of Records erected in 1928 for the accommodation of many of the county offices; and the new Annex to the City Hall built in Romanesque style, completed in 1928, at a cost of $1,061,000. In Military Park, an irregular plaza used in colonial days as a drill ground and surrounded by public and semi-public buildings, there has been erected a bronze group by Gutzon Borglum depicting the Wars of America.

Newark's development as a seaport is comparatively recent. In 1914 the city began the creation of Port Newark on Newark Bay southeast of the city, a part of New York Harbor, as a shipping terminal and industrial centre. On the entrance of the United States into the World War, the War Department leased 133 acres of the newly-filled land for one of its largest supply bases, spending $12,000,000 on docks, warehouses, and freight-handling equipment; and the U. S. Shipping Board established a $30,000,000 shipyard where 17,000 persons were employed by the Submarine Boat Corporation in the construction of 150 steel cargo vessels. At the close of the War, the city acquired the Army Base, including nine warehouses with 2,000,000 feet of floor space, and resumed its programme. By 1929 it had spent nearly $6,000,000 reclaiming, filling, and developing a large area of the meadows for industrial sites and, with Federal aid, constructing a channel 30 feet deep and 400 feet wide. Six public and 139 private docks and piers have been constructed. Water-borne commerce in 1927 amounted to 7,115,323 tons. In 1926 the construction of the four-track bridge of the Central Railroad of New Jersey, across Newark Bay between Bayonne and Elizabeth, N. J., was completed at a cost of approximately $15,000,000.

Industrially, Newark ranks fourteenth among the cities of the United States in value of output. In 1925, 66,854 persons were employed in 1668 manufacturing establishments and received $89,640,000 in wages; the value of products manufactured was $490,046,599. Among the principal products in 1925, measured by value, were: electrical machinery, apparatus, and supplies ($51,564,446); paints and varnishes ($23,271,662); leather ($22,945,072); jewelry ($22,301,802); chemicals ($18,053,917); and meat products ($17,682,863). Newark is also important as an insurance centre. The 16 large life, fire, and casualty companies which have home offices there employ some 9000 persons and have assets aggregating $2,100,000,000.

The Newark metropolitan airport, consisting of 350 acres of city-owned land at the port of Newark, was established in 1928 for commercial aviation. It is to be used by the Post Office Department as the concentration and distributing base for air mail for the metropolitan district and eastern points. In 1929 contracts were made for the construction of a new Union Pennsylvania Railroad station in Newark, extension of the Hudson & Manhattan tube system, and the building of a new high-speed trolley line in the bed of the old Morris Canal. The city's share in the total cost will be about $12,500,000. The water supply of Newark from the Pequannock River has been increased by the development of the Wanaque watershed, a joint undertaking by several municipalities of northern New Jersey, which will supply a total of 100,000,000 gallons a day; 40,500,000 gallons have been allotted to Newark. See Water Supply.

The city's public-school system comprises 68 elementary, three junior high, five senior high, two vocational, two continuation, and 17 evening schools. There are 27 parochial schools, and several private schools, including Newark Academy, founded in 1792. The Newark Institute of Arts and Sciences (1910) is an extension of New York University. Newark is the seat of a State normal school (established 1913); the Newark College of Technology (1885), which coördinates theoretical instruction with practical training in industrial plants; the New Jersey College of Pharmacy (1891), now affiliated with Rutgers University; and the New Jersey Law School (1908). Bank clearings in 1928 amounted to $1,520,155,000. The assessed valuation of property in 1927 was $821,841,000; the net debt was $83,252,000.

NEWARK MUSIC FESTIVAL. See Music, *Festivals.*

NEW BEDFORD. The fourth city in Massachusetts and the third in value of its manufactured products. The population increased from 96,652 in 1910 to 121,217 in 1920, and to 130,072 in 1923, according to estimate of the U. S. Bureau of the Census, but decreased to 119,038, according to the assessors' estimate of Apr. 1, 1927. Between 1914 and 1924, a State pier, 750 feet long, with a depth of 25 feet of water on sides and end, was completed. This pier afforded double-track accommodations for 24 freight cars and had ample loading platforms and large storage space. A modern intersecting sewer system also was installed at a cost of $3,500,000, with capacity to care for a population of 300,000. The capital invested in the textile industry rose from $47,820,575 in 1914 to $73,794,900 in 1927, and the number of persons employed from 31,820 to 35,966. New Bedford is the spot cotton market of the North and has five public modern warehouses with a capacity of 12,400,000 cubic feet. Other manufactures include fine tools, twist drills, dies, silverware, cut glass, rope, cordage, shirts, underwear, overalls, cloth caps, paper goods, boxes, sheet copper, soap, mechanical toys, electrical devices, refined oils, tire fabrics, etc. The industries of New Bedford represent a capital investment of more than $175,000,000.

The city of New Bedford has a public-school system consisting of 36 elementary schools, two junior high schools (erected in 1926), and one high school. In addition, there are the New Bedford Vocational School, the New Bedford Textile School, and the Swain Free School of Design. Bank clearings in 1928 amounted to $54,673,000. The assessed valuation of property in 1927 was $315,738,000; the net debt was $10,360,000. On Apr. 16, 1928, a general strike of between 25,000 and 30,000 cotton-mill operatives was called on account of an announced wage reduction of 10 per cent. Work was suspended for about six months in the great majority of the mills; on October 6, the unions voted to return to the shops with a wage cut of 5 per cent.

NEWBERRY, Truman Handy (1864–). An American financier and public official, born in Detroit, Mich. He was graduated from Yale in 1885 and was later connected in various capacities with railroads and other industrial organizations. In the Spanish-American War, he served as lieutenant and navigator. He was appointed Assistant Secretary of the Navy in 1905 and served until 1908, when he assumed the post of Secretary of the Navy until March, 1909. In the World War, he was commander of the United States Naval Reserves. He was elected to the United States Senate in 1918, defeating Henry Ford for the nomination. The expenditure of over $200,000 in the primaries led to accusations of corruption. He was tried and convicted in the State courts, but the case was dismissed in the United States Supreme Court. Charges were brought before the Senate Committee on Privileges and Elections in 1922, and he was exonerated. He resigned his seat following the elections of 1922.

NEWBOLT, Sir Henry (John) (1862–). An English writer, best known for his sea poetry and stories (see Vol. XVI). Besides receiving honorary degrees from various universities, he was knighted in 1915 and made a Companion of Honor in 1922. From 1911 to 1921, he was a professor of poetry and he was controller of wireless and cables during the World War. In 1923 he was made official Naval Historian, and wrote *Naval Operations*, vol. iv (1928). His later work included *The Book of the Blue Sea* (1914); *The Book of the Thin Red Line*, adventures (1915); *The Story of the Oxfordshire and Buckinghamshire Light Infantry* (1915); *A New Study of English Poetry* (1917); *St. George's Day and Other Poems* (1918); *The Book of the Long Trail*, tales of explorers (1919); *A Naval History of the War* (1920); *The Book of the Grenvilles*, fiction (1921); *Studies Green and Grey*, essays (1926); and *New Paths on Helicon*, one of his many anthologies (1927). In 1925 he became editor of the *Teaching of English Series*.

NEW BRUNSWICK. A Canadian maritime province, with an area of 27,985 square miles. In 1911 the population was 351,889; in 1921, 387,876, a gain of 10.23 per cent. The estimated population on June 1, 1929, was 419,300. The rural population in 1921 was 67.9 per cent of the total; in 1911 it was 71.7 per cent. Populations of the principal towns in 1921 were: St. John, 47,166 (42,511 in 1911); Moncton, 17,488; Fredericton, the capital, 8114.

Industry and Trade. In 1927 only 889,276 acres out of the total area (904,055 in 1914) were under field crops, although agriculture is the most important industry. Total value of yield in 1926, $23,338,000; in 1914, $29,045,100. Oats, hay and clover, and potatoes receive the greatest attention. Dairying has shown substantial gains, since 1,413,454 pounds of butter were made in 1926, against the 849,633 pounds in 1910. Fishing occupies a high station; in 1928 the catch was valued at $4,996,898, comparing favorably with that of 1913. Mineral production in 1927, largely made up of coal and gypsum, reached $2,024,025, as compared with $1,102,613 in 1913. Much of the forest land is in the hands of the Government, and lumbering ranks high among the industries. Lumber cut in 1925 was valued at $10,513,568; pulpwood made a very thriving industry (153,669 tons), worth about $8,424,327. In 1910 there were 1158 manufacturing establishments (capital $36,125,012); in 1925, 846 establishments (capital, $91,509,933). The output in 1910 was $35,422,302; in 1925, $73,374,660. Of the 87,000 horse power estimated available, 47,231 (1928) was already being worked. Exports, domestic and foreign, amounted to $100,973,185 in 1926–27 ($34,634,156 in 1912–13); imports in 1926–27, $28,279,707 ($14,445,811 in 1912–13). In 1926 there were 1935 miles of railway line, as compared with 1545 in 1913.

Government. The receipts for 1927 were $4,933,029 ($1,459,000 in 1913), and expenditures, $4,917,237 ($1,446,963 in 1913). The debt of the province in 1912 was only $4,693,457; by October, 1926, it had mounted to $35,325,909. The money expended on public works, i.e., hydroelectric development, roads, bridges, and grants to railways, accounted for the increase. By 1927 the number of teachers reached 2533 from the 2002 in 1913, and of pupils, 80,690 from the 63,580 in 1913. The total cost of education also increased, from $942,203 in 1913 to $3,071,315 in the 1926–27 school year. The province is represented in the Canadian Parliament by 10 senators and 11 members of the House. The suffrage is exercised by both sexes.

NEW CALEDONIA. See Pacific Ocean Islands.

NEWELL, Edward Theodore (1886–). An American numismatist, born at Kenosha, Wis., and educated at Yale University. He was president of the American Numismatic Society after 1916 and wrote many works on coins and minting, including *The Dated Alexander Coinage of Sidon and Ake* (1916); *Tarsos under*

Alexander (1919); *Myriandros* (1920); *The Kyparissia Hoard* (1921); *The Coinages of Demetrius Poliorcetes* (1927).

NEWFOUNDLAND. A British dominion in North America, comprising the island of Newfoundland and Labrador. See LABRADOR. The area of the island is 42,734 square miles; of Labrador, 120,000. The total population increased from 242,619 in 1911 (Labrador, 3949) to 262,979 in 1921 (Labrador, 3621) and to 263,182 in 1927 (Labrador, 4054). St. John's, the capital, had a population of 40,059 in 1926 (32,292 in 1911); Harbor Grace, 3825 in 1921 (4279); Bonavista, 4025 in 1921 (3911); Carbonear, 3320 in 1921 (3540). The population, the great bulk of which is native and of English, Irish, and Scotch descent, still remains practically concentrated on the southeast coast. Emigration rose noticeably during the post-war depression. In 1927 there were 13,687 immigrants and 15,765 emigrants.

Industry and Trade. Fishing exceeds all other occupations in importance. In 1927, 740 men and 41 vessels on the Bank cod fishery brought in a catch of 99,663 quintals, compared with 152,374 quintals brought in by 1830 men in 104 vessels in 1913. Exports of codfish in 1927 were 1,557,753 quintals. The serious decline in the seal fishery was partly attributable to the loss of ships and the prohibitive cost of shipbuilding. In 1913, 19 steamers with 3609 men brought in 272,065 seals; in 1928 the catch was 227,022 seals, with 12 vessels and 2200 men engaged. The lobster, herring, and whale fisheries have shown a distinctly downward trend; lobsters have grown scarce because of overfishing and a closed season was declared from 1924 to 1928; the herring market is affected by renewed European competition; the whale fisheries have practically ceased operation. To relieve the serious situation that ensued, the Government in 1923 undertook a programme of encouragement for industry and farming, in order to relieve the almost entire economic dependence of the island on its fisheries. The industries growing out of the great forest resources have extended considerably. Spruce has replaced the disappearing pine as the important wood. In 1927 for the first time, the value of pulp and paper production ($13,000,000) exceeded that of the fisheries. The mineral production, chiefly iron, in 1912 amounted to $2,810,000; in 1926–27, 929,000 tons of iron, valued at $1,580,000, were exported. Some copper and oil have been produced. The mineral resources are as yet unexplored, although in 1921 a beginning was made at the development of certain coal deposits and the investigation of oil-bearing lands. In 1928 an American firm was developing a lead and zinc mine at Buchans. A mill was built with a daily capacity of 600 tons. Of the 4,000,000 acres capable of cultivation, up to 1928 only 230,000 were being utilized, and the Government was actively encouraging the population away from the sea to the land. The chief crops are hay, potatoes, cabbage, turnips, and oats. The total value of farm crops in 1912 was $2,000,000; in 1921, $14,367,877. Exports, which in 1913–14 were valued at $14,720,000, had risen to $30,839,859 in 1926–27. Imports rose from $14,793,000 in 1913–14 to $25,814,000 in 1926–27. The chief markets in the export trade are the United Kingdom, Portugal, Spain, Canada, and the United States. The bulk of the imports come from Canada and the United States. Dry codfish is the principal export, with manufactured paper in second place, although in 1927 their positions were reversed. The total revenue of the dominion, in bulk from customs, was $3,142,491, and the expenditure $3,524,653, in 1911–12. In 1926–27 revenues were $8,932,000 and expenditures, $10,533,000. The increase of the funded public debt from $29,470,060 in 1912–13 to $55,030,027 in 1921–22 was largely due to World War expenditure ($60 per capita). On June 30, 1927, the public debt was $72,018,000. In 1927 there were 905 miles of government railroads, as compared with 794 in 1913. Additional proposed extensions had been postponed during the War, after which, because of unprofitable operation, the management of the roads and their extension became a conspicuous problem of the Government. There was an additional 69 miles of private line. The mileage of telegraph wires (open) increased from 4225 in 1914 to 7500 in 1926; telephone wires, from 899 in 1913 to 12,000 in 1926. Steamship communications with the United Kingdom, Canada, and the United States were disorganized during the War, but have been restored. Public instruction still remains under denominational auspices, with government support, and school attendance has not been made compulsory by law.

History. A Newfoundland regiment was enlisted on the outbreak of the War, and saw service in Gallipoli, Egypt, France, and Flanders. In all, some 6500 men were under arms. In 1913, Sir Edward Morris's party was returned to office and continued in power through 1917, when the Morris government was succeeded by a ministry headed by Sir William Lloyd. In 1919 Sir Michael Cashin became Premier; in November, 1919, as a result of the general election, Richard Squires succeeded to office. The Squires government, however, resigned in 1923, though the general election of May had returned it with a sizable majority. W. R. Warren was then summoned by the governor. On Dec. 26, 1923, Premier Warren brought a grave accusation against his predecessor, Sir Richard A. Squires, charging him, among other things, with the receipt of money from private corporations and diversion of government funds to individuals occupying official posts. An investigator for the British Colonial Office found the charges in a large measure true; this was followed by the arrest of Squires in April and the overthrow of the Warren government. Reorganization of the public services and a greater honesty in government became the leading issues of the day. Mr. Hickman, who succeeded Mr. Warren, enjoyed only a brief tenure of office, for his party was turned out in the general election of June 3. He was in turn followed by Walter Monroe. The next general election was not held until October, 1928, when Sir Richard Squires and the Liberal Party were returned by a large majority. For an account of the settlement of the Labrador boundary dispute, see LABRADOR.

NEW GUINEA. One of the largest islands of the world, in the East India Archipelago. Area, 320,000 square miles (estimated). Politically, it was divided into: (1) Dutch New Guinea, area, 160,692 square miles; population (1920) 195,460; (2) Territory of Papua (British New Guinea), area, 90,540 square miles; estimated population 276,428 (1928); (3) Territory of New Guinea (late Kaiser Wilhelm's Land), area, 70,000 square miles; population (estimated), 100,000 (for the mainland only).

Dutch New Guinea is administered from the Dutch East Indies of which, for trade and other purposes, it was considered an integral part. See DUTCH EAST INDIES.

The Territory of Papua is a possession of the Australian Commonwealth. Little of the area is under cultivation; the natives are averse to hard labor. In all, only 186,966 acres have been leased by planters (1927), and coconuts, rubber, and sisal hemp are the chief products. Gold continues to be mined to some extent, and boring for oil began after 1915. The gold output declined from £64,115 in 1912–13 to £7240 in 1927–28. Imports and exports for 1913–14 were £212,134 and £123,140; for 1928, £403,561 and £350,363. Revenues and expenditures for 1913–14 were £54,703 and £81,095; in 1928, £107,052 and £158,964. To meet the deficit, Australia supplies an annual grant of £50,000. The Australian government has shown itself zealous in the preservation of the integrity of the natives and has refused to settle cheap coolie labor in the territory. In 1928 Europeans numbered 1428. Port Moresby is the chief town and port of call for Australian ships.

The Territory of New Guinea is the name given to the former German New Guinea and included, besides the late Kaiser Wilhelm's Land, (area, 70,000 square miles; population, 100,000), the Bismarck Archipelago (area, 17,600 square miles; population, 188,000), made up of New Britain, New Ireland, and other islands, and Bougainville and Buka of the Solomon Islands group (area, 3400 square miles; population, 17,000). On Sept. 12, 1914, an Australian force occupied the islands. A mandate was given to Australia for the territory by the League of Nations on Dec. 17, 1920; the Australian government established its civil administration on May 9, 1921. The seat of government is at Rabaul on New Britain, the former German capital. In 1921 nonindigenous inhabitants numbered 3173, divided as follows: 715 British, 1402 Chinese, 215 Dutch, 579 Germans, 87 Japanese, and 60 Americans. On the mainland, coconuts are cultivated as well as rubber and cacao; tropical fruits serve as the articles of food. Total revenues for 1918–19 and 1927–28 were £55,760 and £223,645. Exports for the same years were £269,866 and £1,471,026; imports, £271,861 and £811,832. Leading exports in 1927–28 were copra, 65,285 tons; shell, 433 tons; cacao, 173 tons. Imports include groceries, hardware, tobacco, spirits, and oils. See also ETHNOGRAPHY.

NEW HAMPSHIRE. The forty-third State in size (9341 square miles) and the forty-first in population; capital, Concord. The population increased from 430,572 in 1910 to 443,083 in 1920, a gain of 2.9 per cent; estimated population, 1928, 456,000. The white population increased from 429,906 to 442,331; Negro, from 564 to 621; native white, from 333,348 to 351,098. The number of foreign-born whites fell from 96,558 to 91,233. The urban population mounted from 255,099 to 279,761, while the rural decreased from 175,473 to 163,322. The two important cities are Manchester and Nashua. They increased, respectively, from 70,063 in 1910 to 78,384 in 1920 and from 26,005 to 28,379.

Agriculture. After a decrease of 24.1 per cent from 1910 to 1920, the number of farms rose from 20,523 in 1920 to 21,065 in 1925, or by 0.4 per cent. The acreage in farms, however, continued to decline from 2,603,806 in 1920 to 2,262,064 in 1925. The total perecntage of land used for agricultural purposes was 45 in 1920 and 39.1 in 1925. The total value of farm property rose from $103,704,196 in 1910 to $118,656,115 in 1920, but declined to $107,084,055 in 1925; the average value per farm was $3833 in 1910, $5782 in 1920, and $5084 in 1925. In interpreting these values, the currency inflation incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 19,895 were operated by owners; 156, by managers; and 1014, by tenants. The comparative figures for 1910 were 24,493; 681; and 1879. In 1920 white farmers numbered 20,509, of whom 17,890 were native and 2619, foreign born. In 1910 the white farmers numbered 27,038 (native-born, 24,347; foreign-born, 2691). Farms reported as under mortgage numbered 5389 in 1920; 4716 in 1925. The number of dairy cows fell from 119,203 in 1920 to 81,504 in 1925; that of "beef" cows decreased from 5055 in 1920 to 2815 in 1925; sheep, from 28,021 to 16,055. The estimated production of the principal farm crops in 1928 was as follows: Corn, 560,000 bushels; oats, 390,000; potatoes, 1,656,000; hay, 665,000 tons. The comparative figures for 1913 are corn, 814,000 bushels; oats, 420,000; potatoes, 2,074,000; hay, 495,000 tons.

Manufactures. New Hampshire is an important industrial State in point of value of products. In 1920 there were eight cities of 10,000 inhabitants or more, the combined populations of which formed 43.7 per cent of the total for the State; in 1919 they reported 63.3 per cent of the value of the State's manufactured products. In 1909 there were 1961 manufacturing establishments in the State; in 1919, 1499; in 1925, 1038; and in 1927, 1028. Wage earners in manufactories numbered 83,074 in 1919; 66,658 in 1925; and 65,482 in 1927. The capital invested amounted to $139,989,662 in 1909 and $329,166,870 in 1919. The value of the products was $164,581,019 in 1909; $407,204,934 in 1919; $327,400,651 in 1925; and $327,528,366 in 1927. The increase in the value of products about 1919 was in great measure due to changes in industrial conditions brought about by the War. Among the chief industries is the manufacture of boots and shoes, amounting to $39,440,000 in 1909; $92,259,000 in 1919; $52,631,681 in 1925. Its rival in magnitude is the manufacture of cotton goods, which had a value of $33,602,000 in 1909; $86,392,000 in 1919; $57,868,732 in 1925. Manufactures of woolen and worsted goods, in third place, were valued at $16,731,000 in 1909; $15,039,000 in 1914; and $45,944,000 in 1919. The wood-pulp and paper industry, next in order, had an output valued at $13,994,000 in 1909; $17,708,000 in 1914; and $41,826,000 in 1919. The most important manufacturing cities are Manchester and Nashua. In Manchester, there were 175 manufacturing establishments in 1909 with a product valued at $46,812,000; in 1914, 151, with $50,800,000; in 1919, 165, with $117,493,000. In 1909 Nashua had 104 manufacturing establishments, with products valued at $17,326,000; in 1914, 87, with $22,780,000; and in 1919, 92, with $48,985,000. Other important manufacturing cities are Concord, Dover, Keene, Berlin, Laconia, and Portsmouth.

Education. The development of their educational system has always been one of the chief concerns of the people of New Hampshire. As in the case of the other New England States, the decrease in rural population has created a difficult problem. In 1919 large sections of New Hampshire had become so impoverished and so depopulated that under the existing school laws reasonable elementary education could not possibly be provided for a very large number of children. Because of this, the Legislature, after a careful study, reorganized the school system and for the first time in the history of the State wrote the school laws into a consistent code in 1921. The results of this action were immediate. The principles of Americanization, equalization, and supervision were adopted. More specifically, the Board of Education was reorganized, methods of consolidation were provided, and, especially, provision was made for education in sparsely populated districts. The Legislature of 1923 passed several important measures which amplified and revised measures already enacted. For one, the provisions of the Smith-Hughes Act of 1917 for the promotion of vocational education were accepted, and the State Board of Education was authorized to arrange with institutions and school boards of towns or city districts in the State to furnish the necessary buildings and equipment for carrying out the provisions of the Federal Act. In 1914 the enrollment in the public schools was 63,004; in 1925–26, 71,785. In the latter year, in the elementary schools and kindergartens, 59,628 were enrolled; and in the high schools, 12,157. The total expenditure for public schools in 1925–26 was: current, $5,872,928; outlays, $1,012,362. The percentage of illiteracy in the State decreased from 5.5 in 1910 to 5.4 in 1920; among the native white population, from 0.9 to 0.6; among the Negro, from 13.8 to 7.7. In the foreign-born population, it increased from 15.4 to 16.4

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $5,907,726 (of which $593,170 was aid to local education); for interest on debt, $74,215; for permanent improvements, $1,826,294; total, $7,808,235 (of which $2,863,302 was for highways, $1,515,964 being for maintenance and $1,347,338 for construction). Revenues were $7,783,195. Of this, property and special taxes formed 41.1 per cent; departmental earnings and charges for officials' services, 9.3 per cent; and sales of licenses and taxation of gasoline, 38.5 per cent. Property valuation was $663,865,495; State taxation thereon, $3,036,918. State net funded debt on June 30, 1928, was $1,817,720.

Political and Other Events. After 1914, New Hampshire remained consistently Republican, with the exception of one year, when the Democrats succeeded in electing their candidate for governor. In 1914 Rollin H. Spalding was reëlected governor, and J. H. Gallinger was reelected to the Senate. In 1916 the Republicans elected Henry W. Keyes governor, and carried other State offices. Wilson for President obtained 43,871 votes; Hughes, 43,725. At this election, the people voted to call a constitutional convention. In January, 1916, the United States government purchased, under the Weeks Forestry Land Act, a tract of 55,000 acres to be added to the forest reserves. Senator Gallinger died during the primary election campaign of 1918, and the term of Henry F. Hollis, Democrat, expired in 1918. Gov. Keyes was elected Senator for the regular term and George H. Moses was chosen successor to Senator Gallinger. John H. Bartlett, Republican, was elected governor. The constitutional convention met in June, 1918, but adjourned following its organization. It met twice subsequently, but none of the amendments it submitted to the people was ratified. The Republicans elected their candidate for governor, Albert O. Brown, in 1920, and reëlected Senator Moses. For President, Harding received 94,947 votes; Cox, 62,562. In 1922 the Democrats elected their candidate for governor, Fred H. Brown, and a Representative to Congress. They also elected a majority of 10 in the State House of Representatives, although the Republicans continued to control the Senate. Coolidge received 98,575 votes for President in 1924; Davis, 57,201; La-Follette, 8993. John G. Winant, Republican, was elected governor. Huntley N. Spaulding, Republican, was elected governor in 1926. In 1928 the vote for President was: Hoover, 115,404; Smith, 80,715. Charles W. Tobey, Republican, was elected governor. Floods caused widespread damage in the State early in November, 1927.

Legislation. The Legislature of 1917 amended the laws relating to the conduct of trials and made provision for the calling of a constitutional convention in June, 1918. The governor received authority to suspend the labor laws by the request of the Council of National Defense. A "blue sky" law was enacted and the laws relating to banking and education were amended. Enactments of 1921 regulated the practice of chiropractors; provided further safeguards against forest fires; made provisions for the protection of maternity and infancy; and regulated and limited the investments of savings banks. In 1923 the Legislature made provision for another constitutional convention; passed a uniform sales act, levied a gasoline tax, and laid a tax on income from intangibles. A special session late in 1927 provided measures of relief and restoration necessitated by the November, 1927, flood.

NEW HAMPSHIRE, UNIVERSITY OF. A State institution of higher education for men and women at Durham, founded as the New Hampshire College of Agriculture and the Mechanic Arts as a part of Dartmouth College in 1866, transferred to Durham as State College in 1893, and incorporated as the University of New Hampshire, July 1, 1923. It consists of a college of liberal arts, a college of agriculture, and a college of technology. The institution grew rapidly between 1913–14, when the student enrollment was 300 and the faculty numbered 48, and 1928–29, when corresponding figures were 1523 and 148. The summer session of 1928 had a registration of 348 students. The library was increased from 35,000 to 63,000 volumes. The endowment in 1928 amounted to $1,030,000 and the income for the year totaled $1,452,322. The school year 1925–26 was the first under the millage law of 1925 which provides an annual amount equal to one mill for each dollar for the assessed valuation of the State. This fund, which in 1927–28 amounted to $656,524, together with income from other sources, is sufficient for the maintenance of the institution and for the gradual construction of a complete physical plant in accordance with a comprehensive plan for the development of the university. In 1925 a wing of the Commons Building was erected, a dormitory for the accommodation of 150 men was under construction, plans were made for the erection of a liberal arts building, and a plan was formulated by a landscape architect for the improvement of the campus. The president, Edward Morgan Lewis, A.M., LL.D., Litt.D., assumed his duties Sept. 1, 1927.

NEW HAVEN. The largest city of Connecticut and the fourth city in size of New England; a manufacturing and educational centre. The population rose from 133,605 in 1910 to 162,537 in 1920, and to 187,900 in 1928, by estimate of the Bureau of the Census. New Haven industries cover a wide variety, including guns, ammunition, hardware, clocks and watches, rubber goods, corsets and clothing, machinery, machine tools, wire and wire goods, insulated wire and insulators, paper boxes, toys, automobile radiators, boilers, and cigars. In 1925, 22,863 persons were employed by 465 industrial establishments, and received $28,463,797 in wages; the value of products manufactured was $110,506,218. Transportation facilities in New Haven are excellent, the city being the hub of six lines of the New York, New Haven & Hartford Railroad. Nine other railroads maintain district offices there.

During the past few years, there has been a marked change in the business section of the city through the erection of a number of large office buildings, and in 1928 plans were adopted for the construction of the new City Hall. The educational facilities also have been expanded, including the construction of a commercial high school and two junior high schools and of a number of magnificent buildings at Yale University, chief of which are the Harkness Memorial Quadrangle, and the University Library. (See YALE UNIVERSITY.) More than 500 acres have been added to the city's park system, including shore frontage for a municipal park and bathing beach. Bank clearings in 1928 amounted to $454,490,000, and building permits in 1927, to $12,487,432. The assessed valuation of property in 1927 was $315,738,000; the net debt was $10,360,000.

NEW HEBRIDES. See PACIFIC OCEAN ISLANDS.

NEW JERSEY. The forty-fifth State in size (8224 square miles), and the tenth in population; capital, Trenton. The population increased from 2,537,167 in 1910 to 3,155,900 in 1920, a gain of 24.4 per cent; estimated population, 1928, 3,821,000. The white population increased from 2,445,894 (1910) to 3,037,087 (1920); Negro, from 89,760 to 117,132; native white, from 1,787,706 to 2,298,474; and foreign-born white, from 658,188 to 738,613. Urban population increased during the decade from 1,907,210 to 2,474,936; rural, from 629,957 to 680,964. The growth of the principal cities was as follows: Newark (q.v.), 347,469 (1910) to 414,524 (1920); Jersey City (q.v.), 267,779 to 298,103; Paterson (q.v.), 125,600 to 135,875; Trenton (q.v.), 96,815 to 119,289; Camden (q.v.), 94,538 to 116,309.

Agriculture. The development of agriculture has not kept pace with the growth in population, which increased during the decade 24.4 per cent, while the number of farms decreased 11.3 per cent, from 33,487 in 1910 to 29,702 in 1920, and stood in 1925 at 29,671. The acreage of land in farms decreased 15.7 per cent, or from 2,282,585 acres in 1920 to 1,924,545 in 1925. The improved land in farms in 1920 was 555,607 acres. The percentage of the total land area in farms decreased from 47.5 per cent in 1920 to 40 in 1925. The total value of farm property rose from $254,832,665 in 1910 to $311,847,948 in 1920, and remained at $311,084,284 in 1925; the average value per farm was $7610 in 1910, $10,499 in 1920, and $10,484 in 1925. In interpreting these values, the currency inflation incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 24,535 were operated by owners; 413, by managers; and 4723, by tenants. The corresponding figures for 1910 were 24,133; 1060; and 8294. White farmers in 1920 numbered 29,167 and colored farmers, 535. In 1910 the white farmers numbered 33,011 and colored farmers, 476. Farms reported as under mortgage, 10,085 in 1920, numbered 10,118 in 1925. The total number of cattle was 179,459 in 1920; 153,492 in 1925. Dairy cows numbered 172,693 in 1920; 122,384 in 1925. In 1920 sheep numbered 10,471; 5684 in 1925; swine, 139,222 in 1920; 55,854 in 1925. The estimated production of the chief farm crops in 1928 was as follows: Corn, 6,968,000 bushels; wheat, 1,200,000; oats, 1,500,000; rye, 758,000; potatoes, 9,120,000; sweet potatoes, 2,175,000; peaches, 1,625,000; and hay, 479,000 tons. Comparative figures for 1913 are corn, 10,862,000 bushels; wheat, 1,408,000; oats, 2,030,000; rye, 1,260,000; potatoes, 8,930,000; and hay, 469,000 tons.

Mining. New Jersey is one of the most important mineral-producing States in the eastern part of the country and it is the only east coast State that produces zinc. Although it has a considerable diversity of mineral products, the most important are clay and zinc. The values of the clay products have been $16,484,652 (1914); $20,741,244 (1918); $40,021,028 (1920); $27,214,685 (1921); and $47,512,514 (1926). Zinc production was 74,253 short tons (1914); 112,020 (1916); 98,470 (1918); 77,371 (1920); 80,629 (1926). Cement also is one of the most important mineral products; shipments were 3,530,476 barrels, valued at $3,081,205 (1914); 2,397,069, $2,962,592 (1917); 2,563,453, $5,096,558 (1920); 2,840,699, $4,820,538 (1921). In addition to the minerals mentioned, the State produces a small quantity of iron ore and large quantities of sand, gravel, and stone. The total value of the minerals in 1926 was $77,065,713, compared with $72,335,207 in 1920; $49,510,290 in 1918; $31,756,503 in 1914; and $56,898,033 in 1910.

Manufactures. New Jersey is one of the leading industrial States. In 1920 there were 39 cities having a population of more than 10,000. These contained 65.6 per cent of the total population of the State, and in 1919 reported 76.4 per cent of the State's manufactured products. There were in the State 8817 manufacturing establishments in 1909; 11,057 in 1919; 8204 in 1925; and 8312 in 1927. Wage earners in manufactories numbered 508,686 in 1919; 425,377 in 1925; and 408,010 in 1927. The capital invested amounted to $977,172,141 in 1909; and $2,815,577,127 in 1919. The total value of the products was $1,145,529,076 in 1909; $3,672,064,987 in 1919; $3,539,181,253 in 1925; and $3,417,450,248 in 1927. The increase in value of products about 1919 was due largely to the change in industrial conditions brought about by the War, and cannot be properly used to measure the growth of manufactures during the period; but a normal increase in number of wage earners and in number of establishments indicated a decided growth in the manufacturing activities of the State. The most important industry in point of value of product is the refining of petroleum, valued in 1914 at $90,877,000; in 1919, at $280,995,000; in 1925, at $297,288,102. The smelting and refining of copper ranks second: in 1909, $125,651,000; in 1919, $244,269,000; in 1925, $224, 039,089. Shipbuilding had a product valued at $8,841,000 in 1909; $11,861,000 in 1914; and $238,015,000 in 1919; the extraordinary increase from 1914 to 1919 being due to the conditions resulting from the War. The three-year period from 1916 to 1919 showed an abnormal increase in vessels and gross tonnage launched, which renders comparison of little value. Silk goods, next in order, were valued in 1909 at $65,540,000; in 1914, $75,706,000, and in 1919, $215,051,000. The most important manufacturing cities are Newark, Jersey City, Paterson, and Trenton. In Newark, there were 1857 manufacturing establishments in 1909, with a product valued at $201,888,000; 2155 in 1919, at $577,609,000; products in 1925 totaled $490,047,000. In Paterson, there were 702 in 1909, $69,263,000; 1044 in 1919, at $216,659,000; in 1925 products were $200,977,000. Jersey City had 745 manufacturing establishments in 1909, with a product valued at $128,775,000; 896 in 1919, at $374,183,000; products in 1925 were $340,735,000. Similar figures for Trenton were 340 establishments, with a product valued at $49,115,000 in 1909; 389, at $122,478,000 in 1919; products of $126,516,000 in 1925. Other important manufacturing cities are Camden, Bayonne, Hoboken, and Passaic.

Education. In recent years, notable progress has been made in educational matters in New Jersey. Much important legislation was passed. In 1919 there was established by law a new teachers'-pension annuity system to supersede the old teachers' retirement fund. The new system operates on an actuarial basis; contributions from salaries of teachers are matched by the State, and this provides a pension of approximately half pay. A compulsory physical education law also was passed in 1919; and a continuation-school law, requiring children from 14 to 16 years of age to attend continuation classes six hours a week after working papers have been obtained. In 1922 provision was made for special aid by the State to school districts not able of themselves to provide satisfactory schools.

The complete survey of finances and business procedure of school districts which was made in 1921–22 resulted in improved methods in the handling of public moneys. A new normal school was opened at Glasborough in 1923, and in the same year plans were started for a new normal school in Jersey City. The enrollment in the public schools of the State increased from 501,948 in 1913 to 735,146 in 1925–26, and the number of teachers increased from 14,811 to 21,807. In the same period, the cost of education vastly increased, the cost per pupil, based on average daily attendance, being $156.45 in 1925–26, as contrasted with $43.72 in 1913. The chief item in this greatly increased cost was the much higher salaries for teachers. The percentage of illiteracy in the State decreased from 6.7 in 1910 to 6.6 in 1920: among the native white population, from 1.4 to 0.9 per cent; among the Negro, from 11.9 to 7.5; among the foreign-born white population, it increased from 14.8 to 16.3 per cent.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of State governmental departments, $44,053,408 (of which $16,896,733 was aid to local education); for conducting public-service enterprises, $156,160; for interest on debt, $3,071,760; for permanent improvements, $24,709,156; total, $71,990,484 (of which $21,868,567 was for highways, $6,100,970 being for maintenance and $15,767,597 for construction). Revenues were $76,045,226. Of this, property and special taxes formed 65.4 per cent; departmental earnings and charges for officials' services, 5.5 per cent; and sales of licenses, 19.7 per cent. The State at the time levied no sales tax on gasoline. Property valuation was $6,111,703,758; State taxation thereon, $36,545,466. Net funded State debt on June 30, 1927, was $63,274,551; State highway debt, $29,000,000.

Political and Other Events. Republican political strength in recent years has predominated except in the election of governors and senators, in which Democrats have at times been successful. In 1914 the Republicans elected a majority in both branches of the Legislature for the first time since 1911. They also elected eight Representatives in Congress, and the Democrats, four. In 1916 Walter E. Edge, Republican, was elected governor and Joseph S. Frelinghuysen to the Senate. In the presidential voting, Hughes received 268,982 votes; Wilson, 211,018. The voters of Newark, on Aug. 9, 1917, adopted a commission form a government. In 1919 the Democrats elected Edward I. Edwards governor, but the Republicans held the Legislature. In 1920 for President, Harding received 611,541 votes; Cox, 256,887. In 1922 the Democrats elected George S. Silzer governor, E. I. Edwards, United States Senator, and six Representatives in Congress. The Republicans held both Houses of the Legislature. The chief issue of the campaign was prohibition. The Democratic candidates for governor and U. S. Senator opposed the State Prohibition Enforcement Act and the Volstead Act. On Feb. 2, 1922, the State Court of Errors and Appeals held the State Prohibition Enforcement Law constitutional but "unworkable," and a new act was passed by the Republican Legislature. A contest in 1923 between Governor Silzer and the Legislature over the appointment of a new highway commission ended with the confirmation of the governor's nominations. The vote for President in 1924 was: Coolidge, 676,277; Davis, 298,043; LaFollette, 109,028. By popular vote in 1927, a measure to make State elections quadrennial, coinciding with national, was defeated. A. Henry Moore, Democrat, was elected governor in 1925. In 1928, his official acts were investigated by the Legislature, during the presidential campaign. The vote for President in 1928 was: Hoover, 925,796; Smith, 616,517. The Republicans elected Morgan F. Larson, governor.

Legislation. In 1914 the Legislature passed a home-rule act affording cities under a commission form of government greater latitude in the administration of local affairs. In 1914 it passed a concurrent resolution extending the suffrage to women. As the same resolution had already passed the preceding Legislature, it was submitted to the people, as noted above, on October 19, and was defeated. The Legislature of 1917 amended the health laws of the State in important details. In 1918 the

Legislature passed a local-option bill and a supplement to the corrupt-practices act and amended the child-labor and other laws. A workmen's-compensation bureau was created, as well as a department of charities and corrections with supervisory capacity over certain State institutions. The Legislature also created the Inter-State Bridge and Tunnel Commission, the Board of Fisheries, and Boxing Commission. In 1919 the laws relating to the State charitable, penal, and reformatory institutions were revised. This Legislature also passed a measure permitting a jury, as a part of its verdict, to recommend life imprisonment, in which case the death penalty shall not be imposed. The Legislature also enacted a child-labor law and passed measures forbidding the display of the red flag. The Legislature rejected the Federal prohibition amendment on Mar. 18, 1919. In 1920 it passed a measure permitting the manufacture and sale in the State of liquor containing 3.5 per cent alcohol. A bond issue of $28,000,000 for the share of New Jersey in the Delaware Bridge between Camden and Philadelphia, and the Hudson River vehicular tunnel between Jersey City and New York, was authorized. In 1921 the Assembly ratified the Prohibition Amendment, but it was defeated by the Senate. The 3.5 per cent alcohol act was repealed. The Legislature created in 1921 the Department of State Police. This bill was vetoed by Governor Edwards, but was passed over his veto. In 1921 and 1922, the Legislature passed measures for the development of the port of New York, under a joint Port Authority of New York and New Jersey. The Legislature on Mar. 9, 1922, finally ratified the Eighteenth Amendment and passed laws for prohibition enforcement over the governor's veto. It authorized a bond issue of $40,000,000 for the construction of good roads. In 1923 the Legislature passed a measure extending the payment of a soldiers' bonus to 1924; prohibited night work for women in factories after Dec. 31, 1924; and authorized cities to adopt the city-manager form of government. An act forbidding injunction against strike picketing was passed in 1926, and a motor vehicle department was created. A commission to reform the State's blue laws of ancient date was formed. Gasoline taxation was enacted in 1927. A zoning amendment to the constitution, later ratified, was passed; also an amendment, later rejected, to synchronize State and National elections.

NEW JERUSALEM, CHURCH OF THE. This organization, commonly known as the New Church, considers itself the organ of a new spiritual compensation and not a denomination of the historic Christian church, and teaches that the true doctrines of Christianity and the spiritual meaning of the Scriptures were revealed in the writings of Emanuel Swedenborg. The first organization, effected in London in 1787, was incorporated in 1821 as the "General Conference of the Ministers and other Members of the New Church signified by the New Jerusalem in the Apocalypse or Revelation of John," and the first local organization of the New Church in the United States was founded in 1792. The General Convention of the New Jerusalem in the United States of America was founded in 1817. Owing to the adoption of a stricter method of counting, involving also the omission of Canadian members, the General Convention declined in numbers of societies from 96 in 1914 to 85 in 1928, and in membership from 6423 to 5700. Home and foreign missions, largely the work of the General Convention, were carried on during this period in the United States and foreign countries.

The General Church of the New Jerusalem. This body was organized in 1897 under episcopal government with headquarters at Bryn Athyn, Pa., a new community where the church established the following institutions; A cathedral of unusual architectural interest, built in the manner of the great cathedrals of the fourteenth century; the Academy of the New Church, which has a valuable museum and library and departments from kindergarten to junior college; and theological and normal schools, with an enrollment of 267 in 1928. The General Church differs from the older bodies in the New Church mainly in its stricter attitude toward the theological writings of Swedenborg (considering them to be the Gospel or Word of the Lord at his Second Advent) and in the endeavor to establish parochial schools. It had an international membership in 1928 of 1933 with 3 bishops, 35 pastors, 5 ministers, and 24 societies, 15 of which were in the United States and Canada, 2 in England, and others in Sweden, Holland, Belgium, France, Natal, New South Wales, and Brazil. Membership in the United States was 733, with 15 churches in 1916, and 996, with 13 churches in 1926. A native mission was carried on in South Africa, with headquarters at Alpha, O.F.S. Among the periodicals published by the General Church were *New Church Life*, its official monthly magazine, *New Church Sermons*, *The Journal of Education*, and *The Bulletin*.

The General Convention of the New Jerusalem in the United States of America. In 1928, the General Convention consisted of about 5700 communicant members, compared with 6352 in 1916, united into 85 societies, territorially organized as 12 associations and 7 societies. The ministerial membership was 115; and the amount expended for missions and benevolences for the year ending Apr. 30, 1928, was $22,000, as compared with $16,317 in 1916. Educational institutions of the General Convention included a theological school at Cambridge, Mass., a junior college at Urbana, Ohio, and the Waltham School for Girls, Waltham, Mass. Periodicals included: the *New-Church Messenger*, weekly, Brooklyn, N. Y.; the *New-Church Review*, quarterly, Boston, Mass.; the *New-Church League Journal*, monthly, Boston, Mass.; *The Helper*, weekly, Philadelphia, Pa.; and *Sunday Afternoons*, weekly, Boston, Mass.

The General Conference of the New Church. This body, which is organized in Great Britain and corresponds to the General Convention in the United States, is the largest organization of the New Church, its 70 societies reporting an adult membership of 6295, together with 656 "isolated receivers," 1053 junior members, and 5775 Sunday-school attendants, in 1928. The conference meets annually, the president holding office for one year. Its principal publications are *New Church Magazine* (quarterly) and *New Church Herald* (weekly). Publication societies are The Swedenborg Society (London, founded, 1810), Missionary and Tract Society, and Manchester New Church Publishing Society.

NEWMAN, HORATIO HACKETT (1875–). An American zoölogist, born near Seale, Ala., and educated at McMaster University and the University of Chicago. He was instructor in zoölogy at the University of Michigan (1905–

08); professor at the University of Texas (1908–11); and associate professor (1911–17), professor (1917–), and dean of the colleges of science (1915–22), at the University of Chicago. He published *The Biology of Twins* (1917); *Vertebrate Zoölogy* (1919); *Readings in Evolution, Genetics and Heredity* (1921); *The Physiology of Twinning* (1923); *Outlines of General Zoölogy* (1924); *The Gist of Evolution* (1926). He was editor of, and contributor to, *The Nature of the World and of Man* (1926).

NEW MEXICO. The fourth State in size (122,634 square miles) and the forty-third in population; capital, Santa Fe. The population increased from 327,301 in 1910 to 360,350 in 1920, a gain of 10.1 per cent; estimated population, 1928, 396,000. The white population increased from 304,594 (1910) to 334,673 (1920); Negro, from 1628 to 5733; native white, from 281,940 to 305,596; and the foreign-born white, from 22,654 to 29,077. Indians in 1920 numbered 19,512; in 1910, 20,573. The urban population of the State rose from 46,571 to 64,960; the rural, from 280,730 to 295,390. The only large city in the State, Albuquerque, increased from 11,020 in 1910 to 15,157 in 1920.

Agriculture. The number of farms, which in the previous decade had decreased 16.3 per cent, increased from 29,844 in 1920 to 31,687 in 1925. The acreage showed a decided increase from 11,270,021 (1910) to 24,409,638 (1920) and to 27,850,325 in 1925. The acreage of improved land in farms was 1,717,224 in 1920. The percentage of the State's total area used for agricultural purposes increased from 14.4 in 1910 to 31.1 in 1920 and 35.5 in 1925. The total value of farm property more than doubled from $159,447,990 in 1910 to $325,185,599 in 1920, but declined to $236,300,563 in 1925; the average value per farm was $4469 in 1910 and $7457 in 1925. In interpreting these values the currency inflation incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 26,005 were operated by owners; 256, by managers; and 5426, by tenants. The comparative figures for 1920 were 33,398; 321; and 1957. White farmers in 1920 numbered 27,969, of whom 26,593 were native. Of the 1875 colored farmers, 1833 were Indians. White farmers in 1910 numbered 33,528; native white farmers, 32,088; and colored farmers, 2148. Farms reported as under mortgage numbered 6257 in 1920; 6897 in 1925. The number of dairy cows decreased from 45,827 in 1920 to 39,383 in 1925; "beef" cows numbered 797,077 in 1920; 691,672 in 1925. Sheep numbered 1,640,475 in 1920; 1,743,079 in 1925; swine, 87,906 in 1920; 55,431 in 1925. The area under irrigation increased from 461,718 acres in 1909 to 538,377 in 1919. The estimated production of the principal farm crops in 1928 was as follows: Corn, 3,482,000 bushels; wheat, 2,054,000; oats, 720,000; and hay 437,000 tons. Comparative figures for 1913 are corn, 1,572,000 bushels; wheat, 1,221,000; oats, 1,500,000; barley, 96,000; potatoes, 612,000; and hay, 399,000 tons.

Mining. New Mexico is rich in mineral resources which have not yet been fully developed, principal among them, in the order of importance, being copper, coal, petroleum, and zinc. The progress of the mineral industry during the period starting with 1914 is indicated by production figures for the principal minerals. The coal production was 3,877,689 net tons, valued at $6,230,871 in 1914; 3,793,011, $5,580,369 (1916); 4,000,527, $7,455,166 (1917); 4,023,239, $10,787,082 (1918); 3,683,440, $13,568,000 (1920); 2,453,482, $9,585,000 (1921); 2,935,539, $9,179,000 (1927). The increased values in 1920 and 1921 were due chiefly to the inflation of the currency and a corresponding decline in the purchasing power of money. The output of gold, copper, silver, lead, and zinc for several years during the period was as shown in the table. The decrease in production in 1921 was due largely to the depression in business conditions which affected metal mining. In addition to the minerals mentioned, the State produces iron ore, sand and gravel, and stone. The total value of mineral production in 1926 was $28,513,991 as compared with $27,883,565 in 1920; $22,679,960 in 1919; $40,631,024 in 1918, and $18,072,919 in 1914.

OUTPUT OF MINERALS IN NEW MEXICO

Year	Copper Pounds	Gold Dollars	Silver Fine ounces	Lead Pounds	Zinc Pounds
1914	59,307,925	1,171,696	1,777,445	1,763,641	18,403,392
1918	98,264,563	682,791	782,421	8,398,239	24,050,324
1920	54,400,691	480,302	768,042	2,869,525	10,013,580
1921	14,267,338	196,822	571,899	678,601	228,000
1922	31,937,207	412,693	752,240	3,012,223	4,496,806
1927	74,251,863	604,483	890,083	16,052,855	59,603,000

Education. There has been steady development in education in New Mexico throughout a long course of years. The elementary schools undertook to furnish education not only in the essential branches but also in vocational training, including agriculture, domestic science, and manual training. The secondary schools during the era of Statehood showed a remarkable increase in their development, both in number and in the ratio of attendance. In addition to these educational activities, the State provided for the education of the blind and the deaf and dumb. The county unit for administration purposes was developed in 1913 and supplemented by the county unit law of 1915 for purposes of taxation. In 1921 the Legislature made provision for an educational auditor, whose duty it was to assist the various agencies throughout the State in the preparation of their financial budgets. The State, in 1917, took advantage of the Federal act which furnished aid to the States for the development of vocational education; under the provisions of the State law, the Board of Education served also as the Vocational Board of Education; and vocational education was provided in both day and night schools. Vocational rehabilitation was also established with very satisfactory results. The total enrollment in the State in 1914 was 67,147. It rose to 87,687 in the year 1925–26; of this number, 79,529 were pupils enrolled in kindergarten and elementary grades and 8158 in high schools. Expenditures for the public day schools in the State in the year 1925–26 were: current, $4,894,309; outlays for new buildings, sites, and equipment, $359,590. The percentage of illiteracy in the State decreased from 23.4 in 1910 to 18.9 in 1920: among the native white population in the same period it declined from 18.8 to 15.2; among the foreign-born, from 31.2 to 28.6; among the Negro, from 15.9 to 4.4.

Finance. State expenditures in the year ended June 30, 1927, according to the U. S. Department of Commerce, were: for maintenance and operation of State governmental departments, $4,917,254 (of which $1,115,808 was aid to local education); for interest on debt, $176,495; for permanent improvements, $3,052,077; total, $8,146,096 (of which $3,946,731 was for highways, $996,097 being for maintenance and $2,950,634 for construction). Revenues were $6,998,951. Of this, property and special taxes formed 27.6 per cent; departmental earnings and charges for State officials' services, 12.7 per cent; sales of licenses and taxation of gasoline, 21.5 per cent. Property valuation was $315,373,405; State taxation thereon, $2,623,523. Net funded State debt on June 30, 1927, was $3,321,279. Highway bonds totaling $2,670,000 were outstanding.

Political and Other Events. In 1914 three amendments to the State constitution were voted on and carried. One of these provided that State and county officials might succeed themselves. Another reduced the term of State and county officials from four to two years, and a third repealed the clause on taxation in the constitution and eliminated the State Board of Equalization. In 1916 the Democrats carried the State, electing A. A. Jones to the Senate. For President, Wilson received 33,527 votes; Hughes, 31,152. The Democratic candidate for governor, E. C. De Baca, was elected. In 1918 the Republicans elected their candidate for governor, O. A. Larrozolo. Albert B. Fall, Republican, was elected United States Senator. In 1920 Merritt C. Mechem, Republican, was elected governor. Harding received 57,634 votes for President; Cox, 46,668. Senator Fall became Secretary of the Interior, and Holm O. Bursum, Republican, was elected senator. The Democrats regained power in 1923, electing James F. Hinkle governor, and reëlected Senator Jones for the Senate. The presidential vote in 1924 was: Coolidge, 54,745; Davis, 48,542; LaFollette, 9543. Merritt C. Mechem was elected governor in 1920, James F. Hinkle in 1922, Arthur T. Hannett (Democrat) in 1924, and Richard C. Dillon in 1926. In 1928 the vote for President was: Hoover, 69,618; Smith, 48,095. Dillon (Republican) was reëlected governor. A measure to increase the term of governors to four years was passed and approved by popular vote in 1927.

Legislation. The Legislature of 1917 enacted a workmen's-compensation law and amended the statutes relating to the administration of justice. In 1919 the Legislature amended the tax laws. It also provided for the recodification of the general banking law and authorized the commission form of government in cities of 10,000 or more population. In 1921 the Legislature made additional provisions for the protection of game, regulated the hours of labor for children, created the office of county flood commissioner, and provided for emergency flood districts and their administration. It also provided for a succession tax, created a Department of Public Welfare, and regulated and limited the working hours of women. The Legislature of 1923 proposed an amendment to increase the term of State officers in the State executive department and county officers from two to four years. The Colorado River Compact was accepted in 1925, and a child-labor act was passed.

NEW ORLEANS, ôr'lē-*anz*. The largest city of Louisiana and a port of entry. The population rose from 339,075 in 1910 to 387,219 in 1920 and to 429,400 in 1928, by estimate of the U. S. Bureau of the Census. Of the 1928 total, 26.1 per cent was Negro and 6.7 per cent, foreign-born. The area is 196 square miles. As a result of the election on Apr. 17, 1928, New Orleans has been enabled to finance needed public improvements without obtaining the approval of the entire State electorate on bond issues for water, sewer, and drainage extensions within the city. The bonds are now approved by the local taxpayer electorate and three local authorities: the City Council, the Sewerage and Water Board, and the Board of Liquidation of the City Debt. The Planning and Zoning Commission has had prepared for the consideration of the City Commission a comprehensive city plan.

The most extensive work carried on by the city since 1914 was the improvement of the port of New Orleans by the construction of the Inner Harbor Navigation Canal. This canal, which joins the Mississippi River and Lake Pontchartrain, connecting with the Gulf of Mexico, is five and one-third miles long and 30 feet deep at low water. It is equipped with a concrete and steel lock 640 feet long and 75 feet wide which permits the passage, even at low water, of 20,000 ton vessels with a draught up to 30 feet. This lock, which was built under the direction of General George W. Goethals, has 75 per cent of the capacity of the bigger lock of the Panama Canal. With the completion of this undertaking in 1923 at a cost of $20,000,000, the water frontage of the port of New Orleans was increased to 52 miles. Sufficient land was acquired within the canal reservation to afford approximately 100,000 acres for industrial development. The river front and Navigation Canal banks are owned and operated by the State of Louisiana and supervised by the Board of Port Commissioners. The municipally-owned Public Belt Railroad affords convenient connection between the water-front facilities, the 12 railroad lines serving New Orleans, all terminals, and local industries requiring switching service.

The equipment of the port of New Orleans includes a public grain elevator holding 2,622,000 bushels of grain, the public cotton warehouse and wharf with a capacity for storing 461,800 bales of cotton, a bulk commodity handling plant, the banana dock with banana conveyors which handle 23,000,000 bunches each year, a huge ore and coal handling plant, and 7 miles of covered wharf sheds including the newly-completed $2,000,000 coffee terminal and the Federal barge terminal. The tonnage of the port in 1927 was 7,697,000 long tons in foreign commerce alone, ranking third to New York. Coastwise cargoes increased from 357,907 tons received in 1917 to 1,689,011 tons in 1927 and from 1,256,214 tons shipped in 1917 to 3,756,654 tons in 1927. The Federal barge line (Mississippi-Warrior Service) handles, between St. Louis and New Orleans, a total of more than 1,250,000 tons of Mississippi Valley commerce.

In 1927, in order to afford a shorter route to the city, there was constructed across Lake Pontchartrain the longest concrete highway bridge in the United States. This structure is more than 5 miles long and cost approximately $5,000,000 to erect. In 1929 the State of Louisiana constructed two additional concrete and steel highway bridges near the city at a cost of approximately $2,000,000, so as to provide an additional artery of traffic and eliminate the necessity of ferry crossings in approaching the city from the north. The city of New Orleans also has undertaken the erection of a municipal auditorium to cost $2,000,000 and the new Criminal Court Building to cost $1,000,000 and, through the sewerage and water board, has been authorized to expend approximately $14,500,000 in expanding and improving the drainage and water-supply system. Through the destruction of cisterns, the installation of a model water purification plant, the rat-proofing of public buildings and docks, and the installation of an elaborate drainage system, yellow fever, malaria, typhoid, and bubonic plague all have been practically eliminated from the health records of the city.

Recently under the direction of the Orleans Parish Levee Board the reclamation of approximately 5 miles of lake front has been started, the new land being created entirely with sand pumped from the bottom of Lake Pontchartrain. Residential districts, parks, bathing beaches, drives, recreation fields, airports, and hotel sites will be provided. The ultimate cost of the improvement, which was voted as a constitutional amendment by the people of the State, is estimated to be $41,000,000.

New Orleans has two commercial airports: the Alvin Callender Airport on the west side of the Mississippi River and 8¾ miles distant therefrom and the Menefee Airport located 6 miles east of the city on the east bank of the Mississippi. The adoption of an amendment to the State constitution in 1928 makes available a municipal airport to be erected by the Orleans Parish Levee Board on the shores of Lake Pontchartrain, 6 miles north of the city. The airport will be 3000 feet long by 3000 feet wide, with sufficient additional area to permit of expansion, and will be equipped with the most modern facilities for the accommodation and serving of both land and water planes.

Within recent years, a tendency has developed among the wealthier citizens of New Orleans to buy and restore old houses in the Vieux Carré, the city's historic quarter, so as to insure their preservation. The famous Patio Royale has been presented to Tulane University, and the Spanish Brulatour mansion now houses the Arts and Crafts Association. The Cabildo, where in Spanish days the governing body of the province used to convene and in which the ceremony of the transfer of Louisiana from France to the United States took place, has been converted into a State museum. The French Opera House was destroyed by fire in 1919. It had been, since its erection in 1859, one of the most famous centres of music in the United States.

New Orleans is the home of the Permanent International Trade Exhibition of the United States. More than 300 industries from 24 States and 11 foreign countries maintain permanent exhibits in the exhibition building which was erected by the United States government at a cost of $5,000,000. In 1925, 22,118 persons were employed in New Orleans' 1200 industrial establishments and received $20,291,000 in wages; the value of products manufactured was $155,106,000.

The public-school system of New Orleans consists of 86 elementary schools, six high schools, one normal school, one industrial school for girls (the Nicholls Industrial School), 15 elementary evening schools, and one evening school for foreigners. There are 19 elementary public day schools for Negroes, one public high school, and 6 elementary evening schools. The public-school enrollment in 1926–27 was 65,590. The parochial schools provided by various denominations consist of 45 elementary schools, three high schools, and five academies. The Delgado Central Trade School is a public institution endowed for more than $1,000,000 and ranking among the first five trade schools in the United States. It provides training in 12 different trades for 1600 boys.

New Orleans is an important financial centre of the South, its bank resources increasing from $186,684,574 in 1917 to $330,171,880 in 1927. The value of building permits issued by the city increased from $2,814,051 in 1917 to $16,011,635 in 1927 and property valuation from $443,157,725 in 1917 to $516,023,000 in 1927. The city's net debt in 1927 was $49,206,000.

NEW SOUTH WALES. A constituent state of the Commonwealth of Australia in the southeastern part of the continent. Area, 310,372 square miles; population in 1911, 1,650,470; in 1921, 2,100,371; average annual increase, 2.4 per cent. The population on Mar. 1, 1928, was 2,415,511. Sydney, the capital and largest city, with suburbs, had 1,101,190 inhabitants in 1927 (629,503 in 1911). Area under crops in 1912–13, 3,737,105 acres; in 1925–26, 4,543,541. Principal crops are wheat, maize, barley, oats, potatoes, and hay. Cane sugar, grapes, and citrus fruits are receiving increasing attention. Grazing is of course a leading activity. Wool production in 1926–27 was 499,320,000 pounds (326,804,000 pounds in 1912–13). Mining in 1927 yielded (1912 figure in parentheses): gold, £76,595 (£702,129); silver and silver-lead ore, £3,487,980 (£3,481,266); tin, £287,539 (£338,074); copper, £12,655 (£579,791); zinc, £996,877 (£1,766,242); coal, £9,782,002 (£3,660,015); iron, £654,230 (£130,708). Manufacturing pursuits engaged 183,193 employees in 1926–27 (115,561 in 1912). Metal works and machinery, and plants concerned with food industries, are the most important. In 1926–27 the value of production of the various industries was: pastoral, £47,822,000; agricultural, £22,098,000; dairying, £14,591,000; forests and fisheries, £6,147,000; mining, £12,352,000; manufacturing, £69,849,000; total, £172,859,000. Imports overseas for 1913 and 1928 were £32,350,600 and £65,072,266; exports for the same years, £32,839,800 and £51,882,929. Leading exports are minerals, wool, dairy products, and meats. On Mar. 31, 1928, 5868 miles of government railways were open; in 1913, the number had been 4197. Total revenues of the Government for 1913–14 and 1927–28 were £18,438,228 and £47,997,372. Expenditures for the same years were £18,065,189 and £48,857,763. The public debt on June 30, 1913, was £106,170,747; by June 30, 1928, it had increased to £245,247,907. The Labor Party gained its first impetus in New South Wales and has controlled the Government more or less regularly.

NEW YORK. The twenty-ninth State in size (49,204 square miles) and the first in population; capital, Albany. Population by the State census of 1925, 11,162,151; estimated population 1928, 11,550,000. The population increased from 9,113,614 in 1910 to 10,385,227 in 1920, or by 14 per cent. Whites increased in number from 8,966,845 to 10,172,027; Negroes, from 134,191 to 198,483; native whites, from 6,237,573 to 7,385,915; and foreign-born whites, from 2,729,272 to 2,786,112. Urban population rose from 7,185,494 to 8,589,844; rural decreased from 1,907,210 to 1,795,383. The growth of the principal cities was as follows: New York (1910), 4,766,883 to (1920) 5,620,048; Buffalo, 423,715 to 506,775; Rochester, 218,149 to 295,750; Syracuse, 137,249 to 171,717; Albany, 100,253 to 113,344 (see articles on these cities).

Agriculture. New York, in common with nearly all the Eastern States, has shown a decline in agriculture in recent years, as compared with growth of population. The number of farms decreased 10.4 per cent or from 215,597 in 1910 to 193,195 in 1920, and decreased 2.3 per cent from 1920 to 1925, or to 188,754; total acreage in farms fell from 20,632,803 in 1920 to 19,269,926 in 1925, or 6.6 per cent. The improved land in farms was 13,158,781 acres in 1920. The total value of farm property rose from $1,451,481,495 in 1910 to $1,908,483,201 in 1920, but declined to $1,706,929,770 in 1925; the average value per farm was $6732 in 1910, $9879 in 1920, and $9043 in 1925. In interpreting these values, the currency inflation incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 159,949 were operated by owners; 2261, by managers; and 26,544 by tenants. The corresponding figures for 1910 are 166,674; 4051; and 44,872. White farmers in 1920 numbered 192,645 and colored farmers, 550. In 1910 the white farmers numbered 214,658 and the colored farmers, 939. The total number of cattle in 1920 was 2,144,244; in 1925, 1,836,900. The increase in the number of dairy cows from 1,509,594 (1910) to 2,081,074 (1920) was reversed thereafter; they numbered 1,370,060 in 1925. The State held second place in milk production, being exceeded only by Wisconsin. Sheep numbered 578,726 in 1920; 472,616 in 1925; swine, 600,560 in 1920; 259,189 in 1925. The estimated production of the principal crops in 1928 was as follows: Corn, 22,100,000 bushels; wheat, 4,702,000; oats, 33,660,000; rye, 758,000; barley, 4,648,000; potatoes, 32,376,000; buckwheat, 3,475,000; apples, 21,900,000; and hay, 6,513,000 tons. Comparative figures for 1913 are corn, 15,020,000 bushels; wheat, 6,800,000; oats, 42,712,000; rye, 2,228,000; barley, 2,056,000; potatoes, 26,640,000; hay, 5,358,000 tons; and tobacco, 4,386,000 pounds.

Manufactures. New York is the most important of the manufacturing States, both in point of the number of establishments and in value of product. In 1920 there were 58 cities with more than 10,000 inhabitants. These formed 78 per cent of the total population of the State and in 1919 reported 87.5 per cent of the State's manufactured products. There were 44,935 manufacturing establishments in the State in 1909; 49,330 in 1919; 33,392 in 1925; and 36,650 in 1927. Wage earners in manufactories numbered 1,228,130 in 1919; 1,066,198 in 1925; and 1,072,284 in 1927. Capital invested amounted to $2,779,496,814 in 1909 and $6,012,082,567 in 1919. The value of products amounted to $3,369,490,192 in 1909; $8,867,004,906 in 1919; $8,968,262,479 in 1925; and $9,406,751,185 in 1927. The large increase in the value of products about 1919 was largely due to changes in industrial conditions brought about by the War and cannot be properly used to measure the normal growth of manufactures during the period; but an increase in the number of wage earners clearly indicated decided growth in the manufacturing activities of the State. The most important industry in the State is the manufacture of women's clothing; the product of this industry, valued at $272,518,000 in 1909, reached $345,316,000 in 1914, and $886,984,000 in 1919. The manufacture of men's clothing ranks second in point of value: $266,075,000 in 1909; $238.627,000 in 1914; and $641,906,000 in 1919. The production of both kinds of clothing in 1925 was $1,495,741,841. The refining of sugar attained totals valued at $124,941,000 in 1914, and at $268,318,000 in 1919. Slaughtering and meat packing had a product valued at $127,130,000 in 1909 and at $265,726,000 in 1919. The printing and publishing product was $216,946,000 in 1909; $478,898,000 in 1919; and $358,009,036 in 1925. The most important manufacturing cities are New York, Buffalo, and Rochester. In New York, there were 25,933 manufacturing establishments in 1909, with a product valued at $2,027,425,000; 32,590 in 1919, with $5,260,708,000; in 1925, the production was valued at $5,324,414,000. Buffalo had 1753 establishments in 1909, with a product valued at $218,804,000; 2093 in 1919, with $634,410,000; and production in 1925 valued at $675,436,000. Similar figures for Rochester were: 1203 in 1909, with $112,676,000; 1367 in 1919, with $351,416,000; and in 1925 production totaling $337,548,000. The other important manufacturing cities are Albany, Binghamton, Niagara Falls, Schenectady, Syracuse, Troy, Utica, and Yonkers.

Mining. Although New York has limited metal mining, it ranked fourteenth among the States in 1926 in the value of its mineral products. The most important minerals are clay, gypsum, cement, and stone. The progress of the clay and cement industries subsequent to 1914 was as follows: In 1914 clay products were valued at $9,078,933; in 1916, $11,755,012; 1920, $19,113,684; 1921, $17,432,086; 1926, $28,999,053. Shipments of cement in 1914 were 5,713,383 barrels valued at $5,143,401; 1916, 5,707,892 barrels, $5,804,444; 1918, 4,074,159, $6,568,746; 1921, 4,993,341, $9,403,015; 1926, 8,535,862, $14,864,066. It will be noted that while the shipments of cement were lower in 1921 than in 1914, the price received was almost double, which was due chiefly to the inflation of currency. In addition to these two minerals, the State produces graphite, a considerable quantity of iron ore, mineral waters, natural gas, petroleum, and sand and gravel. The total value of the mineral production in 1926 was $112,016,262, compared with $78,431,317 in 1920; $56,379,564 in 1919; $52,768,877 in 1918; and $36,420,134 in 1914.

Education. There has been a great development in education in New York during the years subsequent to 1914. In 1914 the establishment of the central rural schools was made possible. In 1917 a measure was passed providing for central high-school districts; school elections in certain cities were regulated by the Legislature. In 1921 and 1922 the laws relating to compulsory education were amended. In 1923 a law was passed providing for State schools of agriculture in St. Lawrence, Alfred, Morrisville, Cobleskill, Delhi, and Farmingdale, under the supervision and direction of the Regents of the University and the Commissioner of Education. Vocational education in general industrial schools, trade schools, schools for agriculture and home economics (also in part-time or continuation schools) was being carried on in all the larger and most of the smaller cities of the State. The benefits of the Smith-Hughes Act providing for vocational education were accepted by a legislative measure in 1917. Farm schools were established throughout the State. The number of public school pupils enrolled increased from 1,532,151 in 1915 to 1,967,447 in 1925–26; of this number, 1,643,215 were enrolled in kindergarten and elementary grades; 324,232 in high-school grades. The percentage of illiteracy in the State decreased from 6.6 in 1910 to 6.4 in 1920: among the native white population, from 1.1 to 0.7 per cent; among the Negro, from 5.8 to 3.4; among the foreign-born white population, it increased from 14.3 to 15.2 per cent.

Finance. State expenditures in the year ending June 30, 1928, as reported by the United States Department of Commerce, were: for maintenance and operation of departments, $169,727,420 (of which $71,550,099 was for local education); for interest on debt, $14,200,688; for permanent improvements, $52,830,044; total, $236,758,152 (of which $51,502,063 was for highways, $24,763,275 being for maintenance and $26,738,788 for construction). Revenues were $240,199,580; of this, property and special taxes formed 56.1 per cent; departmental earnings, 3.3 per cent; receipts from licenses, 30.4 per cent. Assessed property valuation was $22,958,837,107; State taxation thereon, $24,897,004. Net State debt on June 30, 1928, was $259,602,471.

Political and Other Events. The political complexion of the State of late years has been chiefly Republican on national issues and Democratic in elections of governors. New York City has remained Democratic. Gov. Martin H. Glynn, who succeeded to the post on the impeachment and removal of Governor Sulzer in 1913, was in 1914 the Democratic candidate for governor; he was defeated by the Republican nominee, Charles S. Whitman. James Wadsworth, Jr., Republican, was elected senator. At this election, delegates to a constitutional convention were chosen. In February of this year, Joseph Cassidy, former Democratic leader of Queens Borough of New York City, was convicted of selling a nomination for the Supreme Court. William Willett, who paid Cassidy $25,000 for the nomination, was convicted with him. The constitutional convention, authorized in 1914, met on Apr. 5, 1915, and sat until September 9. The constitution that it shaped was defeated by a popular majority of 470,000; woman suffrage, by a vote of more than 200,000. In 1916 Senator Root declined renomination and the Republicans elected William M. Calder. Governor Whitman was reëlected.

For President, Hughes received 863,841 votes in 1916; Wilson, 756,946. In 1917 Mayor Mitchel was a candidate for reëlection as Mayor of New York City, but the Democrats elected John F. Hylan. On Oct. 12, 1917, the Catskill aqueduct carrying water to New York City was opened. In June, 1917, a census of all persons of the State under the age of 45 years was taken, with the purpose of assigning war service. In 1918 nominations were made for governor and other State officers at regular State primaries; the State convention had been abolished. Charles S. Whitman was renominated by the Republicans, and Alfred E. Smith, president of the Board of Aldermen of New York City, by the Democrats. Smith was elected by a close vote. In 1920 Nathan L. Miller was elected governor by the Republicans, defeating Governor Smith. James W. Wadsworth, Jr., was reëlected to the Senate. For President, Harding received 1,868,240 votes; Cox, 781,485. At this election a referendum for a soldiers' bonus providing for a bond issue of $45,000,000 was approved. Investigations by a legislative committee in 1920 exposed much corruption in the building trades. In 1921 Hylan was reëlected Mayor of New York City by a plurality of more than 400,000 votes. At this election several amendments to the constitution were carried. One of these provided for a literacy test for voting, including the requirement that the voters should know the English language.

The Court of Appeals on Aug. 31, 1921, declared the Bonus Act of 1920 unconstitutional. In 1922 a new election law went into effect, providing that Judges and United States Senators were to be nominated by the convention, while candidates for the House of Representatives, for State Legislature, and for local officers were to be nominated by primaries. For governor, Nathan I. Miller ran again and was defeated by Alfred E. Smith. For United States Senator, Dr. Royal S. Copeland was nominated by the Democrats and was elected. In the Legislature, the Democrats secured a majority of one in the Senate, while the Republicans retained control of the Assembly. On Mar. 31, 1923, the Supreme Court held that the Anti-Saloon League was a political organization subject to the corrupt-practices law, and it was required to file a verified statement of campaign expenditures. In the election of November, 1923, a constitutional amendment providing for absentee voting was carried by a large majority. Another measure sanctioning a $50,000,000 bond issue for State hospitals also was carried, and so was the proposal for a soldiers' bonus. On Dec. 9, 1923, the Cayuga Indians, after 111 years of exclusion, regained their representation in the supreme council of the Six Nations of the Iroquois Confederacy. An inquiry was carried on in the House of Representatives in 1924 in regard to the right of Sol Bloom, elected on June 28, 1923, to sit as a member. It was charged by his Republican opponent, W. M. Chandler, that he had been elected by corrupt methods. The investigating committee decided in favor of Bloom.

In 1924 the vote for President was: Coolidge, 1,820,058; Davis, 950,796; LaFollette, 467,293. Smith was reëlected governor. As a result of enactments at a special session of the Legislature in 1925, the State entered on a programme of $10,000,000 expenditure yearly for 10 years, to be defrayed by bonds, to modernize State institutions. It also undertook a $300,000,000 plan for the elimination of grade crossings of railroads and highways. James J. Walker, Democrat, was elected Mayor of New York in 1925. Smith was reëlected governor in 1926, and the voters gave a heavy majority for a referendum proposal looking to modification of the Volstead Act. In 1927 the voters rejected a proposed constitutional amendment to make State office terms quadrennial, with elections coinciding with those of Presidents; they approved amendments creating an executive budget, exempting water-supply debt from city debt limits, and granting exemption from debt limit to New York City for $300,000,000 of subway construction. Mrs. Florence E. S. Knapp, ex-Secretary of State, was convicted in 1928 of criminal irregularity in expenditure of State funds provided for the State census of 1925. The presidential vote in 1928 was: Hoover, 2,193,344; Smith, 2,089,863. Franklin D. Roosevelt, Democrat, was elected governor.

Legislation. The Legislature in New York meets annually. In 1914 it passed a measure providing pensions for widowed mothers. The Legislature in 1917 created a State food supply commission and provided for compulsory military training for boys between the ages of 16 and 18. The public-health law was amended and a State constabulary force was authorized. The Legislature of 1919 passed an income-tax law. This Legislature also passed a measure repealing the statute punishing as a crime attempts to commit suicide. At the legislative session of 1920, five Socialist members of the Assembly, who were charged with disloyalty, were expelled. Three sedition laws passed by the Legislature were vetoed by the governor, and so were laws making Socialists ineligible for political office. In 1921 the Legislature reorganized the Public Service Commission and created a transit commission for New York City. It repealed the presidential-primaries law and abolished the direct primary for United States Senator, State Supreme Court judges, and officers elected by the State at large. It also provided for the enforcement of prohibition and the Volstead Act by local authorities. A measure was enacted providing for a bi-State Port of New York Authority to carry out works for the improvement of New York Harbor, under a compact with the State of New Jersey.

The Legislature of 1922 passed several bills for the relief of the housing situation. This Legislature also created a Veterans' Relief Commission and by an amendment to the marriage law it made absence for five years a ground for divorce. In 1923, because of judicial decisions that had made it possible to try prohibition offenders in Federal and again in State tribunals for one and the same act, the Legislature repealed the Mullan-Gage Prohibition Enforcement Law so as to leave the enforcement of prohibition in the State entirely under Federal law. At this Legislature, a measure was passed compelling the Ku-Klux Klan to abandon secrecy in its practices. A measure also was passed making a robber who uses an automobile or motor vehicle in the commission of crime guilty of robbery in the first degree. The Legislature also passed a measure intended to reorganize the administrative machinery of the State government by abolishing the election of secretary of State, treasurer, and State engineer and surveyor. In 1924 a compromise transit law was passed which gave New York City power to complete and control new subways. The income-tax law was revised.

Particularly important to the water needs of New York City, a water compact for the joint utilization of the Delaware River was executed by New York, New Jersey, and Pennsylvania in 1925, but the latter two States had not ratified this compact up to the end of 1928. An enactment of 1925 imposed a tax on decedents' estates. In 1926 an executive budget was provided and the State administration was reorganized so as to merge some 180 bodies into 18 departments. The State Water Power Commission, which had antagonized the water-power policy of Governor Smith, was abolished. In 1926 and again in 1927, a constitutional amendment was passed to extend the terms of elective State officers to four years, their election to coincide with that of Presidents; this was submitted to popular vote and was rejected thereby in 1927. A series of amendments of the criminal law, recommended by the Baumes Commission, were passed, 1926–28; they provided increasing penalties for repeating offenders, up to life imprisonment. The child-labor law was made in 1928 to apply in some respects up to the age of 17.

NEW YORK. The largest city and seaport of North America. The population increased from 4,766,883 in 1910 to 5,620,048 in 1920, to 5,873,356 in 1925 (State census), and to 6,017,500 in 1928, according to estimate of the U. S. Bureau of the Census. In 1928 the population was distributed in the boroughs as follows (State figures for 1925 in parentheses): Manhattan, 1,752,000 (1,945,029); the Bronx, 951,900 (872,168); Brooklyn, 2,308,500 (2,203,991); Queens, 854,400 (713,891); and Richmond, 150,700 (138,277). These figures indicate the stationary position of the Borough of Manhattan and the extraordinary growth of Queens and Brooklyn. The area is 316 square miles.

Many elaborate enterprises have been carried out by the city since 1914, but most significant has been the work of the Port of New York Authority. In 1921 the State of New York and New Jersey entered into a compact which was ratified by the Congress of the United States, creating the Port of New York Authority and charging it with the duty of developing the Port of New York, particularly with reference to freight-handling facilities. The Port Authority consists of three Commissioners from each State and functions independently of legislative control. This body has jurisdiction over an area of 1463 square miles with a water frontage of 771 miles, 578 miles of which are in New York and 193 miles in New Jersey. Along this water front, there are more than 850 piers, and it is estimated that more than 75,000,000 tons of freight annually move in and out of the port. Of this amount, 40,000,000 tons are transported by steamships, there being approximately 200 companies operating ships in and out of the port. The foreign commerce of the port in 1927 amounted to 25,275,933 tons, of which 13,315,114 tons were imports and 11,960,819 tons exports. In 1928, a total of 6761 vessels of 29,066,546 tons entered the port, and 6830 vessels of 29,248,183 tons were cleared.

Development of the port has gone steadily forward since 1920. During 1920–22, 12 piers between 1026 and 1137 feet long and from 125 to 209 feet wide were built on Staten Island, with rail connection with the main railroads of New Jersey. The City of New York extended a number of its piers on the North River to accommodate the ever-increasing size of ocean vessels and in 1929, without success, requested the United States War Department to permit the construction of still longer piers. In addition to the construction of the 40-ft. Ambrose Channel, with its illuminated buoys permitting access to the harbor of the largest vessels, extensive dredging was carried on to provide a 40-ft. channel between the Upper Bay and Brooklyn and to remove various reefs in the East River. In 1925 the construction of a 30-ft. channel in Jamaica Bay was undertaken. The total cost of the improvement was estimated at approximately $29,000,000,

$12,000,000 to be contributed by the Federal government and $17,000,000 by the City of New York. The work involved the excavation of about 16,000,000 cubic yards of sand, which was deposited upon the city-owned land adjacent to the channel. Jamaica Bay covers 32 square miles of area and has 25 miles of direct water frontage.

In connection with the development of the New York State Barge Canal, the State constructed at Piers 5 and 6 in the East River a terminal basin for barge fleets. There were also erected at Gowanus Bay, Brooklyn, a bulkhead wall 900 feet long and a pier 1200 feet long, a steel freight house, and a $2,000,000 grain elevator with a capacity of 2,000,000 bushels. These terminals are operated under the direction of the Commissioner of Canals and Waterways in the Department of the State Superintendent of Public Works. In 1929 the New York Dock Company was constructing along its two and a half miles of waterfront on the Brooklyn shore additional manufacturing and storage buildings involving an expenditure of $10,000,000.

Improvements carried out by the Port of New York Authority have included the construction of Belt Line 13 from Edgewater to Bayonne, N. J., and the establishment of the first of a series of inland freight stations serving 11 trunk railroad lines. These stations are to be located conveniently with respect to shippers and receivers, and are to be served from the various railroad terminals by a system of motor trucks and later by underground rail connections.

New York, which long has had a notable group of suspension bridges across the East River, has continued bridge construction. In 1917 the Hell Gate railroad bridge was built over the East River from Long Island to the Bronx, a distance of more than three miles, with a single steel arch of 1000-ft. span and a long concrete viaduct; over this bridge are routed fast passenger trains from New England to the South and West via the Pennsylvania Terminal. In 1923, in accordance with orders from the War Department, the stone piers of the High Bridge in the Harlem River were replaced by a single steel arch with a span of 425 feet and a navigation clearance height at the centre 100 feet above mean high water; the cost of the project was approximately $716,000. The Port of New York Authority, on assuming office, was directed by the States of New York and New Jersey to construct four interstate bridges, the funds being realized from the sale of Port Authority bonds, supplemented by certain advances made by the States. Between 1926 and 1928, two bridges were constructed across the Arthur Kill, connecting Staten Island and New Jersey, at a cost of approximately $18,000,000. The southern bridge with a 750-ft. central span crossed between Perth Amboy, N. J., and Tottenville, S. I., and was named the Outerbridge Crossing in honor of E. H. Outerbridge, the first chairman of the Port of New York Authority. The northern structure, also of the cantilever type but with a somewhat smaller span, was named the Goethals Bridge in honor of the famous army engineer; it crossed from Elizabeth, N. J., to Howland Hook, S. I. In 1928 construction was begun on a third bridge across the Kill van Kull from Bayonne, N. J., to Port Richmond, S. I. When completed in 1932, it will be the longest bridge of its type in the world, its span of 1675 feet exceeding by 25 feet the steel arch of the newly-constructed bridge over Sydney Harbor in Australia. The cost of construction was estimated at $16,000,000.

On Sept. 21, 1927, ground was broken for the construction of the mammoth double-deck suspension bridge between Fort Washington in Manhattan and Fort Lee in New Jersey. The bridge, which is scheduled for completion in 1932, will be the longest suspension bridge in the world and will cost approximately $60,000,000. Its single span of 3500 feet will have a clear height above water of about 200 feet. In 1928 construction of a new vehicular roadway on the upper deck of the Queensboro Bridge was approved by the Board of Estimate at a cost of $6,000,000. The new roadway will increase the number of traffic lanes from six to nine and the capacity of the bridge, which is approximately 65,000 cars a day, by about 50 per cent. In 1929 the city decided to proceed with the construction of the Tri-borough Toll Bridge, connecting Queens with the Bronx and Manhattan. See BRIDGES.

Between 1914 and 1920, rapid transit facilities were greatly extended by the addition of a third track for express service to the Second, Third, and Ninth Avenue elevated lines at a cost of $26,000,000 and by additional construction on the lines operated by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. The latter improvement involved the extension of the Fourth Avenue line of the Interborough up Lexington Avenue to Kingsbridge Road and Bronx Park and of the Broadway line of the B. R. T. downtown from Lexington Avenue and 60th Street to DeKalb Avenue, Brooklyn. The additions totaled about 45 miles of single tracks. Half of the cost of $330,000,000 was met by the city and half, by the operating companies. In 1919 the Brooklyn Rapid Transit Company went into the hands of a receiver, and in 1923 the Brooklyn-Manhattan Transit Corporation took over control of its properties.

The long-standing deadlock between the State-appointed Transit Commission and the city authorities was partially resolved in 1924 by the Legislature's authorization of the appointment of the Board of Transportation by the Mayor. The board was entrusted with the choice of new subway routes, the construction of new lines and their operation, and the construction of uncompleted portions of the lines already projected. In 1925 construction of 54.79 miles of rapid transit, to supplement the systems of the Interborough and the B. M. T., was undertaken at an estimated cost of $506,765,000. The lines comprised the Queensboro subway, giving service between Times Square, Manhattan, and Flushing, Long Island; the 14th Street-Eastern subway in Brooklyn; the so-called Nassau Street loop in Manhattan connecting the B. M. T. station under the Municipal Building with the Montague Street tunnel of the B. M. T.; the Washington Heights Line, extending from the upper end of Manhattan along Broadway and St. Nicholas and Eighth Avenues to Fulton Street, with a cross-connection at 53d Street to Long Island City; the Cranberry-Culver line from Church Street, Manhattan, to Cortelyou Road, Brooklyn; the Brooklyn Crosstown line from Nott Avenue to Ft. Green Place; the Houston-Jay Street line from Sixth Avenue, Manhattan, to High Street, Brooklyn; the Bronx Concourse line from St. Nicholas Place to Webster Avenue; the Long Island City-Jamaica line from East Avenue to 178th Street; the Schermerhorn-Fulton Street line from Court Street to

By Ewing Galloway, N. Y.

NEW YORK

LOWER PART OF NEW YORK FROM GOVERNOR'S ISLAND

Alabama Avenue, Brooklyn; and the Sixth Avenue line from 53d Street to Eighth Street, Manhattan. The Queensboro subway and the 14th Street-Eastern subway were opened in 1928, and by the end of the year the Washington Heights line was largely completed from 212th Street and Broadway south to Church Street at Fulton Street.

In 1929, 37 miles of subways in the boroughs of Manhattan, Bronx, Brooklyn, and Queens were under construction, costing approximately $305,000,000. These lines included three underriver tunnels: one from lower Manhattan to Brooklyn at Fulton Street, another from 53d Street to Long Island City, and the third under the Harlem River from 155th Street, Manhattan, to 161st Street in the Bronx. In 1927, 40 B.M.T. stations were lengthened at a cost of $1,106,340, so as to accommodate eight-car trains, thus standardizing the length of all trains in service on this line and increasing the passenger-carrying capacity of each train by 33⅓ per cent. During the fiscal year ending June 30, 1928, the rapid transit and surface lines of New York carried a total of 2,921,200,000 passengers, an increase of 76,700,000 or 2.7 per cent over the preceding year.

The Holland Tunnel under the Hudson River to Jersey City, which was begun in 1922, was officially opened on Nov. 13, 1927. (See TUNNELS.) In 1929 two additional vehicular tunnels received the indorsement of the city's Board of Estimate. One was to accommodate vehicular traffic across Manhattan under 38th Street and the East River to the Borough of Queens and will have a branch terminating in the Greenpoint section of Brooklyn. The other will cross the Narrows from South Brooklyn to Staten Island. In 1919 the city built a viaduct from Park Avenue across 42d Street overgrade to an elevated roadway passing round the west side of Grand Central Terminal, and in 1929 also around the east side, both passing under the new Grand Central Building and again to Park Avenue. In 1928 a viaduct, carrying Riverside Drive across the valley from 155th to 161st Streets, Manhattan, was completed at a cost of $2,360,000. In 1929 there was signed between the New York Central Railroad and the City of New York the final contract for the carrying out of the $175,000,000 West Side improvement plan in Manhattan. The plan called for the elimination of all grade crossings from St. John Park (Beach Street) to Spuyten Duyvil, the removal of tracks from 11th Avenue, and the beautification of Riverside Drive. The reaching of this agreement closed 40 years of negotiation between the railroad and the city over this project. The tracks along Riverside Drive were to be roofed over so as to enable the city to carry out its project of an elevated express highway extending from Canal Street along the West Side waterfront. The New York Central Railroad was to contribute $110,000,000; the city, $50,000,000; and the State of New York, $15,000,000 toward the cost of the improvement which is to be completed by 1936.

In 1917 the city's main water-supply system, the Catskill Aqueduct, was formally opened some 12 years after the beginning of the development of that region. The aqueduct had its origin in the Esopus and Schoharie watersheds with areas of 257 and 314 square miles, respectively. In 1924 construction of Gilboa Dam was completed. This dam, 160 feet high, was used for impounding the waters of Schoharie Creek in a reservoir of 20,000,000,000-gallon capacity. The Shandaken Tunnel carried the water a distance of 18 miles to the Ashokan Reservoir, an artificial lake 12 miles long, which was used for impounding purposes; and the Catskill Aqueduct, extending 92 miles from the Ashokan Reservoir to the northern boundary of the city, carried 250,000,000 gallons of water daily to be distributed by 56 miles of tunnel and pipe lines within the city limits. Other reservoirs included in the system are the Kensico storage reservoir near White Plains, the Hillside equalizing reservoir in the city of Yonkers, and the Silver Lake terminal reservoir on Staten Island. In 1929 the construction of a supplementary pressure tunnel, 17 feet in diameter and 20 miles long, was undertaken. The tunnel was to extend from Hill View Reservoir in Yonkers to Hamilton Avenue and Hicks Street in Brooklyn and was expected to be completed in 1932.

In 1916 a zoning plan was adopted by the city to regulate the use to which buildings may be put, their heights in relation to street widths, and the percentage of the area of the lots permitted to be covered. The heights of buildings are regulated chiefly by the width of the street on which they front, with variations for different parts of the city. A tower covering not more than one-fourth of the area of the lot, however, may be carried to any height; setbacks also may be used to increase somewhat the permitted height for the rest of the building. The Russell Sage Foundation in 1922 announced the preparation of a project for an inclusive plan for New York and its environs as far as Bridgeport, Conn., West Point, N. Y., and Princeton, N. J., and including all of Long Island and a large part of the New Jersey coast. The study was completed in 1929 at a cost to the Foundation of approximately $1,000,000 and covered highway, suburban rapid transit, trunk railroad, waterway, airport, and other needs of New York and its environs for a population of approximately 20,000,000 in 1965.

The opening of the Columbia-Presbyterian Medical Centre on Washington Heights at 168th Street in 1928 marked the completion of the first section of a notable group of combined hospital and medical school buildings designed on skyscraper lines. This great coöperative achievement includes the College of Physicians and Surgeons of Columbia University, the De Lamar Institute of Public Health, the School of Dental and Oral Surgery, the School of Oral Hygiene, the New York State Psychiatric Institute and Hospital, the Presbyterian Hospital of New York, the Presbyterian Hospital School of Nursing, the Squier Urological Clinic, the Harkness Private Pavilion, the Neurological Institute of New York, the Babies' Hospital of New York, the Sloane Hospital for Women, and the Vanderbilt Clinic. In 1929 a site for the proposed Cornell-New York Hospital Medical Centre was secured overlooking the East River between 68th and 70th Streets near the Rockefeller Institute.

Among the notable structures which have been erected since 1918 are the Bush Terminal, American Radiator, Standard Oil, Federal Reserve Bank, S. W. Straus, Farmers Loan & Trust Co., Equitable Life Assurance, Barclay-Vesey (New York Telephone Company), Fred F. French, Salmon Tower, and Graybar buildings; the Commodore, Pennsylvania, Ambassador, Savoy-Plaza, and Sherry-Netherlands hotels; the Guild

Theatre; New York Life Insurance and Chanin buildings; and the Church of the Heavenly Rest (Protestant Episcopal), and Synagogue of the Congregation Emanu-El. In 1929 a $1,000,000 building was being erected at Fifth Avenue and 103d Street to house the Museum of the City of New York, founded in 1923 and temporarily located in the Gracie Mansion in Carl Schurz Park. Plans called for the construction of a $15,000,000 Museum of the Peaceful Arts (industrial) and a new $6,000,000 building for Hunter College, together with the new $3,500,000 De Witt Clinton High School, on the site of the former Jerome Park Reservoir. Additions to the Metropolitan Museum of Art since 1924 include: the George Gray Barnard collection of Gothic art installed at the Cloisters on Fort Washington Avenue; Wing K, containing collections of Greek and Roman art; and the American Wing. An additional building also was erected by the city for the American Museum of Natural History. There have been important residential and apartment-house developments overlooking the East River at 42d Street, Sutton Place (57th Street), and on East End Avenue around 86th Street.

The city's public-school system, as of Sept. 30, 1928, comprised 710 day and evening schools with a total registration of 1,182,441. Among the high schools erected in 1928 were: Textile High School ($2,500,000), Evander Childs High School ($2,533,000), John Adams High School ($2,500,000), Seward Park High School ($2,225,000), Samuel J. Tilden High School ($2,300,000), and Abraham Lincoln High School ($2,450,000). The school appropriation for 1929 amounted to $46,150,000 and provided for the construction of 53 new school buildings and additions to 21 existing structures.

In 1929 the New York municipal airport, named in honor of Floyd Bennett, was constructed on Barren Island in Jamaica Bay about 12½ miles east of the Pennsylvania Station at a cost of $2,500,000. It embraced 387 acres and included all facilities for land and sea planes.

New York is the home of the Federal Reserve Bank of the second district. Bank clearings rose from $83,018,580,016 in 1914 to $213,996,182,727 in 1923 and to $391,627,476,000 in 1928. The value of products manufactured rose from $2,029,692,576 in 1910 to $5,259,477,577 in 1919 and to $5,324,414,000 in 1925. The assessed valuation of taxable real estate in 1929 was approximately $16,500,000,000; the net debt in 1927 was $1,394,476,000.

NEW YORK, College of the City of. A free municipal college at Washington Heights, New York City, established in 1848 by the Board of Education of the city. The student enrollment rose from 7998 in 1914 to 23,761 in the fall of 1928, the faculty from 218 to 650 members, and the annual income from $684,963 to $3,540,127.58. The number of volumes in the main library, exclusive of pamphlets, increased from 47,589 to 89,000. In that period, departments were established in engineering and military science; the departments of Greek and Latin were consolidated into the department of classical languages; the department of natural history was divided into the departments of biology and geology, and the department of political science into the departments of economics and government and sociology; and in 1928 a new department of accountancy was formed. A course leading to the degree of bachelor of science in social science, in addition to the previously existing courses leading to the degrees of bachelor of arts and bachelor of science, was established in 1916. The Brooklyn branch of the evening session was begun in the following year and the entire evening session was opened to women; also in 1917 a summer session was established. In 1919 the first professional schools of technology and business and civic administration, with their own deans and faculties, were founded, and the college was given the name of the College of Liberal Arts and Science. The work of the school of business and civic administration was carried on not only in the Washington Heights buildings and the evening session in Brooklyn, but also at the original site of the college at Twenty-third Street and Lexington Avenue, in a new building on that site costing $1,500,000 the cornerstone of which was laid in the latter part of 1928. The professional school of education was founded on similar terms in 1921; its work was carried on in the Washington Heights buildings and at various centres in different boroughs in the city. The Brooklyn Center, a day college for men, was opened in September, 1926. The curriculum of the College was revised for new students beginning in 1928. President, Frederick B. Robinson, Ph.D., LL.D.

NEW YORK PHILHARMONIC SOCIETY. See Music, *Orchestras.*

NEW YORK STATE COLLEGE FOR TEACHERS. A coeducational State institution for the training of high-school teachers at Albany, N. Y., founded as a State normal school in 1844, and chartered as the State College for Teachers by the Board of Regents in 1905. Courses are offered in liberal arts and sciences, in commercial education, and there is a graduate course in education. The student enrollment was increased from 450 in 1914 to 1200 in 1928–29 and the freshman class limited to 300 each year. The summer session in 1928 had an enrollment of 737. The income from legislative appropriations increased from $97,000 to $335,843 in 1928. In 1923 the Legislature appropriated money for the construction of William J. Milne Hall, providing facilities for a practice high school, laboratories, a large lecture hall and recitation rooms; and the alumni pledged $150,000 for a residence hall. In addition to a special reference library, the college uses the State Library of 1,500,000 volumes. Abram Royer Brubacher became president in 1915.

NEW YORK SYMPHONY ORCHESTRA. See Music, *Orchestras.*

NEW YORK UNIVERSITY. A nonsectarian institution in New York City, chartered in 1831. The university increased its enrollment from 5233 in 1914 to 33,692 in 1927–28. The graduate division of business administration was established in 1916; two degrees were then authorized—master of business administration in 1920 and doctor of commercial science in 1923—and the division of oriental commerce and politics was inaugurated. The Ingram Institute for Economic Education and the school of retailing were founded in 1918, and the degree of master of science in retailing was authorized in 1921. In 1920 the name of the school of applied sciences was changed to the college of engineering. A steam engineering plant was built in 1919 and the Sage Engineering Building, for which about $250,000 worth of equipment was assembled, was authorized in the same year. The engineering research laboratory was built at University Heights in 1920-21 at a cost of $345,000. The Nichols Chemistry Building at University Heights, costing $600,000, was completed in 1927. Evening courses were started in the College in 1921 and in 1923 plans were made for courses in aëronautical engineering.

The medical college was opened to women in 1918. In 1921 the State bacteriological laboratory was built at a cost of $105,000, and the Helen Hartley Jenkins gift of $150,000 was received. Medical preparatory courses were offered at the Flower Hospital, and medical and dental preparatory courses in the evenings at Washington Irving High School. The school of pedagogy was renamed the school of education and an undergraduate division was established.

The productive endowment increased from $1,225,227 in 1914 to $4,290,325.60 in 1928 and the budget from $592,391 to $5,569,656.89. During the period, the following buildings were bought or erected: the Trinity Building for the Wall Street division of the school of commerce, a university apartment house, an addition to the chemistry laboratory and a residence house, both at University Heights. Additional space in the Washington Square Building was taken over and other buildings acquired for classroom use. A new building for the school of education was erected early in 1929 at Fourth and Greene Streets, just off Washington Square. In 1928 a bequest of $500,000 was received from the late Emily O. Butler, and in the same year a gift of $1,000,000 was received from the Straus family. Chancellor, Elmer Ellsworth Brown, Ph.D., LL.D.

NEW ZEALAND. A British dominion in the southern Pacific, made up principally of North and South Islands, with Steward Island included. Area, 103,862 square miles; population in 1911, exclusive of Maoris, 1,008,468; in 1921, 1,218,913; average annual increase, 2.2 per cent. Estimated population June 30, 1928, 1,389,076, exclusive of 65,004 Maoris. The birth rate in 1927 was 20.29 per 1000 (26.48 in 1912); the death rate, 8.45 (8.87 in 1912); and the marriage rate, 7.90 (8.81 in 1912). In 1926 the excess of immigration over emigration was 11,860 and in 1927, 2428 (in 1912, 8927). Estimated populations of chief towns, with suburbs, on Apr. 1, 1928 (1911 figure in parentheses): Auckland, 206,810 (102,676); Wellington, 130,120 (70,729); Christchurch, 123,370 (80,193); Dunedin, 84,060 (64,237). At the end of 1927 there were 2601 public primary schools with a registration of 223,388; 43 endowed secondary schools with 14,190 pupils; 134 native schools with 6620 pupils; 4 university colleges with 4878 students. The expenditure for public education in 1927–28 was £3,769,969; in 1912–13 it was £1,334,599.

Agriculture. In 1926 there were 1,990,000 acres of arable land in New Zealand, or about 3 per cent of the total area; 16,680,000 acres of permanent meadow and pasture; 163,000 acres of trees, shrubs, and bushes; and about 13,000,000 acres of forest. The total area under cultivation in 1927 was 18,830,436 acres. In 1928 there were 3,530,811 cattle, 586,704 swine, 27,133,810 sheep, 26,000 goats, and 307,160 horses. Animal husbandry is much the major industry of the country. In 1928 there were produced 9,541,000 bushels of wheat, 862,000 bushels of barley, 3,852,000 bushels of oats, and 4,424,000 bushels of potatoes (1927–28 figures). The following table gives the production of the principal animal products in thousands of pounds.

Product	1912–13	1923–24	1924–25	1925–26	1926–27
Factory butter	64,633	161,603	181,925	173,009	.....
Cheese	76,395	171,918	160,893	170,259	.....
Wool	202,177	218,369	200,536	223,884	226,032
Pork, bacon, and ham	25,013	41,620	51,614	52,811	57,762
Meats, frozen and preserved [a]	5,885 [b]	13,262	15,812	14,678	13,631

[a] £1,000 [b] 1910–11

Manufacturing. In recent years, advances in manufacturing have been important. While factories only increased from 4402 in 1910 to 5088 in 1926–27, the number of hands increased from 56,234 to 81,904 and capital from £16,731,359 to £62,723,125. The total value of products in 1926–27 was £83,012,503; of this, meat freezing and preserving accounted for £13,630,714; butter and cheese factories, for £19,021,878. Water-power development is going forward at a rapid pace considering the newness of the country and the small population. More than £6,000,000 had been spent on its development up to 1927. Mining is of relatively little importance, the principal minerals being gold and coal, the value of 1927 production, £534,639 and £2,223,300 (respectively).

Commerce. Imports for 1913, 1920, and 1927 were £22,288,302, £61,595,828, and £44,783,000. Exports for the same years were £22,986,722, £46,441,946, and £48,496,354. Proportions of value by countries of origin of New Zealand's imports for 1913 and 1927 were: the United Kingdom, 60 and 48 per cent; other British possessions, 24 and 15 per cent; the United States, 9 and 17 per cent. Proportions for exports were: the United Kingdom, 80 and 76 per cent; other British possessions, 14 and 11 per cent; the United States, 3 and 5.5 per cent. For 1927 imports from the United States were £7,827,755. The most important American products imported are automobiles and machinery. In 1913, 645 vessels of 1,738,985 tons entered, and 635 vessels of 1,699,807 tons cleared, New Zealand ports; in 1927, 634 vessels of 2,195,804 tons entered and 633 vessels of 2,200,763 tons cleared. New Zealand's registered ships employed wholly or partly in the coastal trade totaled 208 of 34,609 tons in 1927, as compared to 404 of 113,341 tons in 1913. New Zealand ships in foreign trade totaled 50 ships of 65,520 tons in 1927 and 29 of 27,015 in 1913.

Communications. In 1928 there were 3180 miles of government-owned railways and only 117 miles of private lines. In 1914 government railways aggregated 2863 miles.

Finance. Total revenues for 1913–14 were £11,961,493; for 1927–28, £25,123,980. Total expenditures for the same years were £11,825,864 and £24,944,905. Estimates for 1928–29 were: revenues, £23,868,250 and expenditures, £23,608,104. The public debt in 1914 was £99,730,427; in 1928, £251,396,252, of which war expenditures (1914–19) accounted for £71,970,636.

History. On July 10, 1912, W. F. Massey, leader of the Reform Party, succeeded the Liberal, Sir Joseph Ward, as Premier. For the next 13 years, his dominant personality ruled the political destinies of the Dominion. Important administrative reforms were undertaken, aiming at further decentralization in the governmental machinery, as well as reformation of the legislative council. The land question was brought nearer settlement when the law of 1912 allowed settlers on improved land to purchase their holdings. It became evident, therefore, that the state relinquished its early policy of state participation in the benefits of the unearned increment. The extreme state socialism which had been typical of New Zealand history up to 1911 and which was made possible by the union of the Labor elements with the Liberal Party, was terminated as the industrialization of the country proceeded and the stratification into classes became more perceptible. The farmers had become more conservative as bulwarks were erected for the safeguarding of private property; the laboring classes had become more radical with the appearance of a wealthy group in the population. The result was the growth of the Labor Party and the decision of workers not to accept decrees of the Arbitration Court but to try their strength in the strike. Bitter industrial conflicts became frequent, those of 1912 and 1913 being characterized particularly by ill feeling.

The World War momentarily put a stop to all internal questions. Volunteer forces were raised for action in German Samoa; the Government was empowered to fix prices and to suspend the labor laws; rent laws were passed (1916), and in 1915 a coalition cabinet was formed for the more effective prosecution of the War. In 1916 a conscription act was passed, though not without opposition, for, in 1917, the coal miners went on strike to secure total exemption. A total of 124,121 men were enrolled in the army, about 90,000 of them volunteers. War financing was based on loans rather than revenues, although some increases were made in taxation, notably in higher income taxes, stamp duties, customs, railway fares, etc. Beginning with 1916, several loans were floated to an approximate total of £100,000,000. The easy success with which all this was accomplished was due to the prosperity which the Dominion enjoyed throughout the War. Most of New Zealand's exports, meats, cheese, wool, hides, sheepskins, were contracted for by the British government, and though prices were fixed, sales reached enormous proportions. By 1921 more than £160,000,000 in produce was sold in this fashion. In spite of the rise in the cost of living, therefore, no class of society was touched by want. Through the fixing of prices of household necessities by the Board of Trade, the importation of wheat in 1918, when a local shortage impended, and the purchase of sugar abroad, retail prices were kept within reason. By the agency of the Court of Arbitration, wages were reviewed and increased to meet mounting costs.

In 1919 the coalition came to an end with the withdrawal of Sir Joseph Ward from the cabinet. The election which followed indicated the increasingly radical temper of Labor. The syndicalist tinge which industrial agitation had taken on was reflected in the outspoken socialist platform of the Labor Party. The election results, however, showed the conservatism of the average voter. Massey's Reform Party elected 47 members, the Liberals only 20, and Labor 8. Labor troubles continued through 1919 and 1920, and the latter year was marked by a general strike of the railway workers. The world depression of 1921, which struck the farmers in particular, and the general unemployment were reflected in the political realignments. In the 1922 elections, the Government seats were reduced to 38; Liberals elected 25; Labor, 17. Two questions of importance locally were the status of the repatriated soldiers and the vote on prohibition. Beginning with 1915, pension and settlement acts were put on the statute books, so that by 1921 upward of 35,000 pensions had been granted and more than 7000 soldiers settled on the land. A repatriation department was created for the vocational guidance of ex-service men. By 1922 more than £30,000,000 had been spent in this work of repatriation.

Polls continued to be taken on national prohibition. By the law of 1918, a triennial vote was ordered on three possibilities: prohibition, license, and state control. A majority of the total vote cast was made necessary for passage. The votes in 1919, 1922, and 1925 all gave prohibition a plurality, but never a majority. In 1928 the majority cast against prohibition and in favor of licensing was close to 200,000.

Massey died in office on May 10, 1925, and was temporarily succeeded by Attorney General Sir Francis Bell, who was Premier from May 15 to May 27. Then the Reform Party elected J. G. Coates as its new leader, and he automatically became the new Premier on May 30, 1925. In the elections of Nov. 4, 1925, the Government won 53 seats out of the total of 80 in the Lower House, and so Coates continued in office for the next three years. The verdict, however, was reversed in the elections of Nov. 14, 1928, in which the Reform Party secured only 27 seats, while the United Liberals also got 27 seats and the Labor Party got 19. The remaining seven seats were scattered among various independents. The United Liberal leader, Sir Joseph Ward, then became Premier again, from Dec. 19, 1928. (The 42 members of the Upper Chamber, known as the Legislative Council, were appointed for seven-year terms by the governor general.)

The appointment of Lord Jellicoe in 1920 as Governor General of the Dominion brought the question of national defense to the forefront as an issue of major importance. The idea of an independent New Zealand naval unit came up for serious consideration time and again. At the various imperial conferences after the War, moreover, Premier Massey adopted a position strongly in favor of the Commonwealth arrangement as it was finally stated in the Balfour Report, a year after the New Zealander's death. New Zealand became a member of the League of Nations on Jan. 10, 1920, and on December 17 of the same year, the Dominion was given a mandate over German Samoa, now called Western Samoa. Colonel Stephen Shepherd Allen was appointed Administrator of Western Samoa on Mar. 22, 1928. In 1923 the territorial jurisdiction of New Zealand was extended to include the Ross Dependency, that is, the area within the Ross and Victoria quadrants of the Antarctic Continent. On Dec. 13, 1924, General Sir Charles Fergusson was appointed governor general to succeed Jellicoe. His term was for five years.

In 1929 the Ward government announced a scheme to borrow some $350,000,000 during the next 10 years for purposes of developing the Dominion in a wide variety of directions.

NEY, Elly (1882–). A German pianist, born at Düsseldorf. After graduation from the Cologne Conservatory, where her teachers were

I. Seiss and K. Böttcher, she went for further study to Leschetizky and Sauer in Vienna and won both the Ibach and the Mendelssohn prizes. For several years, she taught at the Cologne Conservatory. Her tours of Germany, Austria, Russia, and Scandinavia established her reputation as one of the greatest of contemporary pianists. At her American début (New York, Oct. 15, 1921), she took her audience by storm and immediately became a prime favorite. She later made annual tours of the States. In 1911 she married the Dutch conductor, Willem Van Hoogstraten, from whom she was divorced in 1927. In 1928 she married the American financier, Paul Allais of Chicago.

NICARAGUA, nē'kȧ-rä'gwȧ. The largest of the Central American republics, with an area estimated at 51,660 square miles; population (according to census of 1920), 638,119. In 1910 the population was estimated at 600,000; and in 1927 at 650,000. At least 75 per cent of the inhabitants live in the western half of the country. Capital, Managua, with a population in 1926 of 32,536. Other large towns are Leon (38,318), Granada (16,773), Matagalpa (10,271), Masaya, (10,287). Illiteracy among the population is still high. In 1925 there were 460 elementary schools with 24,490 pupils.

Industry and Trade. The agricultural products of the western half are varied; coffee, sugar cane, wheat, cacao, and beans are grown. The average annual crop of coffee is placed at 25,000,000 pounds. In 1921, the export value of coffee was $2,352,487, and the 1927 exports were worth $4,082,000. Sugar exports in 1927 were worth only $443,000. The sugar industry took its inception from the great demand created during the War. Exports of sugar in 1916 totaled only 3034 metric tons; in 1922, this export was 9948 tons, but by 1927 had dropped to 5853 tons. The banana is the principal crop grown in the east. The banana exports in 1927 were 2,386,000 stems, compared with 2,617,765 in 1922. Timber and forest products also play an important part in Nicaragua's foreign trade. Gold exports average $1,000,000 yearly. Practically all exports of lumber and gold go to the United States. In 1927 imports into Nicaragua were valued at $10,208,000 ($5,604,300 in 1913); exports in 1927 $8,986,000 ($7,494,100 in 1913). Proportions in 1927 by countries of origin of imports were: the United States, 66.4 per cent (50 in 1912); the United Kingdom, 10 per cent (19 in 1912); France, 3 per cent (5 in 1912); Germany, 6.7 per cent (12 in 1912). Leading imports are cotton goods, chemicals, iron and steel, and wheat flour. Proportions in 1927 by countries of destination of exports were: the United States, 55.6 per cent (46 in 1912); France, 13.1 per cent (16 in 1912); the United Kingdom, 6 per cent (13 in 1912). The isolation of the Atlantic coast, with communications between the west and the east by way of Costa Rica and Panama, led the Government to survey a route from San Miguelito on Lake Nicaragua to Monkey Point on the Atlantic, and in 1921 a loan of $9,000,000 was secured in New York for this and other purposes. The national railways also passed into the hands of New York bankers for $2,000,000. In 1920 work was begun on a railway from Chinandega to Playa Grande on the Gulf of Fonseca, as a link in the International Railways chain. Total railway mileage in January, 1929, was 163 miles, exclusive of small private lines. There were 1800 miles of telegraph wire and 1143 miles of telephone wire in 1926.

Finance. For 1927 revenues were $3,666,900 ($2,479,313 in 1914) and expenditures $3,228,494 ($1,980,328 in 1914). Total debt on Mar. 31, 1927, $10,183,000, including claims and floating debts of $4,000,000. As a result of the ambitious financial scheme of 1917, the size of the debt consistently decreased. By the programme, a rigorous budget was laid out; financing of deferred interest was provided for; the floating debt was settled. Credit so improved that in 1921 a loan of $9,000,000 was raised, part of which was to be applied toward the redemption of the 1909 bonds. Financial recovery was set back by the revolution of 1926–27, the cost of which was estimated at $20,039,651. Most of this expense was met by the United States.

History. The continued interest of the United States in Nicaraguan affairs aroused the hostility of other Central American republics, and two of these, Costa Rica and Salvador, were led to sue Nicaragua in the Central American Court of Justice when the Bryan-Chamorro Treaty was finally ratified by both parties in 1916. By this instrument, for the payment of $3,000,000, the United States acquired exclusive canal rights in Nicaragua, permission to construct a naval base on the gulf of Fonseca, and the Corn Islands.. Though the suits were successful, the decision was disregarded by Nicaragua and the United States. The continued stay of American marines in the country insured the permanence of the Government in power. Border outbreaks in 1921 and revolutionary disturbances in 1922, which for a time led to an attack on Chinandega by rebels, and a move on the capital in August, 1922, caused the holding of a conference by the presidents of Nicaragua, Honduras, and Salvador, on board the U.S.S. *Tacoma* in Fonseca Gulf on Aug. 22, 1922. Steps were taken to check revolts fomented by political emigrants and for the putting down of border uprisings by united action. The purpose of the general treaty of peace and friendship signed on Dec. 20, 1907, by all the Central American countries was reaffirmed. This move, fostered by Nicaragua, was in strange disagreement with its refusal to join the Central American Union erected in 1921. Nicaragua did, however, participate in the subsequent Central American Conference at Washington and in the treaties signed there. See CENTRAL AMERICAN UNION.

On May 8, 1917, Nicaragua declared war on Germany and as an Associate Power became an original member of the League of Nations. The President for 1916–20 was Emiliano Chamorro; for 1920–24, Dr. Diego Manuel Chamorro. The untimely death of Dr. Chamorro on Oct. 19, 1923, necessitated the ad interim assumption of presidential powers by the Vice President, Bartolomeo Martinez, pending the election of a new President in October, 1924. For this election, a new electoral law, drafted by an American, Dr. H. W. Dodds, secretary of the National Municipal League, had been adopted, and Dr. Dodds was invited to assist in installing the new system. An offer by the Washington government to withdraw the force of American marines which had been stationed in Nicaragua since 1912, unless the Nicaraguan government desired their continued presence to safeguard electoral freedom, elicited the reply that the Nicaraguan government desired the Legation guard to remain at least until the installation of a new administration in January, 1925.

In the months preceding the elections in October, there was much disorder, but the elections themselves passed off quietly. Carlos Solorzano was chosen President and Dr. Juan Sacasa, Vice President. They were inaugurated on January 1. On August 3, the United States withdrew the force of marines which had been stationed in Nicaragua since 1912. It was only a few weeks before military outbreaks ensued. Ex-President Chamorro, Conservative leader, through a *coup d'etat* made himself military master of the government in October, and Sacasa, the Liberal Vice President, fled. To preserve an appearance of constitutionality in his taking over of the Presidency, Chamorro had himself elected to the Senate, forced the subservient Solorzano to resign, Jan. 15, 1926, and was selected by Congress to fill the office of President; but the United States flatly refused the all-important recognition. Claiming that Sacasa was the constitutional President through the resignation of Solorzano, the Liberals took up arms in May and captured Bluefields, on the east coast. United States marines were landed there, ostensibly to protect American lives and property, and a neutral zone was declared around the city. Although defeated by Chamorro, the Liberals, generously aided, it was said, from Mexico, again became active and American marines, who had been withdrawn in June, were once more landed in August.

Attempts by the United States to reconcile the factions failed. On October 30, Chamorro resigned and on November 11, Congress chose Adolfo Diaz, a Conservative, as his successor. He was immediately recognized by the United States. The Liberals, however, refused to consider him as rightfully chosen, and on December 2, at Puerto Cabezas, declared Dr. Sacasa the constitutional President. He in turn was recognized by Mexico, whose support so strengthened the Liberal cause that Díaz complained that he could not hold out without American aid. On December 23, Admiral Latimer of the United States Navy, on instructions from Washington, took possession of the Liberal capital, Puerto Cabezas, and established a neutral zone there, rendering Liberal operations practically ineffective. Criticism in the United States became sharp, and brought a message from President Coolidge in January charging Mexico with keeping the revolution alive, against American interests, through material support of Sacasa.

Fighting continued sporadically and in April, President Coolidge sent Henry L. Stimson to Nicaragua as a mediator. With the power of the United States behind him, he virtually compelled the Liberal leader, General Moncada, to lay down his arms. The Conservatives also consented to take the same action. On May 5, a programme was laid down which included full disarmament, continued control by American marines until a native constabulary could be trained, an election supervised by Americans, and other provisions. They were accepted by all factions except that led by General Sandino, who defied the American marines and carried on a guerilla warfare against them in the northern mountains. During most of 1928, sporadic clashes occurred, with a number of losses to the marines and reported heavy casualties to the Sandino forces. In November, at an orderly election supervised by General Frank R. McCoy, U. S. Army, sent to Nicaragua for this purpose, General Moncada, the Liberal leader, was elected President. Following his inauguration on Jan. 1, 1929, the situation gradually cleared as all factions except the Sandino band accepted the result of the elections. Dr. Sacasa was appointed Minister to Washington in the spring of 1929 and presented his credentials on April 15. Sandino in June went into exile in Mexico and except for occasional brushes between the marines and bandits, peace was fully restored. In June, preparations were made to send to Nicaragua a battalion of engineers to make a survey of the route for a proposed Nicaragua Canal.

NICHOLAS II (1868–1918). Emperor of Russia from 1894 to 1917 (see VOL. XVII). In September, 1915, he took over the nominal command of the Russian Armies. The reactionary influences about him and his fatalistic temper prevented him from making any effective resistance to those intent on his downfall. In March, 1917, when the representatives of the Duma demanded his abdication, he submitted, with very little protest, in favor of Grand Duke Michael. The Grand Duke declined to accept the honor, unless the crown was tendered to him by the will of the people. At first, it was planned to send the Imperial family to England, but the Provisional Government would not allow this, and Nicholas and his wife, son, and four daughters were transferred from Pskov to Tsarskoe Selo and then to Tobolsk, where they remained for several months. In 1918 they were taken to Ekaterinburg, given an apartment of only three rooms, and when Kolchak advanced in the Ural in July, the Communists, at a secret meeting, decided to put the Czar and his family to death. They were all shot in the cellar of the house where they had lived, and their bodies were removed to an isolated spot near Ekaterinburg and burned. A few pieces of their clothing were afterward found at the place.

NICHOLAS (NIKOLAI NIKOLAIEVITCH, ny-ē-kō-lāyĕ-vĕtsch), GRAND DUKE (1856–1929). A Russian general (see VOL. XVII). At the outbreak of the World War, he was given command of the Russian Armies, and handling them with admirable skill, successfully overran East Prussia which materially relieved the hard-pressed French and British in the West. The Allies esteemed it a tragedy of first magnitude when his defeats of 1915 and domestic politics induced the Czar to take command in September, 1915. The Grand Duke was sent to the Caucasus as viceroy and commander, and there carried out the successful campaigns of Erzerum and Trebizond. After the revolution, he lived under surveillance in the Crimea until he escaped from Russia on a British warship. He lived for a time in Italy, and then in Choigny, near Paris. Many Russians looked to him as the rightful aspirant to the throne of Russia. He died of pneumonia at Cap d'Antibes on the French Riviera.

NICHOLS, ERNEST FOX (1869–1924). An American physicist (see VOL. XVII). He was professor of physics at Yale University from 1916 to 1920; director of pure science at the Nela Research Laboratories at Cleveland, Ohio, during 1920–21; and president at the Massachusetts Institute of Technology from March to November, 1921, after which he returned to the Nela Research Laboratories.

NICHOLSON, WILLIAM (1872–). An English painter and engraver, born at Newark, England, and educated at the Magnus School there and at the Julian Academy at Paris. As a student, he produced good experimental work in wood engraving by using bold masses of black and white or of sombre grays and browns relieved by touches of bright color. He engraved many portraits, illustrated books, and collaborated with James Pryde in designing posters under the name of Beggarstaff Brothers. As a painter, he was best known for interior and still life subjects, although he did portraits and landscapes. He received the gold medal in Paris (1900), and is represented in the Luxembourg and in many English galleries. He published *An Alphabet* (1898); *An Almanac of Twelve Sports* (with Rudyard Kipling, 1898); *London Types* (with W. E. Henley, 1898), and *Characters of Romance* (1900).

NICOLLE, Charles (1864–). A French physician born in Rouen. He studied at the Pasteur Institute under Metchnikoff and Roux, and was for a time professor of microbiology at the University of Rouen. While a surgeon in the French Army stationed at Algiers he began the scientific study of typhus fever and was able to show by numerous experiments on monkeys and chimpanzees that the body louse was the chief if not the sole transmitting agent. Nicolle remained in Africa as director of the Pasteur Institute, Tunis, and in 1916, in conjunction with Dr. Blaisot, discovered a cure for eruptive typhus. In 1928 he was awarded the Nobel Prize in medicine.

NIDAROS. A city in Norway formerly called Trondhjem. See norway, under history.

NIEHAUS, Charles Henry (1855–). An American sculptor (see Vol. XVII). His later works include the John Paul Jones monument at Washington, D. C.; the Commodore Perry monument, Buffalo, N. Y.; statues of Zachariah Chandler and Governor Click, National Capitol; Hernandez Cortez, Panama-Pacific Exposition; Francis Scott Key Memorial, Baltimore (1922), and war memorials at Hoboken and Newark, N. J.

NIELSEN, Fred Kenelm (1879–). An American lawyer, born in Denmark, and educated at the University of Nebraska and the law department of Georgetown University. After admission to the bar, he practiced law in Washington and was special agent of the General Loan Office from 1909 to 1911. From 1913 to 1922, he was assistant and acting solicitor to the Department of State, and in 1914, delegate at the conference to conclude the treaty for the government of Spitzbergen. He served during the World War as a major in the United States Army. At the Paris Peace Conference, he was in charge of matters relating to treaties and claims against the enemy governments, and he was American representative in the drawing up of other treaties. He served as technical expert at the Disarmament Conference in 1921–22. He was agent and counsel for the United States in arbitrations with Great Britain, the Netherlands, and Mexico.

NIELSEN, Ludolf (1876–). A Danish composer, born at Nörre-Tvede, Denmark. At the Copenhagen Conservatory, he studied under V. Tofte (violin), A. Orth (piano), and F. Hartmann (composition), and in 1903–04 he attended the Leipzig Conservatory. As winner of the Ancker stipend, he spent the year 1907 in travel and study in Germany, Austria, and Italy. From 1897 to 1907, he was solo violist and assistant conductor of the Tivoli Orchestra and viola of the Björvig Quartet. He later lived in Copenhagen as teacher and composer. He wrote three operas, *Isabella* (Copenhagen, 1915), and *Uhret* and *Lola* (not produced up to 1929); three symphonies; the symphonic poems *Ragnar Lodbrog*, *Sommernatsstemning*, *In Memoriam*, *Fra Bjaergene*, and *Babelstaarnet*; *Romanze* for 'cello and orchestra; *Herbstabend*, recitation with orchestra; *St. Hans* for baritone, chorus, and orchestra; two string quartets; and choruses, songs, and piano numbers.

NIGERIA. A British colony and protectorate in West Africa. The colony has an area of 1400 square miles; the protectorate, made up of the northern and southern provinces, has an area of 335,700 square miles. The total population is about 18,765,690, of whom 5200 are Europeans. The leading products of economic importance, measured by exports, are nuts and palm kernels, exports in 1913, £3,109,818; in 1927, £4,438,886; palm oil, exports in 1913, £1,854,384; in 1927, £3,374,550; raw cotton, exports in 1913, £159,223; in 1927 (cotton lint) £331,086; cocoa, exports in 1913, £157,480; in 1927, £1,998,679; tin, exports in 1913, £568,428; in 1926, £2,217,046; groundnuts, exports in 1913, £174,716; in 1927, £1,629,542; hides and skins, exports in 1913, £197,214; in 1927, £651,620. Other products are rubber, mahogany, ivory, live stock, ostrich feathers, and capsicums. Exports for for 1913, 1920, and 1927 were £7,352,377, £16,987,018, and £16,340,957. Imports for the same years were £7,201,819, £25,216,507, and £15,664,637. Leading imports in 1926 were cotton piece goods and coopers' stores. Tonnage entered and cleared for 1913, 1920, and 1927 was 1,735,036 tons, 1,434,222, and 3,367,312. The importation of spirits was prohibited in 1919 with the result that a customs tax was placed on exports to fill out the territory's revenues. Imports come mostly from the United Kingdom and the British colonies. In 1927, 1470 miles of railway were open. There is a network of excellent motor roads in the southern provinces, as well as several thousand miles of telegraph wire.

The cost of government mounted after the World War. Revenues increased from £3,462,507 in 1913 to £6,304,663 in 1927–28, and expenditures from £2,916,801 to £7,086,775. The debt in 1913 was £8,267,569; in 1927, £23,559,209. The system of administrative centralization inaugurated in 1914 was continued. In 1917 an uprising in the West gave the Government some concern, but it was soon checked. In 1923, to extend more fully the idea of local autonomy, the British government granted the whole of Nigeria a new constitution, embodying a provision for the erection of a legislative council.

NINE-POWER OPEN-DOOR TREATY. See China, *History*.

NITROGEN, Fixation of. See Chemistry, Applied; Fertilizers.

NITTI, Francesco Saverio (1868–). An Italian Liberal leader and Prime Minister, born in Melfi. He was professor of economics in the University of Naples from 1898 to 1904, in the latter year becoming a member of Parliament. From 1911 to 1914, he was Minister of Agriculture; he was a member of the special Italian mission to the United States in 1917, and on his return was appointed Minister of the Treasury. On the fall of the Orlando ministry in June, 1919, he became Prime Minister and held this office until May, 1920. In 1924, when the

Fascists gained full control in Italy, he began the life of an exile, first in Switzerland and after 1926 in Paris. He wrote *Il bilancio dello stato* (1900); *Il capitale straniero in Italia* (1915); and *Bolshevism, Fascism, and Democracy* (trans., 1927).

NIVELLE, nē'vĕl', ROBERT GEORGES (1856–1924). A French soldier, of English ancestry on his mother's side. He entered the artillery service of the army, serving in North Africa (1901–14) and at the outbreak of the World War was a colonel. He greatly distinguished himself in the retreat from Mons and in the Battle of the Marne in September, 1914, and was promoted to be chief assistant to General Pétain in the defense of Verdun. He succeeded to the command in that sector and initiated and carried out a counter-offensive which on Oct. 24, 1916, regained the forts of Douaumont and Vaux. He was appointed successor to General Joffre as commander-in-chief of the French Armies of the North and East on Dec. 12, 1916. He planned and undertook a grand offensive on the Aisne front, but this failed to dislodge the Germans and resulted in immense losses to the French in April and May, 1917; on May 15 he was relieved of his post as commander-in-chief. He was placed in command of the French forces in North Africa (1917–19), was a member of the Higher War Council (1920–21), and in 1920 visited the United States on a special mission.

NOAILLES, nō'ä'y', COUNTESS MATHIEU DE (1876–). A French poet and novelist (see VOL. XVII), who was known as the "Muse of Gardens" and who received the Grand Prix de la Littérature française in 1921. Her later poetic works include *Les Forces Éternelles* (1920); *Poème de l'amour* (1924); and *L'honneur de Souffrir* (1927). Her later prose was *Poésies et romans*, criticism (1922) and *Les innocents*, short stories showing keen analysis of woman's mind (1923). Consult *La Comtesse Mathieu de Noailles*, by René Gillouin (1908).

NOBILE, UMBERTO (?–). An Italian airman and Arctic explorer. In May, 1926, with Roald Amundsen and Lincoln Ellsworth, he crossed the North Pole from King's Bay, Spitzbergen, to Teller, Alaska, a flight of 71 hours, in the dirigible *Norge*, which he had designed. In May, 1928, in the dirigible *Italia*, he returned to the Arctic to make scientific observations. After a successful flight over Lenin Land (May 15–18), the *Italia* was wrecked on the ice May 25 while on a flight to the Pole. On June 22, the Swedish aviator, Captain Lundborg, landed on the ice floe on which Nobile and some of his crew were stranded, and insisted that Nobile be the first to fly to civilization with him. For allowing himself to be rescued ahead of his crew and for the accident to the airship, Nobile was censured by an Italian Court of Inquiry, which announced its findings on Mar. 3, 1929. He immediately resigned from the flying force, in which he was a general. See POLAR EXPLORATION.

NOGUCHI, no'gōō-chē, HIDEYO (1876–1928). A Japanese physician and scientist whose life was devoted to the discovery and prevention or cure of some of the great disease plagues. (See VOL. XVII). He was connected with the Rockefeller Institute until his death. Diseases specially studied by him were infantile paralysis, syphilis, hydrophobia, verruga peruana, snake poisoning, yellow fever, and trachoma. He developed a diagnostic test for syphilis and contributed materially to knowledge of several diseases. His greatest achievement was considered to be the isolating of the cause of American yellow fever. This was probably premature and his reputed discovery of the cause of trachoma has not been corroborated. It was while engaged in the study of African yellow fever that he contracted the disease himself with fatal outcome. He was one of the greatest of bacteriological technicians and was the recipient of the highest honors from governments and medical colleges and societies. His death, at Accra on May 21, 1928, prevented him from defending his original teachings on the causation of yellow fever, representing years of research in Central America and South America, and also from following up his apparent success with trachoma. His chief writings include *Snake Venoms* (1909); *Diagnosis of Syphilis and Luetin Reaction* (1910, with later editions); and *Laboratory Diagnosis of Syphilis* (1923). His book, *The Etiology of Trachoma*, appeared posthumously in 1928.

NOLEN, JOHN (1869–). An American landscape architect and city planner, born at Philadelphia and educated at Pennsylvania, Munich, and Harvard universities. After 1903 he engaged in practice in Cambridge, Mass. His more important work includes the plans for the Agricultural School and Smith College at Northampton, Mass., for public institutions for Wisconsin, and for many private houses. He drew up plans for the improvement of Roanoke, Va., Sacramento, Calif., and many other cities. During the World War, he was a member of the advisory housing committee of the Emergency Fleet Corporation and was consultant and designer for several towns for the United States Housing Corporation. His many writings on architectural subjects include *Madison, a Model City* (1910); *New Ideals in the Planning of Cities, Towns, and Villages* (1919); and *New Towns for Old* (1927).

NOLHAC, nō'läk', PIERRE DE (1859–). A French historian and critic (see VOL. XVII), who was elected to the French Academy in 1922. In 1920 he was made director of the Jacquemart-André museum in Paris, becoming honorary instead of active curator of the Versailles museum, a position which he had held since 1892. His later works include *Histoire du Château de Versailles* (2 vols., 1911–17); *Le Trianon de Marie Antoinette* (1914, trans. 1925); *Vers pour la patrie* (1920); *Ronsard et l'humanisme* (1921); *Souvenirs d'un vieux Romain* (1922); *Versailles et la Cour de France* (1925); *Versailles inconnu* (1925); "La vie amoureuse de Pierre de Ronsard" in the collection *Leurs Amours* (1926); and *Madame de Pompadour et la politique*, a continuation of *Louis XV et Madame de Pompadour* (1928).

NORDAU, nôr'dou, MAX SIMON (1849–1923). Pseudonym of Südfeld, a Jewish author of Hungarian birth (see VOL. XVII), who died in Paris. His later publications include *Menschen und Menschliches von Heute* (1915); *Französische Staatsmänner* (1916); *Morals and the Evolution of Man*, a translation of *Biologie der Ethik* (1922); volumes of Spanish impressions and art and *Zionistische Schriften* (1923). Consult *Figures juives*, by Robert de Launay (1921).

NORDEN, N. LINDSAY (1887–). An American organist and composer, born in Philadelphia. He received his musical training in New York under M. Spicker, F. W. Robinson,

A. Weld, and later, at Columbia University, under Prof. C. Rybner. In 1917 he was appointed W. W. Gilchrist's successor as conductor of the Mendelssohn Club in Philadelphia, where he settled permanently the following year as organist and choirmaster at the Presbyterian Church, choirmaster at St. Paul's, and teacher at the Delancey School. In 1920 he became conductor of the Reading Choral Society, producing oratorios and choral works in the larger forms, and retaining the conductorship after he founded, in 1928 in Philadelphia, the Brahms Chorus, a similar organization. In 1925 he became professor of theory at the Curtis Institute, and in 1927 organist of the First Presbyterian Church. Having become interested in the a cappella music of the Russian liturgy, of which he made a special study, he organized in 1912 the Æolian Choir of 60 trained voices, which he conducted until 1917, introducing to concert audiences works never heard in the United States outside the regular service in some of the larger Russian churches. This pioneer work he continued in Philadelphia with his choir of the Second Presbyterian Church. He edited a large collection of this music, about 80 numbers, with English translation. His original compositions include an overture, *King Melville*; three orchestral sketches, *Silver Plume, A Garden*, and *The White Swan*; a cantata, *Thanatopsis*; many motets, anthems, and services; and songs.

NORDENSKIÖLD, nōr′*e*n-shēld, Nils Erland Herbert, Baron (1877–). A Swedish anthropologist (see Vol. XVII), a professor at Gothenburg since 1914. In 1927 he made a trip to Panama and Colombia. He also served as neutral president of the Turco-Rumanian mixed Arbitral Tribunal. His later works include *Forskningar och Aventyr i Sydamerika* (1915); *Drömsagor från Anderna* (1916); and *Comparative Ethnographical Studies*, dealing with the South American Indians (6 vols., 1919–25).

NORDENSKJÖLD, (Nils) Otto (Gustav) (1869–1928). A Swedish scientist and explorer (see Vol. XVII). He led a scientific expedition to South America and Patagonia in 1920. His later works include *Kolonisationen och naturfolken* (1914); *Polarnaturen* (1918); *Die nordatlantischen polarinseln* (1921); *Nord- und Südpolarländer* (1926); *Südamerika, ein Zukunftsland der Menschheit* (1927); and, with Ludwig Mecking, *The Geography of the Polar Regions* (1928).

NORDEN SOCIETY. See Norway, History.

NORDIC. See Eugenics; Race Problems.

NOREEN, nō̇-rān′, Adolf Gotthard (1854–1925). A Swedish philologist (see Vol. XVII). In 1919 he resigned his chair of Scandinavian languages at Upsala University, and in the same year became a member of the Swedish Academy. His later works include *Nordiska ortnamm* (1914); an edition of Marcus Borgström's *Svenska Sprakets Historia for Folkskoleseminarier* (1916); the sixth and final volume of *Vårt språk* (1903–1918), and *Ynglingatal*, translations of Norse poetry with a commentary (1925).

NORFOLK. A port of entry for Virginia and the third port on the Atlantic Coast in volume of exports. The population increased from 67,452 in 1910 to 115,777 in 1920 and to 184,200 in 1928 by estimate of the U. S. Bureau of the Census. In 1918 the commissioner-manager form of government was adopted, and city planning and zoning were established. During the World War, the Federal government built an army base terminal at a cost of $29,000,000, which was afterward leased and operated by the city. A new $5,000,000 water system, adequate for a city of 1,000,000 population, was procured; two junior high schools and an industrial high school for Negroes were built at a cost of $500,000 apiece; and 15 playgrounds were established and equipped. Additions to the school buildings since 1924 have totaled $503,219. A municipal grain elevator and terminal of eight warehouses were built in 1923 at a cost of $5,000,000 and a municipal market was completed in the same year. Private building operations in 1928 amounted to nearly $5,000,000 and the city budget, to $7,321,950.

The total annual value of port commerce increased more than 800 per cent in 10 years, the total foreign cargo movement in 1927 amounting to 6,885,750 tons of which 6,417,266 tons were exports. During 1927 the city's industrial development took on fresh impetus, more than $8,000,000 being invested in 39 new manufacturing enterprises. Bank clearings in 1928 amounted to $274,435,000. The assessed valuation of property in 1928 was $32,896,198; the net debt was $32,896,198.

NORFOLK ISLAND. See Pacific Ocean Islands.

NORMAL COLLEGE OF THE CITY OF NEW YORK. See Hunter College.

NORMAN, Rt. Hon. Montagu Collet (1871–). A British banker, Governor of the Bank of England, a member of the Privy Council (1923), and a lieutenant of the City of London. He was educated from Eton and King's College, Cambridge, was in the Fourth Battalion of the Bedfordshire Regiment, and served in South Africa during the Boer War (1900–01), being made a Companion of the Distinguished Service Order in the latter year. In 1920 he was elected Governor of the Bank of England, traditionally a one-year term, and was subsequently reëlected annually for nine consecutive terms.

NORRIS, George William (1861–). An American legislator (see Vol. XVII). He was reëlected to the United States Senate in 1918 and 1924. He was one of the most prominent leaders of the so-called Progressive wing of the Republican Party in the Senate. In 1924 he supported La Follette for President and in 1928, Alfred E. Smith.

NORRIS, James Flack (1871–). An American chemist, born at Baltimore, Md., and educated at Johns Hopkins University. He was with the chemical department of the Massachusetts Institute of Technology (1895–1904), and was professor of chemistry at Simmons College (1904–15) and at Vanderbilt University (1915–16). He returned to the Institute of Technology and in 1916 became professor of organic chemistry there. His original investigations have been chiefly in organic chemistry. He was an associate on the Naval Consulting Board in 1916 and during 1917–18 was connected with the gas-defense work of the Bureau of Mines. He served later in the Chemical Warfare Service, with the rank of lieutenant colonel, and inspected the war gas factories of Germany. He was chairman of the division of chemistry of the National Research Council, 1924–25. Dr. Norris is the author of *The Principles of Organic Chemistry*; *Experimental Organic Chemistry*; and *Textbook of Inorganic Chemistry*.

NORRIS, Kathleen (Thompson) (1880–). An American novelist (see Vol. XVII). Among her later books are *The Treasure* (1915); *The Story of Julia Page* (1915); *The Heart of Rachel* (1916); *Undertow* (1917); *Martie, the Unconquered* (1917); *Josslyn's Wife* (1918); *Sisters* (1919); *Harriet and the Piper* (1920); *The Beloved Woman* (1921); *Lucretia Lombard* (1922); *Certain People of Importance* (1922); *Butterfly* (1923); *The Callahans and the Murphys* (1924); *Noon* (1925); *Little Ships* (1925); *The Black Flemings* (1926); *Hildegarde* (1926); *The Sea Gull* (1927); *Barberry Bush* (1927); *The Fun of Being a Mother* (1927); *The Foolish Virgin* (1928); and *Red Silence* (1929).

NORTH CAROLINA. The twenty-seventh State in size (52,426 square miles) and the fourteenth in population; capital, Raleigh. The population increased from 2,206,287 to 2,559,123, or by 16 per cent; estimated population, 1928, 2,938,000. The white population increased from 1,500,511 (1910) to 1,783,779 (1920); Negro, from 697,843 to 763,407; native white, from 1,494,569 to 1,776,680; foreign-born, from 5942 to 7099. Both urban and rural populations increased during the decade: the former from 318,474 to 490,370; the latter from 1,887,813 to 2,068,753. The growth of the principal cities was: Winston-Salem, 22,700 (1910), to 48,395 (1920); Charlotte, 34,014 to 46,338; Wilmington, 25,748 to 33,372; Asheville, 18,762 to 28,504.

Agriculture. As North Carolina is one of the cotton-producing States, it has suffered from the depredations of the boll weevil, which reached the State about 1920–21. Its ravages have varied with the mildness of the winter (the cold killing this pest), so that while there was serious destruction in some sections, the effect on production was not so marked as it was farther South. The acreage planted to cotton in 1913 was 1,576,000 and the production, 792,000, bales; 1920, 1,587,000 and 925,000; 1922, 1,626,000 and 852,000; 1928 (estimated), 1,890,000, and 840,000. See Cotton; also Boll Weevil.

The number of farms increased 5 per cent, or from 269,763 in 1920 to 283,482 in 1925. The acreage of land in farms, however, showed a decrease of 7.1 per cent, or from 20,021,736 in 1920 to 18,593,670 in 1925. The improved land in farms totaled 8,198,409 acres in 1925. The total value of farm property rose from $537,716,210 in 1910 to $1,250,166,995 in 1920, or by 132.5 per cent, but declined to $1,050,015,835 in 1925; the average value per farm was $2119 in 1910, $4634 in 1920, and $3704 in 1925. In interpreting these values, the currency inflation incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 134,805 were operated by owners; 423, by managers; and 128,254, by tenants. The corresponding figures for 1910 were 145,320; 1118; and 107,287. White farmers numbered 193,473 in 1920; 202,516 in 1925; colored farmers, almost entirely Negroes, numbered 76,290 in 1920 and 80,966 in 1925. Farms reported as under mortgage, 24,499 in 1920, numbered 29,918 in 1925. The total number of cattle was 644,779 in 1920; 538,780 in 1925; dairy cows numbered 462,077 in 1920; 252,387 in 1925; sheep numbered 90,556 in 1920; 66,557 in 1925; swine, 1,271,270 in 1920; 871,187 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 42,642,000 bushels; wheat, 5,150,000; oats, 4,202,000; potatoes, 10,545,000; sweet potatoes, 7,840,000; tobacco, 475,230,000 pounds; hay, 794,000 tons. Comparative figures for 1913 are corn, 55,282,000 bushels; wheat, 7,078,000; oats, 4,485,000; potatoes, 2,400,000; tobacco, 167,500,000 pounds.

Manufactures. While North Carolina has but recently become a leading manufacturing State, it has great industrial importance. In 1920, there were 14 cities of more than 10,000 inhabitants, which formed 12.1 per cent of the total population; and in 1919 these reported 42.2 per cent of the value of the State's manufactured products. There were in the State 4931 manufacturing establishments in 1909; 5999 in 1919; 2614 in 1925; and 2984 in 1927. Persons engaged in manufactories numbered 133,453, 175,423, and 182,234, respectively; capital invested was $217,185,588 (1909) and $669,144,096 (1919). The value of the product was $216,656,055 in 1909; $943,807,949 in 1919; $1,050,434,117 in 1925; and $1,154,646,612 in 1927. The large increase in value of products in 1919 was mainly due to changes in industrial conditions brought about by the War and cannot be used to measure the normal growth of manufactures during the census period, 1914–19; but the increase in the number of persons engaged in manufacture clearly indicates steady growth in the manufacturing importance of the State. The manufacture of cotton vies with tobacco in value of product: cotton manufactures were $72,680,000 in 1909; $318,368,000 in 1919; $316,069,000 in 1925. Lumber and timber products, third in value, amounted to $33,525,000 in 1909; $69,580,000 in 1919; and $38,080,932 in 1925. The manufacture of cottonseed oil and cake, next in order, had a product valued at $8,504,000 in 1909; $46,995,000 in 1919; and $17,484,244 in 1925. The chief manufacturing cities of the State are Winston-Salem, Durham, and Charlotte. In Winston-Salem, there were 66 manufacturing establishments in 1909, with a product valued at $18,240,000; 73 in 1914, with $37,288,000; and 93 in 1919, with $200,485,000. Durham had 60 manufacturing establishments in 1909, with a product valued at $23,027,000; 74 in 1919, with $70,659,000; and 54 in 1925, with $67,532,339. Similar figures for Charlotte were: 108 in 1909, with $10,460,000; 111 in 1919, with $43,096,000; and 109 in 1925, with $19,937,497. Other important manufacturing cities are Greensboro, Raleigh, New Bern, Wilmington, and Asheville.

Education. The educational problems in North Carolina in the immediate past have been those of the other Southern States that have a large colored population. Schools were reorganized in 1919 and provision was made for the State Equalizing Fund, the purpose of which is to distribute as equally as possible the burden of supporting the county schools; the General Assembly had been setting apart a fund for this purpose for several years. The General Assembly of 1921 inaugurated a greatly improved tax system, which renders easier the raising of money for educational purposes. There was being developed in the State a system of public schools with the county as the unit of administration, in contrast to a tendency in former years for the county to break up into small districts chartered by the General Assembly and made independent of the county authorities. The decision of the courts and legislative acts during this period tended to make the county the unit and to bring all the small local tax or special charter districts under county control, giving to the county board of education very broad powers. The growth of the community high school was remarkable, the county districts providing as good high-school advantages as the towns and cities. Vocational training in agriculture and home economics was carried on in the public schools, having been made possible through acceptance of the provision of the Federal act that appropriates Federal funds to the States for this purpose. The Legislature of 1921 created a Division of Negro Education, to which was entrusted the general supervision of Negro schools in the State, with the design of its effecting improvements in these schools. The school enrollment increased from 520,404 in 1910 to 818,739 in 1925–26; that in high schools alone, from 14,407 to 84,569. Expenditure for public day schools in 1925–26 was: current, $26,278,446; outlays, $8,413,223. The percentage of illiteracy in the State decreased from 22.6 in 1910 to 16.9 in 1920: among the native white population from 15 to 10.7; among the foreign-born, from 8.1 to 7; among the Negro, from 24.2 to 18.9.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $18,142,100 (of which $2,074,306 was aid to local education); for conducting public-service enterprises, $9,952; for interest on debt, $6,125,268; for permanent improvements, $22,501,890; total, $46,779,210 (of which $24,534,293 was for highways, $4,206,686 being for maintenance and $20,327,607 for construction). Revenues were $35,826,832. Of this, special taxes formed 21.5 per cent (there being no general property tax); departmental earnings and charges for State officials' services formed 11.9 per cent; sales of licenses and taxation of gasoline, 50.1 per cent. Net funded State debt, notably increased in the course of the year, stood on June 30, 1927, at $147,981,294. Highway bonds outstanding totaled $94,999,600.

Political and Other Events. North Carolina, up to the political reversal of 1928, remained steadily Democratic. In 1914 Senator Overman was reëlected. Democratic Representatives were elected to all districts except one. In 1916 Thomas W. Bickett was elected governor. Wilson received 168,383 votes for President; Hughes, 120,890. In 1918 Senator Simmons was reëlected. Cameron Morrison, Democrat, was elected governor in 1920, and Lee S. Overman was reëlected to the Senate. Cox received 305,447 votes for President; Harding, 232,848. The State made heavy expenditures for improvements and incurred a large bonded debt. In 1924 A. W. McLean was elected governor; the vote for President was: Davis, 284,270; Coolidge, 191,753. Personal opposition to A. E. Smith for President in 1928 threw the State into the Republican presidential column; the vote was: Hoover, 348,923; Smith, 286,227. But the Democrats elected O. M. Gardner governor, with the whole State ticket.

Legislation. Measures regulating the sale of liquor in the State were enacted in 1915. In 1917 the Legislature amended the laws relating to criminal procedure, created a budget system, and provided for the voting of citizens absent in the national service. In 1919 it enacted measures forbidding child labor and passed an act requiring compulsory school attendance for children under 14 years of age. In 1921 the banking institutions of the State were regulated. Laws relating to attempted bribery were amended and measures were passed for the promotion of coöperative marketing of farm products. A provision also was made for a State system of roads. The Legislature also made provision for the issue of bonds to enlarge and improve the educational and charitable institutions of the State. In 1923 a measure was passed by the Legislature creating a board to supervise the taxes. A prohibition law was repealed and a law substituted providing prohibition against the transportation, manufacture, or sale of liquors containing more than .05 per cent alcohol. A system of mothers' pensions also was created. In 1925 the State prison system was put under board control, and convict road work was regulated; a permanent board to study the judicial system was created; and a budget system was enacted. A $2,000,0000 bond issue to defray land purchases for Smoky Mountain National Park was authorized in 1927; and the State's presidential primary law was repealed.

NORTH CAROLINA, UNIVERSITY OF. A State institution for men, at Chapel Hill, N. C.; founded in 1795. The University expanded considerably between 1914 and 1928–29, the enrollment increasing from 981 in the former year to 2504 regular students, and 3514 in the extension course, in the autumn of 1928, with an additional registration of 2019 in the summer session of that year; the faculty was increased from 85 to 215; the library from 75,000 to 200,000 volumes; the productive funds in 1928 amounted to $2,232,575; and the income increased from $170,000 to $1,254,400, of which $75,000 comes annually from the bequest of Mrs. Robert W. Bingham, received in 1917, and $40,000 from the gift of the General Education Board in 1920. Four new dormitories and three class buildings were erected between 1921 and 1923, and State funds were appropriated in 1923–25 for four other dormitories and a building for the department of chemistry. The Student Union was erected in 1923 from Alumni subscription, and the Alumni Club from a private gift, and in 1926 a gift of $275,000 was received from William R. Kenan, Jr., for the construction of the Kenan Memorial Stadium. The University extension division publishes an extensive list of bulletins on a number of subjects. Harry Woodburn Chase, Ph.D., LL.D., succeeded Edward K. Graham, who died in 1918, as president.

NORTH CENTRAL, formerly **NORTHWESTERN COLLEGE.** An institution of higher education for men and women at Naperville, Ill., founded in 1861; supported by the Evangelical Church, but nonsectarian in its requirements. The student enrollment and the faculty increased from 291 students and 29 instructors in 1916, to 597 students and 41 instructors in the autumn of 1928. The library was increased from 12,500 volumes to 15,000 volumes in the same period. The productive funds of the College amounted to $723,000 in 1928 and the income for the year was $137,600. In 1921 an addition of $500,000 was received for the endowment, and $250,000 for building purposes, from the Forward Movement Campaign of the Evangelical Association, and in 1923 the campus was increased by 41 acres through other gifts. In the following year, $90,000 was received in gifts, including $9000 for the athletic field and $8000 for the Home Economics Practice House, and an auditorium to cost $200,000 was under construction. Gifts in 1925 included $25,000 for a memorial organ, and $55,000 from the citizens of Naperville toward the Barbara Pfeiffer Memorial Hall; a new chapel-music building was also under construction at a cost of $225,000. Improvements in 1927 included the erection of a women's dormitory, Kaufman Hall, the gift of Mr. and Mrs. Jacob Kaufman, of Kitchener, Ontario, and of Mr. and Mrs. Henry Pfeiffer, of New York. The name of the College was changed from Northwestern College to its present name in 1926, to avoid confusion with other institutions of the same name, and four-year courses leading to degrees were established in the school of music. President, Edward Everett Rall, Ph.D.

NORTHCLIFFE, Alfred Charles William Harmsworth, First Viscount (1865–1922). A British newspaper publisher (see Vol. XVII). His activities in influencing public policies at the outbreak and during the course of the World War were in many cases highly effective. He was strongly opposed to the administration of Lord Kitchener as Secretary of State for War and was instrumental in making Lloyd George Minister of Munitions, a new post in the War Office. He was an ardent supporter of Lloyd George and had much to do with the latter's accession to the premiership. In 1917 he was appointed director of the Civil Aërial Transport Committee and chairman of the British War Mission to the United States; in the following year, he was director of propaganda in the enemy countries. For his services during the War, he was created viscount in 1917. He published *At the War* (1916); *Newspapers and their Millionaires, with Some Further Meditations About Us* (1922); and *My Journey Round the World*, edited by Cecil and St. John Harmsworth (1923). Consult *Lord Northcliffe: a Memoir*, by Max Pemberton (1922), and *Lord Northcliffe; a Study* by R. Macnair Wilson (1927).

NORTH DAKOTA. The sixteenth State in size (70,837 square miles) and the thirty-sixth in population; capital, Bismarck. The population increased from 577,056 in 1910 to 646,872 in 1920, a gain of 12.1 per cent; population, 1925 (State census), 641,192. The white population increased from 569,855 (1910) to 639,954 (1920); the native white, from 413,697 to 508,451. Indians decreased in number from 6486 to 6254; Negroes, from 617 to 467; foreign-born whites, from 156,158 to 131,503. Urban population mounted from 63,236 to 88,239; rural, from 513,820 to 558,633. The growth of the principal cities was as follows: Fargo, 14,331 (1910), to 21,961 (1920); Grand Forks, 12,478 to 14,010; Minot, 6188 to 10,476.

Agriculture. As North Dakota is one of the largest grain-producing States, agricultural conditions have been much affected by the fluctuations in price and production of wheat and other grains during and since the War. Accounts of the general agricultural situation will be found under Agriculture, Corn, and Wheat. The number of farms, which had increased 4.5 per cent in the previous decade, declined from 77,690 in 1920 to 75,970 in 1925; the total acreage in farms from 36,214,751 to 34,327,410, or by 5.2 per cent. The improved land in farms totaled 24,563,178 in 1920. The percentage of the total area used for agricultural purposes increased from 63.3 in 1910 to 80.6 in 1920, but decreased to 76.4 in 1925. The total value of farm property rose from $974,814,205 in 1910 to $1,759,742,995 in 1920, or 80.5 per cent, but receded to $1,191,036,966 in 1925; the average value per farm was $13,109 in 1910, $22,651 in 1920, and $15,678 in 1925. In interpreting these values, the currency inflation incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 49,513 were operated by owners; 361, by managers; and 26,096, by tenants. The comparative figures for 1910 were 63,212; 484; and 10,664. White farmers in 1920 numbered 77,147, of whom 40,899 were native and 36,248 foreign-born. In 1910, there were 73,617 white farmers; 35,750 native, and 37,867 foreign-born. In 1920, the colored farmers numbered 543, of whom 517 were Indians; in 1910 there were 743, of whom 721 were Indians. Farms reported as under mortgage, 40,462 in 1920, at the time of the unfavorable agricultural conditions after the War, diminished to 31,602 in 1925. The number of dairy cows was 461,093 in 1920; 312,045 in 1925. The number of "beef" cows was 296,135 in 1920; 328,427 in 1925. The number of sheep increased from 298,912 in 1920 to 310,527. The estimated production of the principal farm crops in 1928 was as follows: Corn, 24,426,000 bushels; wheat, 142,923,000; oats, 59,954,000; rye, 12,710,000; barley, 55,654,000; flaxseed, 8,115,000; and hay, 3,346,000 tons. Comparative figures for 1913 are corn, 10,800,000 bushels; wheat, 78,855,000; oats, 57,825,000; rye, 1,800,000; barley, 25,000,000; potatoes, 5,100,000; and hay, 388,000 tons.

Manufactures. There were three cities in 1920 having more than 10,000 inhabitants. These formed 7.2 per cent of the total population in 1920 and reported 33.3 per cent of the value of the State's manufactured products in 1919. There were 752 manufacturing establishments in the State in 1909; 894 in 1919; 320 in 1925; and 307 in 1927. Wage earners in manufactories numbered 4472 in 1919; 3261 in 1925; and 3260 in 1927. Capital invested amounted to $11,584,747 in 1909 and $24,548,833 in 1919. The value of the manufactured products amounted to $19,137,506 in 1909; $57,373,622 in 1919; $44,631,516 in 1925; and $47,003,022 in 1927. The increase in the value of products was due partly to price changes incident to the War. The most important industry in the State in point of value of product is gristmilling. This amounted to $11,685,000 in 1909; $29,282,000 in 1919; $16,052,922 in 1925. The manufacture of butter ranks second, its product bring valued at $1,029,000 in 1909; $1,740,000 in 1914; and $11,122,000 in 1919. Dairy products in 1925 totaled $14,786,842. Printing and publishing had a product valued at $1,910,000 in 1909; $2,220,000 in 1914; and $3,225,000 in 1919. Car construction and repair had a product valued at $680,000 in 1909; $1,235,000 in 1914; and $3,183,000 in 1919. The principal manufacturing cities are Fargo, Grand Forks, and Minot.

Education. During recent years, there was a rapid increase in the number of standardized rural schools and in the consolidated schools of the State. Two normal schools were established at Minot and Dickinson, respectively, and the normal school at Valley City became the State Teachers College, granting a bachelor's degree. For a number of years, a campaign against illiteracy has been carried on. The legislative session of 1923 granted an appropriation for Americanization work which made it possible for the department to appoint a State director for adult education. The State then entered upon what was regarded as a period of reconstruction in education, and a new State educational programme was undertaken. The total enrollment in the public schools increased from 139,802 in 1910 to 172,818 in 1925–26; of this number, 149,565 were enrolled in elementary, and 23,253 in secondary grades. Expenditure for public day schools in 1925–26 was: current, $12,992,933; outlays, $1,359,235. The percentage of illiteracy in the State decreased from 3.7 per cent in 1910 to 2.9 per cent in 1920: among the native white population, from 0.4 to 0.3; among the foreign-born white, from 5 to 4.9; and among the Negro, from 6.8 to 6.7.

Finance. State expenditure in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, was: for maintenance and operation of governmental departments, $8,427,548 (of which $1,490,788 was aid to local education); for conducting public-service enterprises, $5,235,518 (spent chiefly in mill and elevator operations); for interest on debt, $1,632,457; for permanent improvements, $3,792,278; total, $19,087,801 (of which $4,393,811 was for highways, $681,371 being for maintenance and $3,702,440 for construction). Revenues were $19,428,280. Of this, property and special taxes formed 23.3 per cent; departmental earnings and charges for officials' services, 7.5 per cent; sales of licenses and taxation on gasoline, 13.7 per cent. Property valuation was $998,180,492; State taxation thereon, $3,842,995. Net State funded debt on June 30, 1927, was $4,519,097.

Political and Other Events. One of the foremost political developments in the State in recent years was the rise of the Nonpartisan League to a position of control, with resultant Socialistic tendencies in government. In 1914 L. B. Hanna, Republican, was elected governor and A. J. Gronna was reëlected senator. The Nonpartisan League, an organization composed chiefly of farmers, and founded largely through the efforts of A. C. Townley, had, by 1916, gained political predominance. The success of the League was facilitated by a breach in the Republican Party in the State. The League advocated the ownership by farmers of terminal elevators, banks, and other facilities for marketing their crops. The State-wide primaries in June, 1916, indorsed candidates of this party, and the State Republican organization came under its control. The League elected its entire State ticket, including L. J. Frazier for governor. It supported Porter J. MacCumber for reëlection to the United States Senate. For President, Wilson received 55,260 votes, and Hughes, 53,471. The League, once in control of the State government, initiated State ownership of terminal grain elevators, packing plants, banks, and other organizations. In 1918 Governor Frazier was reëlected, together with the other State officers. At a referendum election held in 1919, the legislative programme of the Nonpartisan League (see *Legislation* below) was adopted. In 1919 A. C. Townley, president of the League, was found guilty under the State Sedition Law. The Nonpartisan League nonetheless continued in political power by the reelection, in 1920, of Governor Frazier. The Republican-Nonpartisan candidate for the Senate, E. F. Ladd, was elected, defeating Senator Gronna. Under the strain of the programme of the Nonpartisan League during this year, the financial system of the State became severely embarrassed. The League had established a State bank in which it was designed to compel the deposit of all public funds. This bank was to be the source of credit for carrying out State projects, and at one time it contained over $30,000,000 in deposits. The people voted against the compulsory deposit of funds in the bank and as a result there were withdrawn large amounts until the deposits amounted, in 1920, to only about $10,000,000. In spite of the action of the State Industrial Commission forbidding counties and towns to withdraw funds, the situation became extremely embarrassing and the programme of the League was largely discontinued. A plan to finance industries by the issue of bonds amounting to $17,000,000 failed. In 1920 Harding, for President, received 160,072 votes, and Cox, 37,422. Industrial and financial conditions continued to be bad in 1921. The government system of North Dakota provides for the recall of public officials; by popular vote, Governor Frazier, the attorney general, and the commissioner of agriculture and labor were recalled. R. A. Nestos succeeded as governor. This action was a serious reverse to the Nonpartisan League. In the election of 1922, Governor Nestos was reëlected. Frazier, however, was elected to the Senate. The Nonpartisan League also elected a State Auditor and other State officials. At the election of November, 1922, the people adopted a soldiers'-bonus measure. This was declared unconstitutional by the State court on Feb. 10, 1923, A. S. Sorlie was elected governor in 1924 on the Republican ticket; the vote for President was: Coolidge, 94,931, LaFollette, 89,922; Davis, 13,858. Under Sorlie, the attempt was made to render the State's business enterprises self-supporting, without embarking on new ventures. Sorlie was reelected in 1926. A referendum in 1928 sustained State prohibition by a slight majority. The State mill and elevator at Grand Forks was reported early in 1928 to be $1,463,208 behind and still running to a deficit. It was proposed in 1928 to redeem by State bonds some $25,000,000 lost in bank failures incident to the difficulties of the State bank system. For President, Hoover received 131,441 votes in 1928; Smith, 106,648. George F. Shafer, Republican, was elected governor.

Legislation. In 1915 the Legislature abolished capital punishment. In 1917 the Nonpartisan League was in control of the Legislature and a great mass of legislation was introduced along lines advocated by that body. The judicial system of the State was amended. The Torrens system of registration of land titles was put into effect. A constitutional amendment was proposed creating a hail-insurance fund for the protection of farmers' crops. A special session of the Legislature was held in 1918. This authorized the county to issue bonds and loan money to farmers on their personal notes. At this session, the Federal Prohibition Amendment was ratified. The Legislature of 1919 created an industrial commission and authorized it "to conduct and manage, on behalf of the State, certain utilities, industries, enterprises, and business projects." This commission was composed of the governor, attorney-general, and other State officers. The State bank and banking system were also adopted and an issue of $20,000,000 in bonds authorized for the establishment of the system. The Legislature also adopted an inheritance and income tax and created the State Board of Administration. Most of these measures were ratified by the people on June 22, 1919. The Legislature of 1919 also adopted an amendment authorizing the State to engage in any industry not specifically prohibited. In 1923 the Legislature passed measures prohibiting expenditures of excessive appropriations, regulating the use of liquor, and forbidding the wearing of masks. Cities were put under the budget system in 1925. A bill to admit private companies into the compensation insurance field, a State monopoly, was vetoed in 1927.

NORTH DAKOTA, UNIVERSITY OF. A State institution for the higher education of men and women at University Station, Grand Forks, N. Dak., founded in 1883. The student enrollment increased from 740 in 1914 to 1650 in the autumn of 1928, and registration in the summer sessions of 1923 and 1928 was 445 and 348 students, respectively. The faculty was increased during the period 1914 to 1928 from 80 to 139 members, and the library from 55,000 to 95,215 volumes. Productive funds in 1928 totaled $1,700,000 and the income for the year to $857,000, exclusive of boarding department and trust funds. A chemistry building and an armory were completed in 1919 and a law school building was opened in 1923. Frank Le Rond McVey, Ph.D., resigned from the presidency in 1917 and was succeeded by Thomas F. Kane, Ph.D., LL.D.

NORTHERN TERRITORY. A territory of the Commonwealth of Australia, situated in the central and northern part of the continent. Area, 523,620 square miles; population, exclusive of aborigines, in 1911, 3310; in 1928, 4238. Occupation proceeded slowly; only 746 square miles had been alienated by 1927. Mineral production steadily has declined so that by 1926–27 the value of the total yield was only £22,222 (£55,299 in 1912). The trade records have made a similar showing: imports and exports for 1913, £20,977 and £67,911; for 1926–27, £36,814 and £29,786. Revenues and expenditures for 1913–14 were £73,657 and £532,535; for 1926–27, £122,062 and £431,512. Expenditures up to 1921 were heavy because of the Port Augusta Railway project. Up to June 30, 1927, the public debt, a charge on the Commonwealth, was £3,564,445. The policy of the Government is to dispose of the lands by leasehold only.

NORTH POLE. See POLAR RESEARCH.

NORTH SCHLESWIG. See SCHLESWIG.

NORTH SHORE MUSIC FESTIVAL. See MUSIC, *Festivals*.

NORTHWESTERN UNIVERSITY. An institution for the higher education of men and women, composed of the college of liberal arts, the graduate school, the school of engineering, and schools of commerce, journalism, music, education, and speech, in Evanston Ill.; and the schools of law, medicine, dentistry, commerce, and journalism, in Chicago. The College of Liberal Arts, the oldest school of the university, was founded in 1851. In the autumn of 1928, the enrollment was 11,105, including 5424 in the school of commerce in Chicago; in the summer session of that year 2115 were registered. In 1914 the enrollment was 4138. The faculty of the university numbered 742 in 1928, as compared with 450 in 1914. The endowment, as of June 30, 1928, was $15,940,876, and the income from these funds for the fiscal year 1927–28 was $816,852. The library, in 1928, contained approximately 280,000 bound volumes and 150,000 pamphlets. During a campaign to raise funds which ended July 1, 1924, and which netted over $8,000,000, a gift of $4,223,000 was received from Mrs. Montgomery Ward, for the construction and endowment of the Montgomery Ward Medical-Dental Centre in Chicago; $500,000 from Mrs. Levy Mayer for the construction of the Levy Mayer Hall for the law school; $250,000 from Mrs. George R. Thorne, for the George R. Thorne Memorial Auditorium. In the following year, important gifts to the university included $500,000 from the Weiboldt Foundation of Chicago, for the erection of Weiboldt Hall for the school of commerce in Chicago, and the Gary Law Library Building from E. H. Gary to house the Gary Law Library, in Chicago. In 1926 the sum of $4,000,000 was received from Mrs. Montgomery Ward to be used for medical research. Walter Dill Scott, Ph.D., LL.D., was elected president in 1920, to succeed Lynn Harold Hough, LL.D., resigned.

NORTHWEST TERRITORIES. The name of the unorganized territories (Franklin, Keewatin, and Mackenzie) of the Dominion of Canada, with an area of 1,309,682 square miles, and a population in 1911 of 6507 and on June 1, 1929, of 9400 (estimated). Agriculture is carried on to a small extent only, because of the short summer season, but vegetable gardening has been successful on an experimental basis. With the discovery of oil at Fort Norman in 1920, interest in the territories quickened. Other minerals are known to exist. There are lead and zinc ores on the south side of the Great Slave Lake; gold in the Liard and Peel Rivers; and gypsum, salt, and coal, in considerable quantities. The lake fisheries and forest wealth are still inadequately explored; furs make up 40 per cent of the total Canadian output. The government is carried on under the direction of a commissioner assisted by a deputy commissioner and a council of five.

NORTON, THOMAS HERBERT (1851–). An American chemist and editor (see VOL. XVII). From 1915 to 1917, he was detailed by the U. S. Department of Commerce to further the development of American chemical industries, especially dyestuffs. From 1917 to 1920, he was chemist with E. I. du Pont de Nemours & Co. and in 1917–18 he edited *The Chemical Engineer.* In 1920 he became editor of *Chemicals.* Among his later writings are *Dyestuffs for the American Textile Industry* (1915); *Cottonseed Industry in Foreign Countries* (1915); *The Dyestuff Census* (1916); and *Tanning Materials of Latin America* (1917).

NORWAY. A kingdom in northern Europe with a total area of 124,964.3 square miles. Its population in 1920 was 2,649,775, of which the urban numbered 785,404. The estimated population in 1928 was 2,787,827. Chief cities in 1920 were: Oslo (formerly Christiania), 258,483 (1910, 241,834); Bergen, 91,443 (1910, 84,330); Trondhjem, (to be known as Nidaros after 1930) 55,030 (1910, 45,335); and Stavanger, 43,778 (1910, 37,261). The total population in 1910 was 2,391,782, of which 713,262 was urban.

Agriculture. Approximately three-fourths of Norway is unproductive and forests are the principal resource of the remainder. In 1926 the area of arable land was 1,671,000 acres or 2.2 per cent of the total land area; there were 622,000 acres of permanent meadows, and 18,-

531,000 acres of forest. In the following year, there were 1,209,000 cattle, 300,000 swine, 1,608,000 sheep, 290,000 goats, and 183,000 horses. The acreage and production of the principal crops in 1927 were as follows: wheat, 24,560 acres, 563,000 bushels; rye, 23,000 acres, 634,000 bushels; barley, 149,000 acres, 4,747,000 bushels; oats, 239,789 acres, 12,169,000 bushels; mixed grain, 16,843 acres, 12,000 metric tons; potatoes, 123,000 acres, 22,232,000 bushels; hay 1,657,162 acres, 2,486,000 metric tons.

Industries. There is practically no domestic production of the nonmetallic minerals, but coal is being mined quite extensively on the Island of Spitzbergen where production at full capacity, it is predicted, would be able to supply the greater part of Norwegian demands. Water power is abundant and was being greatly utilized; the quantity developed up to 1929 was approximately 1,400,000 turbine horse power. The chief mineral products are silver, copper, pyrites, iron ore, and nickel. In 1927 the total value of production in the mining industry was 21,260,000 kroner. Norwegian forests and fisheries are the chief natural sources of wealth. The total value of fisheries during 1927 was 177,919,743 kroner. The total area covered with forests is estimated at 28,956 square miles; value of planed and unplaned, sawn and unsawn timber products exported in 1927, 35,623,400 kroner; value of wood pulp and paper, 189,506,000 kroner.

Transportation. Length of state railways, 2025 miles; private railways, 229. Passengers carried by railways: (1927) 22,069,000. Volume of freight moved by railways, 9,802,000 metric tons.

Ocean Shipping. In 1927 vessels entering at Norwegian ports numbered 9094, of 7,027,453 net registered tons. Vessels clearing from Norwegian ports numbered 8891 of 6,938,904 tons. The Norwegian merchant marine, on Jan. 1, 1928, included 3698 vessels of 1,744,000 net tons. Gross earnings of merchant marine in 1927 reached 390,000,000 kroner, as compared with 430,000,000 for 1926. Norway does an extensive carrying trade all over the world. Its principal ports are Oslo, Bergen, Trondhjem, Narvik, Fredriksstad, and Haugesund.

Foreign Trade. Imports in 1928 were valued at 1,012,800,000 kroner, as compared with 552,321,000 in 1913. Export figures for the same years were 669,500,000 kroner and 380,910,000 kroner. The leading imports are ships, coal, iron and steel, and textile fabrics; the leading exports, wood pulp, paper, fish, wood, and aluminium. The United States supplied 14.3 per cent of the imports in 1926 and purchased 11.8 per cent of the exports; France, 3.9 and 6; Germany, 20.4 and 10; Great Britain, 19.5 and 28.5.

Finance. The total national debt on July 1, 1928, stood at 1,635,060,416 kroner. The gold and silver stocks, on Dec. 31, 1927, totaled 147,300,000 kroner; the amount of paper currency outstanding, 331,000.000 kroner. The exchange, which at par is $.268 to the kroner, stood at 6.83 kroner to $1 on Dec. 31, 1923, and at 7.42 kroner on Mar. 18, 1924. On May 1, 1928 the currency was stabilized at par on a gold basis. The proposed budget for 1928–29 balanced at 351,065,000 kroner.

History. Norway during the World War, like her neighbors, Sweden and Denmark, showed the unsettled conditions prevalent in all neutral countries. The policies of the three Scandinavian states, however, gravitated toward the same end. By the close of August, 1914, they had declared their neutrality; on December 19, agreements were definitely made by which all three pledged themselves to common action in the observance of this neutrality. Throughout the War, these conferences continued, with the result that the northern peoples were more firmly drawn together than ever before. The amity with which events were discussed made a pleasant picture against the dark background of the turbulent nationalistic aspirations of the rest of the European peoples. In fact, the movement thus started for the closer union of the Scandinavian populations soon reached an articulate form in the creation of the Norden Society in 1919. A Norwegian branch was opened on Apr. 12, 1919, an active publicity campaign was kept up, and year books were published.

During the War, extraordinary measures were necessary to shelter Norway's population as far as possible from the rigors of the hostilities. In November, 1914, a loan of $4,000,000 was voted to cover extraordinary military expenses, and the Government tried to push the construction of the two warships then on the ways in English shipyards. A commission was created to regulate the importation and distribution of foodstuffs, and the fixing of prices was likewise established. Because of the setting up of the British blockade in 1914 and the restriction of shipping to a circumscribed area about Scandinavia, Norway's contact with the outside world was greatly hampered, and widespread distress ensued. Shipping suffered severely. In all, as a result of torpedoing and mines, 830 ships with a tonnage of 1,238,300 were lost, and about 2000 sailors were drowned. Yet in spite of difficulties that continuously increased, Norwegian sailors refused to be driven from the high seas and maintained their intercourse with countries at war, Great Britain in particular. As foodstuffs became scarce, prices naturally rose and labor unrest increased.

In 1916 demonstrations and strikes for the increase of wages involved almost 150,000 workmen, with the result that the Storting forced through a measure for compulsory arbitration. After the War, the return to regular conditions was slow. Norwegian workmen manifested a great interest in communist doctrines, and in 1919 and 1920 strikes, particularly on the railways, were frequent. Labor circles regarded sympathetically the attempts of Soviet Russia to open commercial relations in September, 1920, but the Norwegian government at first refused to take the step. In 1921 a commercial treaty was effected which granted Russia surprisingly liberal terms, and in March, 1924, *de jure* recognition was accorded. The Norwegian government even refused to press the claims of its nationals in Russia, which amounted to some 300,000,000 crowns.

Other matters of national interest after the War were the appointment of a royal commission in 1920, after much agitation, for the consideration of the creation of industrial works councils; and the passage by the Storting in 1917 of a measure tantamount to limited prohibition, which forbade the importation of liquors having more than a 12 per cent alcohol content. Two years later, permanent prohibition of spirits was introduced. An attempt to repeal prohibition by legislative act in 1924 failed, but in a plebiscite on Oct. 18, 1926, the majority in favor of repeal was 110,000. The Storting accordingly undertook to repeal the Act of 1919 on Apr. 14, 1927. On May 2, 1927, new laws, allowing a sort of local option, went into effect. In 1922 a ship subsidy act was passed setting aside 25,000,000 crowns for government aid.

Labor troubles continued to make things unpleasant throughout the subsequent years. On Apr. 24, 1926, about 30,000 men in various industries went on strike against a proposed reduction in wages. In April, 1927, some 16,000 men struck for a similar reason. By this time, the string of strikes and lockouts was so long that the Government, in May, 1927, passed a law for the compulsory arbitration of labor disputes. The law was to be effective until April, 1929. In a spirit of self-defense, the Labor and Social Democrat parties drew together early in 1927 and presented a united front in the elections of October 17 of the same year. As a result of the coalition, Labor secured 59 seats in the new government, as against the 34 it had had in the old. This victory was followed by the setting up of the first Norwegian Labor government, on Jan. 26, 1928, under the Premiership of M. Hornsrud; but M. Hornsrud was forced to resign by February 10, because of the great unpopularity of his plans for a stricter system of taxation and for the suspension of military exercises in 1928 in preparation for complete disarmament. He was succeeded, on February 13, by the leader of the Radical Party, J. L. Mowinckel, who had been Premier for a while in 1924. In 1926 and 1927, the country was wrought up over the impeachment trial, begun on Oct. 4, 1926, of ex-Premier Abraham Berge and six members of his cabinet. The trial was held in the Supreme Court at Oslo, and the charge was the unconstitutional support of the Norde Handelsbank (Norwegian Bank of Commerce) in 1923–1924 by the secret depositing of government funds there at a time when the bank was in financial difficulties. The court dismissed the case in March, 1927.

Norway was quite successful in her foreign relations in the decade following the War. In 1922 the Permanent Court of Arbitration at The Hague awarded her $12,000,000 against the United States for the seizure of Norwegian ships in American ports during the War. A long-standing dispute with Denmark over the sovereignty of Greenland was temporarily settled in January, 1924, by a treaty which left the chief point at issue undecided, but which safeguarded Norway's economic interests and claims there for a period of 20 years. The Spitzbergen Treaty, signed in Paris on Feb. 9, 1920, gave Norway the sovereignty over the Spitzbergen archipelago. The treaty went into effect on Aug. 14, 1925, when the Norwegian flag was first hoisted over the island group. On Jan. 19, 1928, Norway announced to England that she had annexed Bouvet Island in the South Atlantic as a whaling station, and that the Norwegian flag had been hoisted there on Dec. 1, 1927. After many months' negotiations, England, on Nov. 20, 1928, finally renounced all claims to the island. Then, on May 8, 1929, Norway decided to annex the island of Jan Mayen in the Arctic Ocean between Spitzbergen and Greenland. Denmark offered no opposition to this move. Naturally, Norway also became a party to a series of conciliation and arbitration treaties.

Norwegian nationalism asserted itself strongly in this period, too. On Jan. 8, 1924, Norway denounced the treaty of November, 1907, signed at Christiania by herself, Great Britain, France, Germany, and Russia guaranteeing Norway's territorial integrity. From Jan. 1, 1925, Christiania was known as Oslo, and in the same year, Spitzbergen came to be known officially as Svalbard. (See SVALBARD.) As a further step in the "purification" of the country, the Government on June 10, 1929, changed the name of the city of Trondhjem to the more national Nidaros, to take effect from Jan. 1, 1930. This step, and the announcement that similar ones were to follow, caused a number of serious riots and demonstrations throughout the land, but the Government remained firm. On Mar. 15, 1928, began a tremendous celebration of the Ibsen Centenary in which the entire world participated.

NORWEGIAN LITERATURE. See SCANDINAVIAN LITERATURE.

NOTRE DAME, UNIVERSITY OF. A Roman Catholic institution for men at Notre Dame, Ind., founded in 1842. The university increased its student enrollment from 1077 in 1913, to 2991 in the autumn of 1928, and 1023 in the summer session; its faculty, during the same period, from 84 to 160; and its library from 65,000 to 200,000 volumes. A library was built in 1916, a chemical laboratory in 1917, a law college building in 1918, and two halls for freshmen and sophomores in 1923. An addition to the science hall was constructed in 1924 and a new residence hall for men in 1925, as well as an addition to the gymnasium. Gifts amounting to $645,000 were received in 1921. In 1924 a new course was added in the school of education in "boy guidance" work. President, the Rev. Charles L. O'Donnell, C.S.C., Ph.D.

NOURISHMENT. See FOOD AND NUTRITION.

NOVAES, GUIOMAR (1895–). A Brazilian pianist, born at Joao de Boa Vista. At the age of four, she began to play by ear, and it was not until she was seven that she received regular lessons from Chiafarelli in São Paulo. Her progress was so rapid that after only two years of instruction she was exhibited as an infant prodigy, making frequent appearances, but at the same time continuing to work systematically. In 1909 she won a scholarship at the Paris Conservatoire, where she remained two years under I. Philipp and graduated as winner of the first prize. After her highly successful début in Paris (1911), she made tours of France, Germany, England, Italy, and Switzerland until 1913. During the next two years, she toured in Brazil and then appeared for the first time in the United States (New York, Nov. 11, 1915), where she won instantaneous and emphatic success. She later made several American tours. She married Ottavio Pinto in 1922.

NOVA SCOTIA, nō'vȧ skō'shȧ. A Canadian maritime province with an area of 21,428 square miles. The population in 1911 was 492,338; in 1921, 523,837, which represented a gain of 6.4 per cent; estimated at 550,400 on June 1, 1929. Of the population in 1921, 56.7 per cent was rural, as compared with 62.2 per cent in 1911. The leading cities, with their populations in 1921, are Halifax, 58,372 (46,619 in 1911); Sydney, 22,545 (17,723 in 1911); Glace Bay, 17,007; Dartmouth, 7899; Amherst, 9998; New Glasgow, 8974; Sydney Mines, 8327; Truro, 7562. Cape Breton Island is an integral part of the province.

Industry. Agriculture is the leading activity. The geographical situation of the province favors the cultivation of hay, and 844,000 tons were cut in 1927. Other important crops are potatoes, oats, and wheat. The growth of fodder crops and the presence of an important livestock industry makes dairying particularly important. The value of live stock was put at $19,355,000 in 1926; wool is important. Agricultural products, in all, yielded $41,251,000 in 1926. Forest products totaled $14,500,000 in 1926. Fisheries continue to absorb the attention of a considerable part of the population. Cod, lobsters, haddock, herring, and mackerel were the most important of the 1927 catch with a total value of $9,500,000, as against $7,384,055 in 1913. In 1926, 20,000 men were engaged, and the whole industry represented a capital of $12,785,188. In 1928 the output of the fisheries amounted to $11,570,387, codfish alone bringing $4,406,507. Bituminous coal is by far the most important mineral product. The output in 1926 was 6,747,477 tons, valued at $33,200,000, and was distributed largely among the other maritime provinces. Gold continues to decline; the 1926 yield was only $34,687, as against $44,935 in 1913. Pig iron also showed decreases for the years following 1913. In all, in 1927, Nova Scotia's mineral products were valued at $30,111,221, almost 12 per cent of the total Canadian production. In 1925 there were 1184 industrial establishments (1480 in 1910) employing 16,568 workers and capitalized at $117,326,491 ($79,596,341 in 1910). The cost of materials was $37,854,196 and the gross value of products $65,033,201 ($52,706,184 in 1910). The following industries are important: manufacture of coke, iron and steel products ($6,967,662 in 1925), shipbuilding, sugar refining, boot and shoe manufacturing, etc.

Trade and Communications. Imports entered for consumption in 1927 were $23,479,462 ($20,753,369 in 1912–13); exports were $53,226,985 ($24,201,473 in 1912–13). In 1927 there were 1451 miles of railway, as compared with 1360 in 1913. Some 18,000 miles of highways kept in good repair make intraprovincial communication easy. This is further facilitated by numerous subsidized boats plying the shore.

Government. The suffrage is exercised by both sexes. Revenues in 1914 were $1,885,000; in 1927, $6,517,072. The Dominion subsidy yielded $661,841 in 1926. Other sources are royalties on coal lands and other provincial properties, succession duties, etc. There is no direct taxation. Expenditures in 1913 and 1927 were $2,098,893 and $6,566,143. In the same period the debt grew from $12,615,686 to $41,708,457. For the year 1926–27, 112,556 pupils were enrolled at 3113 schools. Total cost of education was $3,605,401, as compared with $1,439,742 in 1913. There is a normal school and an agricultural school at Truro, and a technical school at Halifax. Representation in Parliament: House of Commons, 14; Senate, 10.

NOYES, noiz, Alfred (1880–). An English poet (see Vol. XVII). From 1914 to 1923, he was professor of modern English literature at Princeton University. In 1916 he was in the British Foreign Office for a short time, and in 1918 was made a commander of the Order of the British Empire. His later prose works were *Walking Shadows*, short stories (1917); *Open Boats*, an account of naval operations (1917); *Aspects of Modern Poetry*, essays (1924); and *New Essays and American Impressions* (1927). His later poems include *A Salute From the Fleet* (1915); *The New Morning* (1918); *The Elfin Artist* (1920); *Collected Poems*, vol. iii (vols. i and ii in 1910) (1920); *Selected Verse* (1921); *The Torchbearers*, "an epic of scientific discovery," vol. i being *The Watchers of the Skies, or famous astronomers* (1922); and vol. ii, *The Book of the Earth*, scientists from Pythagoras to Darwin (1925); *Dick Turpin's Ride* (1927); and *Ballads and Poems* (1928).

NURSERY SCHOOLS. See Education in the United States.

NUTRITION. See Food and Nutrition.

NUTS. See Horticulture.

NYASALAND PROTECTORATE. A British protectorate in southeastern Africa on the southern and western shores of Lake Nyasa. Area, 37,890 square miles; population (1927), 1,304,123 natives; 1829 Europeans; 982 Asiaties. In 1911 there were 766 Europeans and 481 Asiatics. The chief settlement, Blantyre, in the Shire Highlands, has some 400 Europeans. In the same locality, coffee is cultivated, as well as tobacco, cotton, and tea. The crops showing the greatest advances are tobacco and tea, while cotton and coffee are falling behind. Tobacco exports in 1912–13 totaled 2,262,545 pounds; in 1927, 15,466,032. Leading imports are cotton piece goods, rice and grain, sugar, and petroleum. Imports in 1913–14 were £208,711; 1921, £637,567; 1927 (April to December), £938,461. Exports in 1913–14 were £266,089; 1921, £416,404; 1927 (April to December), £960,869. The trade does not include specie or goods in transit. Of the exports, 97 per cent went to the United Kingdom; 44 per cent of the imports came from the United Kingdom and 20 per cent from British possessions. The following figures show the course of administrative charges: revenues for 1913–14 and for 1927, £124,849 and £348,320; expenditures for same years, £133,106 and £318,399. The public debt of the protectorate in 1927 was £727,105. To this must be added £3,000,000 borrowed from Great Britain to finance campaigns in German East Africa during the World War. To bring the protectorate into ready communication with the Indian Ocean, a railway from Chindio, in Portuguese East Africa, to Blantyre (174 miles) was constructed. In 1922 another line connecting Blantyre with Beira in Portuguese East Africa was opened. The extension of the railway system northward to Lake Nyasa, on which so much depended, was still only contemplated in 1929. The settlers were involved in the War because of the proximity of German East Africa. Most of the Europeans saw service, as well as almost 200,000 natives in the rôle of carriers. The natives continued orderly except for a single uprising in 1915, which was soon quelled.

NYE, Gerald P. (1892–). A United States Senator, who was born at Hortonville, Wis., and attended the Wittenberg, Wis., high school. He engaged in country newspaper work in Wisconsin, Iowa, and, after 1915, in North Dakota, settling at Cooperstown, N. D., in 1919 and becoming editor and manager of the *Griggs County Sentinel-Courier*. In 1923 he was defeated as a candidate for Representative in Congress on the Independent ticket. Two years later, he was appointed by Governor Sorlie to fill an unexpired term as United States Senator and was seated after controversy in the Senate over the governor's right to appoint. In June, 1926, he was elected as a Progressive Republican for the short term and in November for the full term.

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OAKLAND. The third city of California. The population increased from 150,174 in 1910 to 216,261 in 1920 and to 274,100 in 1928, by estimate of the Bureau of the Census. In 1923 Oakland joined with eight neighboring cities to purchase the East Bay Water Company and to develop new sources of water supply for the district. The initial cost of the project was $39,000,000, in addition to which the cities voted $26,000,000 in 1927 to acquire a complete distributing system from Pardee Dam, which provides the main storage for the new supply from the Mokelumne River through a 95-mile aqueduct. In 1923 the city also purchased a site on the shore of Lake Merritt on which to erect a museum. A bond issue, amounting to $9,600,000, was voted in 1925 for the development of the city's water front. In 1928 Oakland completed the erection of three high schools and six junior high schools authorized by a $5,000,000 bond issue voted in 1919. The Oakland airport, erected at a cost of $2,000,000, is one of the largest airports in the United States and is operated as a municipal terminal facility by the Board of Port Commissioners; approximately 8000 landings are made each month. In 1928 the George A. Posey Tube, a vehicular tunnel under the estuary between Oakland and Alameda, was completed. See TUNNELS. In 1925, 15,537 wage earners were employed in Oakland's 125 industries and received $21,654,000 in wages; the value of products manufactured was $144,841,000. Building permits increased 368 per cent, from $4,442,520 in 1917 to $20,794,669 in 1927. Bank clearings increased 259 per cent, from $269,219,938 in 1917 to $1,046,041,000 in 1928. The assessed valuation of property in 1928 was $252,012,045; the net debt was $35,528,839.

OATS. Among the cereal crops in the United States, oats are exceeded only by corn and wheat in acreage and value. The average annual production for the years 1919 to 1928, inclusive, was 1,314,939,000 bushels and, similarly, the annual production for the three leading States was 213,194,000 bushels for Iowa, 143,364,000 for Minnesota, and 139,520,000 for Illinois. During the World War, there was a general increase in acreage and production in the United States, while in Europe, the crop decreased and for a number of years did not regain its normal status. The United States Grain Standards Act requires oats in interstate commerce to be inspected by a licensed inspector and graded by him on the basis of official standards. According to these standards, effective since June 16, oats are classified for commercial purposes as white (including yellow), red, gray, and black oats. Each class is divided into four grades on the basis of condition and general appearance, test weight per bushel, sound oats, heat damage, wild oats, and mixtures of other classes of oats. In addition, there is a "sample grade" for oats too poor to come within the numerical grades. Since then, grades have been added for chemically bleached, weevily, and cereal oats, and standards for feed oats and mixed feed oats. Consult U. S. Department of Agriculture *Year Book*, 1922 and 1927.

OBER, ō'bēr, MARGARETE (1885–). A German dramatic mezzo-soprano, born in Berlin. She studied there with Benno Stolzenberg and, later, Arthur Arndt, whom she married in 1910. After her début at Frankfort in 1906, as Azucena, she was engaged at the Stadttheater in Stettin, where her extraordinary voice and superior talent as an actress attracted the attention of Von Hülsen, who in 1907 engaged her for the Royal Opera in Berlin. Her American début as Ortrud at the Metropolitan Opera House (Nov. 21, 1913) was one of the sensations of the season. From 1913 to 1917, she divided her time between New York in the winter and Berlin in the summer and sang as guest in other principal German opera houses and in Amsterdam. When the Royal Opera became the Staatsoper in 1919, she was retained as one of the principal stars. Her interpretation of the great Wagner rôles and of the German *lieder* is considered unexcelled.

OBERHUMMER, ō'bēr-hum'ēr, EUGEN (1859–). A German geographer, professor in the University of Vienna since 1903 (see VOL. XVII). His later works include *Imperialism* (1920); *Ferdinand Magellan* (1921); *Ratzel* (1923); *Weltkarte des Pi-Desceliers* (1924).

OBERLIN COLLEGE. A nonsectarian institution for men and women at Oberlin, Ohio, founded in 1833. There was only a slight variation in the enrollment of students during the period 1914–28, since the college limited the attendance of students to the number that it could efficiently care for with its classrooms, laboratories, and dormitories. In the autumn term of 1928, the registration was 1617, while that of the summer session was 185. The faculty increased from 157 in 1913 to 248 in 1927–28. The library contained 241,000 bound volumes and 178,000 pamphlets in 1924, and 299,179 volumes and 200,429 pamphlets in 1928. New buildings erected during the period under review included: An art building in memory of Dr. Dudley P. Allen, given by Mrs. Allen; an administration building erected in memory of Gen. Jacob Dolson Cox; and a hospital. In November, 1923, Oberlin entered upon a campaign to raise $4,500,000 for new endowment and buildings, and by Jan. 1, 1924, had received gifts and pledges to the amount of $3,000,000, including a contribution of $500,000 from the General Education Board. A gift of $100,000 from Andrew H. Noah, of Akron, announced in November, 1927, was the first contribution to a fund to be raised for the construction of residence halls for men students. Henry Churchill King, D.D., LL.D., was succeeded by Ernest Hatch Wilkins, Ph.D., Litt.D., LL.D., as president in 1927.

OBREGÓN, ōbrā-gōn', ÁLVARO (1880–1928). A Mexican soldier and President (see VOL.

XVII). In 1914 he became commander of the Constitutionalist Army of the West, and after defeating Zapata and Villa, he entered Mexico City in August of that year. Then followed a period of civil strife, General Obregon victoriously supporting Carranza against Villa and Zapata, and losing his right arm from a severe wound received at Celaya (1915). During Carranza's presidency, Obregon remained at the head of the army, and in 1920 became a candidate for President. When Carranza ordered his arrest. Obregon headed a successful revolt and was elected President. He started far-reaching labor, agrarian, and educational reforms, and his government finally received the recognition of the United States on Aug. 31, 1923. The close of his term was marked by the unsuccessful revolt of de la Huerta, who opposed Calles's candidacy for the Presidency. After four years of official inactivity, Obregon was reëlected President on July 1, 1928. He was assassinated on July 17, before he had entered on his second term. See MEXICO, *History.*

O'BRIEN, EDWARD JOSEPH HARRINGTON (1890–). An American author and editor, born at Boston, Mass. He studied at Boston College and at Harvard and from 1912 to 1915, was editor of *The Poetry Journal.* In the year following, he was editor of *Poet Lore.* He wrote *The Flowing of the Tide,* a play (1910); *White Fountains,* verse (1917); *The Bloody Fool* (1917); *Distant Music* (1921); *Hard Sayings* (1922); and *The Advance of the American Short Story* (1923). He edited *The World's History at a Glance* (1913); *Poems of the Irish Revolutionary Brotherhood* (1917); and from 1915 to 1928, edited with John Cournos *The Best Short Stories* and *The Best British Short Stories.* He also translated several books from the French and other languages.

O'BRIEN, FREDERICK (1869–). An American writer, born in Baltimore, Md., and educated at the Jesuit College in Baltimore and the University of Maryland. At the age of 18, he went to sea and for many years thereafter traveled extensively. He was at various times connected with newspapers in New York, San Francisco, Manila, and Paris. During the World War, he served with the Food Administration in California and in Washington D. C. As a result of a sojourn in the islands of the South Seas, he wrote *White Shadows in the South Seas* (1919). This was immediately successful and was followed by *Mystic Isles of the South Seas* (1921), and *Atolls of the Sun* (1922).

O'BRIEN, WILLIAM (1852–1928). An Irish journalist and parliamentary leader (see VOL. XVII). With his colleagues of the All-for-Ireland League, he withdrew from Parliament at the general election of 1918 and thereafter lived quietly at Mallow, engaged mainly in writing. His later works were *Evening Memories* (1920); *The Irish Revolution and How It Came About* (1923); *Edmund Burke as an Irishman* (1924); *The Parnell of Real Life* (1926).

OBSTETRICS. See ABORTION

O'CASEY, SEAN (1890–). An Irish playwright, born in Dublin of poor parents. He worked at various forms of unskilled labor and lived in the cheerless tenement district of Dublin, frequently in danger of his life because of his activities in the Easter Rebellion of 1916. His plays, given at the Abbey Theatre, were stirring accounts of the life of the Irish city worker, objectively written, with bitterness and a feeling of disillusionment running through them, tense situations relieved by whimsical or hilarious humor, as the case might be, and a pacifist's emphasis on the horrors of war. The best known were *The Shadow of a Gunman* and *Juno and the Paycock,* published as *Two Plays* in 1925; *The Plough and the Stars,* an account of the Easter Rebellion of 1916 (1926); and *The Silver Tassie* (1928).

OCCIDENTAL COLLEGE. A coeducational residence college of liberal arts and sciences at Los Angeles, Calif., founded in 1887 under Presbyterian auspices, but nonsectarian since 1910. The number of students increased from 311 in 1915 to 718 in 1927–28, the faculty from 25 to 74 members; the endowment from $161,027 to $952,637, and the annual income from $129,961 to $271,000, for the year ending in June, 1928. The physical plant included a campus of 83 acres, nine principal buildings and a number of minor structures. The college library in 1928 contained a total of 26,000 volumes. Occidental College was fully accredited in 1918 by the Association of American Universities and in 1926 received a chapter of Phi Beta Kappa, the Delta Chapter of California. The graduate school and the school of education were founded in 1922; and a campaign to raise $500,000 in 1924 was oversubscribed by $150,000. The women's gymnasium and the president's house were built in 1922; the library, an anonymous gift in honor of Mrs. Mary Norton Class, was completed in March, 1924, at a cost of $150,000; Orr Court, a women's building and residence court, given by William Mead Orr in honor of Bertha Harton Orr, was erected; and a student union, providing social and dining halls, was one of the most recent additions to the plant. President, Remsen D. Bird, D.D.

OCEAN NAVIGATION. See SHIPPING; SHIPBUILDING; NAVIGATION.

OCEANIA. See EXPLORATION.

OCEANOGRAPHY. See EXPLORATION.

OCHS, ŏks, ADOLPH S. (1858–). An American newspaper publisher (see VOL. XVII). In 1926 he arranged to supply funds to be used by the Council of Learned Societies in the preparation of manuscript for the *Dictionary of American Biography* over a period of 10 years. He was made a commander of the Legion of Honor (France) in 1919 and received the honorary degree of LL.D. from Columbia University (1924), the University of Chattanooga (1925), and New York University (1926). In May, 1927, he received the gold medal of the National Institute of Social Sciences for "developing and maintaining high standards of journalism."

OCHS, SIEGFRIED (1858–1929). A famous German choral conductor (see VOL. XVII). In 1920 the unfavorable conditions of the postwar period compelled him to dissolve the Philharmonic Choir in Berlin, part of which was absorbed by the chorus of Staatliche Hochschule für Musik. Ochs himself joined the faculty of this institution as professor of choral music and conductor of the chorus, a post which he filled with signal distinction until his death. He wrote *Der Deutsche Gesangverein* (4 vols., 1923); *Über die Art Musik zu hören* (1926); and his autobiography under the title *Geschehenes, Geschehenes* (1922).

OCHSNER, ALBERT JOHN (1858–1925). An American surgeon (see VOL. XVII). In 1916 he wrote the surgical section of Smithies's *Cancer of the Stomach,* and in 1917, assisted by Percy, he brought out a new edition of his work, *A New Clinical Surgery*, with the title *A New Manual of Surgery, Clinical and Military*. A large four-volume system of surgery edited by Ochsner, *Surgical Diagnosis and Treatments by American Authors*, was published in 1920. During the War, he was a major of the Medical Reserve Corps.

O'CONNOR, Andrew (1874–). An American sculptor (see Vol. XVII). His later important works include the fine "Soldier," Worcester, Mass.; "Serenity," part of the monument to General Thomas, Tarrytown, N. Y.; "Inspiration," St. Louis Museum, and especially a bronze "Lincoln" (Springfield, Ill.), which has caused much discussion.

O'CONNOR, Rt. Hon. T(homas) P(ower) (1848–1929). An Irish journalist and parliamentarian (see Vol. XVII). While continuing to represent the Scotland Division of Liverpool in Parliament, he became editor of *T. P.'s and Cassell's Weekly* in 1923 and wrote for the *Sunday Times* and other journals. He was made a Privy Councilor in 1924 and in 1929 published *Memoirs of an Old Parliamentarian*.

OFFICERS' TRAINING CAMPS. See Armies and Army Organization.

OGG, Frederic Austin (1878–). An American teacher of political science, born at Solsberry, Ind., and educated at DePauw, Harvard, and Indiana universities. From 1905 to 1913, he was a member of the faculties of the Boston University and Simmons College. In the latter year, he was appointed associate professor at the University of Wisconsin, where after 1917 he was professor of political science and after 1925, chairman of the graduate division of social studies. He wrote *The Opening of the Mississippi—A Struggle for Supremacy in the American Interior* (1904): *Social Progress in Contemporary Europe* (1912); *Life of Daniel Webster* (1914); *Economic Development of Modern Europe* (1917); "The Old Northwest and Reign of Andrew Jackson" (in *Chronicles of America*, vols. xix and xx; 1919); *National Governments and the World War*, with C. A. Beard (1919); *Introduction to American Government*, with P. O. Ray (1921); *Research in Humanistic and Social Sciences* (1927). He was editor of *The Century Political Science Series*.

O'HIGGINS, Harvey J. (1876–1929). An American writer, born in London, Ont., and educated at the University of Toronto. He began his career as a writer by the publication of *The Smoke Eaters* (1905). This was followed by *A Grand Army Man* (1908); *The Beast and the Jungle*, with Judge Ben B. Lindsey (1910); *Polygamy* (1914); *From the Life* (1919); *The Doughboy's Religion*, with Judge Lindsey (1919); *Secret Springs* (1920); *Some Distinguished Americans* (1922); *The American Mind in Action*, with Edward H. Reede (1924); *Clara Barron* (1925). He also wrote several plays with Harriet Ford. Some of these were successfully produced.

OHIO. The thirty-fifth State in size (41,040 square miles) and the fourth in population; capital, Columbus. The population increased from 4,767,121 in 1910 to 5,759,394 in 1920, a gain of 20.8 per cent; estimated population, 1928, 6,826,000. The white population increased from 4,654,897 (1910) to 5,571,893 (1920); Negro, from 111,452 to 186,187; native white, from 4,057652 to 4,893,196; foreign-born white, from 597,245 to 678,697. The urban population rose from 2,665,143 to 3,677,136; the rural population, on the other hand, fell from 2,101,978 to 2,082,258. The growth of the principal cities was as follows: Cleveland, from 560,663 in 1910 to 796,841 in 1920; Cincinnati, 363,591 to 401,247; Toledo, 168,497 to 243,164; Columbus, 181,511 to 237,031; Akron, 69,061 to 208,435. See articles on these cities.

Agriculture. As Ohio is an important grain-growing State, agricultural conditions have been affected by the fluctuations in production and prices of grain during the World War and the post-war period. The general agricultural history of the period is treated under Agriculture, Corn, Wheat, Barley, etc. The number of farms, which had decreased 5.6 per cent, or from 270,045 in 1910 to 256,695 in 1920, decreased further by 4.8 per cent, to 244,703 in 1925. The acreage of land in farms, 23,515,888 in 1920, decreased to 22,219,248 in 1925, or by 5.5 per cent. The improved land in farms was 18,542,353 in 1920. The percentage of total area in farms decreased from 92.5 in 1910 to 90.2 in 1920 and 85.2 in 1925. Farm land values increased in the war period. The total value of farm property rose from $1,902,694,589 in 1910 to $3,095,666.336 in 1920 or 62.7 per cent. but receded to $2,236,901,636 in 1925; the average value per farm was $6994 in 1910, $12,060 in 1920, and $9141 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 181,346 were operated by owners; 1060, by managers; and 62,296, by tenants. The comparative figures for 1910 are 192,104; 2753; and 77,188. White farmers in 1920 numbered 255,079; colored farmers 1616. In 1910 white farmers numbered 270,095 and colored farmers, 1950. Farms reported as under mortgage, 50,784 in 1920, numbered 47,800 in 1925. The total number of cattle in 1920 was 1,926,823; in 1925, 1,652,594; there were 1,349,373 dairy cows in 1920; 839,880 in 1925. Sheep in 1920 numbered 2,102,550; in 1925, 1,941,023; swine, 3,083,846 in 1920; 2,367,570 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 136,725,000 bushels; wheat, 9,475,000; oats, 89,281,000; barley, 9,191,000; potatoes, 12,054,000; hay, 3,706,000 tons; tobacco, 33,440,000 pounds; and sugar beets, 281,000 short tons. Comparative figures for 1913 are corn, 146,250,000 bushels; wheat, 35,100,000; oats, 54,360,000; barley, 960,000; potatoes, 10,240,000; hay, 3,848,000 tons; and tobacco, 61,425,000 pounds.

MINERAL PRODUCTS IN OHIO

	Coal		Clay products	Petroleum	
Year	Net tons	Valued at	Valued at	Barrels	Valued at
1914	18,843,115	$ 21,250,642	$37,166,768	8,536,352	$13,372,729
1915	22,434,691	24,207,075	....	7,825,326	10,061,493
1916	34,728,219	46,150,907	44,947,877	7,744,511	16,154,940
1917	40,748,734	100,897,148	....	7,750,540	21,104,483
1918	45,812,943	118,095,548	52,899,180	7,285,005	23,465,197
1920	45,878,191	175,081,000	82,061,960	7,400,000	37,338,000
1921	31,942,776	84,686,500	67,396,680	7,335,000	21,512,000
1926	27,872,488	54,759,000	97,873,102	7,272,000	19,180,000

Manufactures. Ohio is one of the most important States industrially. In 1920 there were more than 50 cities having more than 10,000 inhabitants and forming 54.5 per cent of the total population of the State. These cities reported 79.6 per cent of the State's manufactured products in 1919. There were 15,138 manufacturing establishments in the State in 1909; 16,125 in 1919; 11,131 in 1925; and 10,961 in 1927. Wage earners in manufactories numbered 730,733 in 1919, 676,661 in 1925, and 669,097 in 1927. The capital invested amounted to $1,300,732,732 in 1909 and $3,748,743,996 in 1919. The value of products was $1,437,935,817 in 1909; $5,100,308,728 in 1919; $5,345,592,745 in 1925; and $5,230,323,268 in 1927. The increase in value of products about 1919 was due largely to changes in industrial conditions brought about by the War and cannot be properly used to measure the normal growth of manufactures during that period. The most important industry in point of value of products is iron and steel, amounting to $197,780,000 in 1909; $626,370,000 in 1919; $968,264,055 in 1925. Foundry and machine-shop products totaled $145,837,000 in 1909; $178,855,000 in 1914; and $527,079,000 in 1919. A very extensive manufacture of rubber tires and rubber goods attained a total annual production of $53,911,000 in 1909; $551,118,000 in 1919; $556,262,424 in 1925. The manufacture of automobiles, bodies, and parts, likewise important, had a product valued at $38,839,000 in 1909; $379,436,000 in 1919; and $514,775,843 in 1925. The principal manufacturing cities of the State are Cleveland, Akron, Cincinnati, and Toledo. In Cleveland, there were 2148 manufacturing establishments in 1909, with a product valued at $271,961,000; 2946 in 1919, with $1,091,577,000; and in 1925, products valued at $1,094,780,000. In Cincinnati, there were 2183 establishments in 1909, with $192,516,000; 2239 in 1919, with $500,041,000; and in 1925, products valued at $457,539,000. Akron had 246 factories in 1909, with products valued at $73,158,000; 304 in 1919, with $558,962,000; and in 1925, products valued at $565,391,000. Similar figures for Toledo were: 760 in 1909, with $61,230,000; 671 in 1919, with $293,521,000; and in 1925, products valued at $371,120,000. Other important manufacturing cities are Columbus, Dayton, Canton, Springfield, and Youngstown.

Education. Among the advances leading to the present stage of education in Ohio were county school systems and trained teachers. There was no supervision of rural schools until 1914, when county boards of education were established. These boards elect county superintendents of schools and, if necessary, assistants. Hundreds of centralized rural schools of the best type have been built under the new régime; most of these included high schools. No training was required of teachers prior to 1914, except by certain city boards of education. The requirements were increased gradually, until the standard rose in 1921 to a full year of normal work, which is, in effect, a year beyond a four-year high-school course. Two new State normal schools were started in 1913; and a county normal school plan was adopted to supplement the other agencies for preparing elementary teachers. There soon were over 50 such schools with work of strictly collegiate grade. Some of the private colleges, of which there are many in Ohio, also undertook to train elementary teachers, under the supervision of the State Department of Education. By 1924 all but two of the standard colleges prepared high-school teachers with the large amount of professional training required by the 1914 law. High-school supervision by the State University was merged with that of the State Department of Education. Most high schools rose to first-grade rank. A compulsory-education law of 1921 required attendance to the age of 18 of those not through high school; those fitted might secure work certificates at 16. Other advances include much improvement in day schools for blind, deaf, and crippled; State and many county supervisors of music; moving-picture censorship under State director of education; establishment of Smith-Hughes vocational work, especially strong in part-time industrial education; a model teachers'-retirement law; increase of State aid to weak school districts from about $200,000 to $2,400,000 with the administration entirely under the State director of education. The enrollment increased from 895,167 in 1914 to 1,255,323 in 1925–26; of the latter number, 1,031,644 pupils were enrolled in elementary grades; 223,679 in high schools. Expenditure for public day schools in 1925–26 was: current, $103,367,178; outlays, $24,212,244. Illiteracy in the State decreased from 4 per cent in 1910 to 3.6 per cent in 1920; in the native white population, from 2.2 to 1.2 per cent; among the foreign-born white, rose from 11.8 to 13.4 per cent; and among the Negroes, fell from 13.9 to 9.7 per cent.

Finance. State expenditure in the year ended June 30, 1927, as reported by the U. S. Department of Commerce was: for maintenance and operation of governmental departments, $41,843,672 (of which $3,111,486 was aid to local education); for conducting public-service enterprises, $109,536; for interest on debt, $976,174; for permanent improvements, $10,912,780; total, $53,842,162 (of which $19,686,268 was for highways, $13,176,744 being for maintenance and $6,509,524 for construction). Revenues were $53,627,085. Of this, property and special taxes formed 20.7 per cent; departmental earnings and charges for officials' services, 11.3 per cent; sales of licenses and taxation of gasoline, 47.6 per cent. Property valuation was $13,350,444,355; State taxation thereon, $3,337,611. Net funded State debt on June 30, 1927, was $19,127,835.

Political and Other Events. The Republican Party has repeatedly alternated with the Democrats in political control in recent years. In 1914 Harding, former lieutenant governor, was elected Senator by the Republicans, who also elected, as governor, Frank B. Willis. An amendment establishing county local option was carried in this election, while amendments providing for woman suffrage and prohibition were defeated. In April, 1914, the coal mines of the State were shut down as the result of the failure to negotiate a wage agreement. The strike caused great suffering to the miners and huge losses. In 1915 a constitutional amendment forbidding the sale of intoxicating liquors was submitted to the people and was rejected. Severe floods in the State, in July, 1915, resulted in five deaths and damage above $2,000,000,000. In 1916 James M. Cox, running for governor, with the entire State Democratic ticket, was elected, and Senator Pomerene was reëlected. For President, Wilson received 604,161 votes; Hughes, 514,753. Riots in East Youngstown among the steel workers resulted in great damage to property and the destruction of practically the entire business section by fire. In 1917 the voters defeated a law permitting women to vote for presidential electors, and rejected a prohibition amendment.

Governor Cox was reëlected in 1918, and a State-wide prohibition amendment was adopted. The Republicans in 1920, elected their candidate for governor, Harry L. Davis, while Frank L. Willis was elected to the Senate. In that year, both candidates for President were natives of Ohio. For President, Harding received 1,182,022 votes; Cox, 780,037. In 1921 at a special election, the people ratified a soldiers' bonus of $25,000,000. In 1922 the Democratic nominee, A. V. Donahey, was elected governor. He was reëlected in 1924 and in 1926. In 1922 the constitutional amendment providing for the sale of beer and light wines was proposed, but the Secretary of State refused to certify it. The Supreme Court ordered him to place the proposal on the ballot. It was rejected by the people by a majority of over 180,000 votes. In 1923 the people rejected an old-age pension proposal. On June 28, 1924, the city of Lorain and others west of it were swept by a tornado which did damage of more than $50,000,000 and took 94 lives, 71 of them in Lorain.

The presidential vote of 1924 was: Coolidge, 1,176,130; Davis, 477,888; LaFollette, 357,948. A species of proportional representation in the election of councilmen in Cincinnati went into effect in 1925. The State act allowing justices of the peace to share in the proceeds of fines that they inflicted was invalidated in 1927 by the U. S. Supreme Court, thus virtually abolishing these magistrates. The disclosure of municipal corruption in Canton by a newspaper editor, Don R. Mellett, led to his murder in 1926 by members of the police force, and aroused widespread resentment against corruption in office. In 1928 the vote for President was: Hoover, 1,627,543; Smith, 964,210. Myers Y. Cooper, Republican, was elected governor.

Legislation. Two special sessions were held in 1914. An act was passed reorganizing the agricultural interests of the State and creating an agricultural commission. The common school system was also reorganized. A law was passed in 1917 permitting women to vote for President but was defeated by the voters. The Federal Prohibition Amendment was ratified by the Legislature on Jan. 7, 1917, but on November 4 of that year, the amendment was rejected by the voters by a majority of 542. In 1919 statutes were passed defining and punishing criminal syndicalism and sabotage and forbidding the teaching of German in the elementary grades of public and parochial schools. The Legislature of 1921 amended the compulsory education laws; made provision for coöperative marketing; passed measures for the enforcement of the prohibition law, and amended the laws relating to the finances of the State. The Legislature in 1923 created a judicial council of nine judges. The State adopted a two-cent gasoline tax in 1925, and made the rate three cents in 1927. A measure to reform the system of justices of the peace, regulating their remuneration in conformity with constitutional requirements, was enacted in 1927 but failed of ratification by popular vote.

OHIO NORTHERN UNIVERSITY. An institution of higher learning at Ada, founded in 1871, and under the direction of the Methodist Episcopal Church; consisting or the George Franklin and Sarah Catherine Getty College of Liberal Arts, colleges of education and engineering and pharmacy, the Warren G. Harding College of Law, the A. D. Juilliard College of Music, a school of commerce, and departments of expression, fine arts, and physical education. The enrollment increased from 1051 in the autumn of 1924 to 1189 in the autumn of 1928, the faculty from 45 to 62, the library from 11,000 to 15,000 volumes, productive funds from $316,000 to $542,860, and the income from $209,376 to $352,925. Additions to the buildings included a newly equipped museum, in 1924; and a new gymnasium and a music hall in 1928. President, Albert Edwin Smith, Ph.D., D.D., LL.D.

OHIO RIVER. See CANALS.

OHIO STATE UNIVERSITY. A State institution of higher education for men and women at Columbus, founded in 1870 and supported by appropriations from both State and Federal governments. The enrollment of the University more than doubled between 1914 and the autumn of 1928, increasing from 4466 in the former year to 10,412 in the latter, with an additional 3504 students in the summer session. In the same period, the faculty increased from 423 to 883, the library from 138,101 to 310,000 volumes, and the income from $1,276,134 to $6,804,063. The University had 10 colleges and a graduate school in 1924 and had added two more colleges by 1928. In 1914 the Sterling Ohio Medical College, including the dental school, was incorporated as part of the University, and the college of commerce and journalism was added in 1916. During 1922–24, new buildings constructed included: Mack Hall, a residence hall for women; Pomerene Hall, a women's gymnasium; the Ohio Stadium; a new administration building; new commerce building; journalism building; chemical laboratories; Hamilton Hall, medical science building; an art studio; and new structures for beef cattle, dairy cattle, hogs, and sheep; while contracts were let for a new university hospital, an addition to the medical science building, and an appropriation of $50,000 was made for the erection on the campus of a residence for the president of the University. During this period, the University began to operate on the four-quarter system, abandoning the semester plan, with such an arrangement in the schedule that a student might enter at the beginning of any quarter. President, George W. Rightmire, LL.D.

OHIO UNIVERSITY. A State institution of higher education, at Athens, Ohio, founded in 1804. Attendance in all departments was 2276 in the autumn of 1914 and 2215 in the autumn of 1928, and in the summer session of the latter year, 1098. The faculty increased from 85 to 260; the library from 47,000 volumes to 63,900; the productive funds decreased from $150,000, chiefly land endowment, to $71,802 in 1925; and income increased from $289,566, to $1,209,936 for the year 1924–25, including appropriation by the Legislature for additions for the biennium 1925–27. President, Elmer Burritt Bryan, L.H.D., LL.D.

OHIO WESLEYAN UNIVERSITY. An institution of higher learning for men and women at Delaware, Ohio, under the control of the Methodist Episcopal Church, founded in 1844. The student enrollment increased from 1126 in 1914 to 1803 in the autumn of 1928; the faculty was increased in membership from 66 to 163, and the library from 66,210 to 118,000 volumes. During the period under review, departments in education, home economics, business administration, and religious education were founded; Austin Hall was built; the Perkins Observatory was constructed; the Z. E. White building, in the heart of Columbus, was bequeathed to the University by Mr. White in 1922, and $250,000 was given for the purchase and maintenance of a 61-inch reflecting telescope. In 1922 the University began a campaign to raise $8,000,000 to add to the endowment and to provide funds for 16 new buildings. The productive endowment amounted to $2,048,922 and the income to $607,344, in 1928. President, Edmund D. Soper, B.A., B.D., D.D., LL.D.

OIL. See PETROLEUM.

OIL ENGINE. See INTERNAL-COMBUSTION ENGINES; MOTOR VEHICLES.

OIL SCANDALS. See UNITED STATES, under *History*: PETROLEUM.

OKLAHOMA. The seventeenth State in size (70,057 square miles) and the twenty-first in population; capital, Oklahoma City. The population increased from 1,657,155 in 1910 to 2,028,283 in 1920, a gain of 22.4 per cent; estimated population, 1928, 2,426,000. Whites increased in number from 1,444,531 (1910) to 1,821,194 (1920); Negroes, from 137,612 to 149,408; native whites from 1,404,447 to 1,781,226. The Indian population decreased from 74,825 to 57,337; foreign-born white, from 40,084 to 39,968. Urban population increased from 320,155 to 539,480; rural, from 1,337,000 to 1,488,803. The growth of the principal cities was as follows: Oklahoma City (q.v.), from 64,205 in 1910 to 91,295 in 1920; Tulsa (q.v.), 18,182 to 72,075; Muskogee, 25,278 to 30,277.

Agriculture. As Oklahoma is an important grain-producing State, agricultural conditions have reflected the fluctuations of price and production which characterized the war and post-war conditions. The general situation is discussed under AGRICULTURE, CORN, WHEAT, etc. Oklahoma is an important producer of cotton, and the damage and uncertainty caused by the invasion of the boll weevil was considerable in some years. The fluctuations of the cotton crop in late years are indicated by the following figures: 1913, 3,009,000 acres, production, 840,000 bales; 1920, 2,749,000 and 1,336,000; 1921, 2,206,000 and 481,000; 1922, 2,951,000 and 635,000; 1928 (estimated), 4,249,000 and 1,180,000.

The number of farms, which had increased 0.9 per cent from 1910 to 1920, rose from 191,988 in 1920 to 197,218 in 1925, or by 2.7 per cent. The total area of land in farms, however, decreased from 31,951,934 acres in 1920 to 3,868,965 in 1925. The improved land in farms totaled 18,125,321 in 1920. The percentage of the total area in farm land decreased from 71.9 in 1920 to 69.5 in 1925. The total value of farm property rose from $918,198,882 in 1910 to $1,660,423,544 in 1920, or 80.8 per cent, but declined to $1,210,134,914 in 1925; the average value per farm was $4828 in 1910, $8649 in 1920, and $6136 in 1925. Of the total number of farms in 1925, 81,226 were operated by owners; 494, by managers; and 115,498, by tenants. The corresponding figures for 1910 were 85,404; 651; and 104,137. White farmers numbered 173,263 in 1920; 169,521 in 1910. Colored farmers numbered 18,725 in 1920; 20,671 in 1910. Farms reported as under mortgage, 47,025 in 1920, numbered 39,263 in 1925. The total number of cattle was 2,073,945 in 1920; 1,656,763 in 1925. Dairy cows numbered 808,459 in 1920; 360,297 in 1925. Sheep numbered 105,370 in 1920; 62,108 in 1925. The number of swine decreased notably from 1,304,094 in 1920 to 920,059 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 70,150,000 bushels; wheat, 59,576,000; oats, 23,140,000; grain sorghum, 30,762,000; potatoes, 5,040,000; sweet potatoes, 1,780,000; hay, 1,333,000 tons. Comparative figures for 1913 are corn, 52,250,000 bushels; wheat, 17,500,000; oats, 18,540,000; potatoes, 1,920,000; and hay, 382,000 tons.

Mining. Oklahoma, although its metal output is secondary, ranked second in 1926, among the States, in value of mineral production. This was due chiefly to the development of the petroleum fields in the State during recent years. The production of petroleum in 1914 was 73,631,724 barrels; (1915) 97,915,243; (1916) 107,071,715; (1917) 107,507,471; (1918) 103,347,070; (1920) 106,206,000; (1922) 149,571,000; (1926) 179,195,000. The production of natural gas kept pace with the development of the petroleum fields, the production in 1914 being 78,167,414 M cubic feet; (1916) 123,517,358; (1918) 124,317,179; (1920) 154,467,200; (1926) 286,421,000. The production of natural-gas gasoline has become extremely important in recent years; 178,856,929 gallons were produced in 1920 and 475,716,000 gallons in 1926. The coal production formerly exceeded 4,000,000 tons annually; it was 3,988,613 tons in 1914; 4,813,447 in 1918; and 2,842,673 in 1926. In addition to the minerals mentioned, the State produces cement, gypsum, lead, stone, and large quantities of zinc. The total value of the mineral production of the State in 1926 was $569,518,693, compared with $493,320,359 in 1920; $291,078,174 in 1919; $336,857,921 in 1918; and $78,744,447 in 1914.

Manufactures. Oklahoma is not one of the leading industrial States, but its manufacturing activities have shown great increase in value of products and in number of persons employed in recent years. In 1920 there were 12 cities with 10,000 inhabitants or more, which contained 15.6 per cent of the total population of the State, and in 1919 reported 33.3 per cent of the value of the State's manufactured products. There were 2310 manufacturing establishments in the State in 1909; 1274 in 1925; and 1373 in 1927. Persons engaged in manufactories numbered 18,034, 38,314, 26,163, and 27,932, respectively; capital invested amounted to $38,872,938 in 1909 and $277,034,318 in 1919. The value of manufactured products in 1909 was $53,682,405; in 1919, $401,362,869; in 1925, $400,291,825; and in 1927, $371,718,409. The large increase in value of products occurring about 1919, was chiefly due to changes in industrial conditions brought about by the War, and cannot be properly used to measure the growth of manufactures during the period; but simultaneous increase in the number of wage earners clearly indicated the augmented manufacturing activities. Petroleum-refining is the most important industry in point of value of product. This amounted to $1,055,000 in 1909; $13,014,000 in 1914; and $150,673,000 in 1919. Flour-mill and gristmill products rank second in this respect, with a value, in 1909, of $19,144,000; 1919, $49,844,000; and 1925, $25,880,940. The smelting and refining of zinc, in third place, had a product, in

1909, valued at $3,002,000; 1914, $9,939,000; and 1919, $19,518,000. The manufacture of cottonseed oil and cake was fourth: valued in 1909 at $5,187,000; in 1919, $18,907,000; and in 1927, at $18,448,000. The chief manufacturing cities are Oklahoma City and Tulsa. In Oklahoma City, there were 171 manufacturing establishments in 1909, with a product valued at $7,868,000; 195 in 1914, with $2,726,000; and 227 in 1919, with $69,971,000. Tulsa had 53 establishments in 1909, with a product valued at $1,563,000; 103 in 1914, with $3,868,000; and 135 in 1919, with $14,050,000. Other important manufacturing cities are Enid, Muskogee, Guthrie, and McAlester.

Education. The development of schools has proceeded amid complications of rapid rise in population and economic status. A remarkable growth in the wealth and population of the State has made possible better schools. The average length of the school term rose from 140 session days in 1909–10 to 166.4 days in 1919–20; in 1925–26 it was 148.9 days. The normal schools, long insufficient, were increased by the provision for normal training in certain selected high schools. There was a large increase in the number of schools offering high-school courses, and high-school opportunities to rural children were greatly extended by the organization of graded and consolidated districts. A large colored and Indian population greatly increased the educational difficulties of the State. The enrollment in the public schools increased from 496,908 in 1914 to 648,946 in 1925–26. The enrollment in white rural schools in 1920 was 544,821, and in colored rural schools, 44,461. In elementary rural schools for white pupils, there were enrolled 517,317 in 1921; in white high schools, 47,893; in Negro elementary schools, 42,938, and in Negro high schools, 1619. The expenditure for public day schools in 1925–26 was: current, $27,259,158; outlays, $1,740,071. Public-school enrollment was 648,946; that in elementary grades, 565,884; in high schools, 83,062. The percentage of illiteracy in the State decreased from 6.9 in 1910 to 4.7 in 1920: in the native white population, from 4.2 to 2.9 per cent; rose in foreign-born white, from 9.7 to 13.4; fell in Negro, from 22.7 to 16.4.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $17,250,096 (of which $3,185,197 was aid to local education); for interest on debt, $124,931; for permanent improvements, $10,763,728; total, $28,138,755 (of which $11,472,649 was for highways, $2,090,358 being for maintenance and $9,382,282 for construction). Revenues were $31,676,172. Of this, property and special taxes formed 9.8 per cent; departmental earnings and charge for officials' services, 7.0 per cent; sales of licenses and taxation of gasoline, 51.5 per cent. Property valuation was $1,697,367.213; State taxation thereon, $848,684. Net State funded debt was, June 30, 1927, $3,074,803.

Political and Other Events. At elections held for governor and United States Senator in 1914, Senator Gore was reëlected and R. L. Williams, the Democratic candidate, was elected governor. On Jan. 21, 1915, the United States Supreme Court declared unconstitutional the so-called "grandfather clause" to the constitution, which disfranchised a large percentage of the Negroes of the State. For President, in 1916 Wilson received 148,626 votes; Hughes, 98,299. In 1918 Senator Owen was reëlected by the Democrats, and Judge J. B. A. Robertson, Democrat, was elected governor. In 1920, for United States Senator, John W. Harrold, Republican, defeated Scott Ferris, Democrat, by a large majority. In the presidential voting of this year, Harding received 243,415 votes; Cox, 215,521. An attempt was made in April, 1921, to impeach Gov. J. B. A. Robertson. This failed in the Legislature. On Mar. 22, 1922, Governor Robertson was arrested for bribery in connection with the insolvency of the Guarantee State Bank of Okmulgee. In 1922 J. C. Walton, Democratic candidate, was elected governor. In the summer of 1923, as a result of alleged outrages by the Ku Klux Klan, Governor Walton placed the State under martial law. The Legislature denied his right to do this and sought to hold a special session in order to impeach him. Governor Walton denied their right to meet, and the members of the Legislature circulated a petition among themselves for a special session. The adjutant general of the State was ordered by the Governor to prevent their meeting, but the legislators entered the Capitol without hindrance, although they were prevented from assembling by an officer of the National Guard. Previous to these events, Governor Walton had called a special election to pass on proposed amendments to the State constitution. One of these would permit the Legislature to assemble without the Governor's consent on a call of a majority of its members. The attorney general attempted to have ballots for this measure cast by the Supreme Court, but the petition was denied. The Governor thereupon sought to prevent the election. It was held nevertheless, and the amendment was passed. Governor Walton then ordered the Legislature to meet but specified that it should devote its attention exclusively to the Ku Klux Klan. On assembling, the House filed charges with the Senate acting as a court of impeachment. In November, Governor Walton was found guilty on 11 counts, including charges that he had padded the State payroll, prevented the assembling of the Grand Jury, attempted to prevent a special State election, exceeded the legal limit of election expenses, and was generally incompetent. The Governor presented no defense. He was succeeded by the lieutenant governor. In 1927 a political feud led to a similar effort to remove Governor Henry S. Johnston. He was successful in having the acts of a self-convened special session declared null in the courts; but in 1929 the regular session of the Lower House impeached him on numerous counts and he was removed. In 1924 the presidential vote of the State was: Davis, 255,798; Coolidge, 226,242; LaFollette, 41,141. M. E. Trapp, succeeded as governor in 1924; in 1926 H. S. Johnston, Democrat, was elected. In 1928 the vote for President was strongly adverse to the Democratic candidate; it was: Hoover, 394,052; Smith, 219,206.

Legislation. A budget system was created by the Legislature of 1919. At this session also measures were passed defining and punishing criminal syndicalism and sabotage. In 1923 the Legislature passed a measure providing for industrial rehabilitation and farm or home aid for veterans of the War. A measure also was passed making robbery or its attempt punishable by a minimum of 25 years in prison. The Legislature also passed a bill prohibiting the

Ku Klux Klan and members of other organizations from wearing masks in public. A measure permitting natural gas to be piped out of the State was passed in 1927.

OKLAHOMA, UNIVERSITY OF. A State institution for the higher education of men and women at Norman, founded in 1892. The student enrollment increased rapidly between 1914 and the autumn of 1928, from 1700 in the former year to 4915 in the latter, with an additional registration in the summer session of 1928 of 2373. The faculty was increased in the same period from 135 to 333, and the library from 23,000 to 100,000 volumes. The income increased from $253,000 in 1916 to $2,328,535 in 1927–28, the productive funds in 1928 amounting to $3,200,000. The school of social service was established, and the department of manual training in the college of engineering opened in 1917; special war courses were offered in 1918; and the school of public and private business was organized in 1923 as a separate school with authority to grant the B.S. degree. Up to that time, the B.A. degree with special certificate in public and private business had been conferred in the college of arts and sciences. An auditorium, a fine arts building, a library building, a geology building, a hospital, and an armory were erected in 1920, and a women's building in the following year. Two new buildings, engineering and medical, were under construction in 1924, and four, including one for classrooms, two dormitories, and a gymnasium, in 1925. Stratton D. Brooks was president during the period under review until 1923, when J. S. Buchanan became acting president and was followed as president by William Bennett Bizzell, Ph.D., LL.D., in 1925.

OKLAHOMA CITY. The capital and commercial centre of Oklahoma. The population increased from 64,205 in 1910 to 91,295 in 1920 and to 177,000 in 1928, according to local estimate. In 1927 the city-manager form of government was adopted. The city ranks as one of the leading seven live-stock markets in the United States; it is also the home of the Oklahoma State Fair and of the Southwest American Live-stock Show, which are held annually. During 1914 to 1924, a $5,500,000 water system and a $1,000,000 power plant were constructed. An important school-building programme also was carried out, increasing the value of the schools from $2,456,000 to $8,494,000. In 1928, 543 manufacturing plants were located in Oklahoma City; the value of their output was $195,000,000. On Nov. 29, 1927, bond issues totaling $10,329,000 were voted for public improvements, including increased water supplies, acquisition of railroad properties for the construction of a civic centre, bridge and river improvements, construction and extension of sewers, and additional school buildings. In 1929 an agreement was reached between the city authorities and the four principal railways (Santa Fe, Saint Louis-San Francisco, Rock Island, and Missouri-Kansas-Texas) for the relocation and elevation of tracks and the construction of a union station costing $2,000,000. The value of building permits in 1927 was $10,621,206 and of bank clearings in 1928, $1,568,022,000. The assessed valuation of property in 1928 was $121,975,196; the net debt amounted to $21,615,537.

OLCZEWSKA, MARIA (1892–). Stage-name of Maria Berchtenbreiter, a German dramatic mezzo-soprano, born at Augsburg. She began her career as a singer in operetta, then sang at the opera in Leipzig (1920–23), and in 1925 became a member of the Staatsoper in Vienna, being heard frequently as guest at important German opera houses. She made her American début with the Chicago Opera Company in the title rôle of *Carmen* (Oct. 31, 1928). Her interpretations of Wagner have won the highest praise.

OLD-AGE PENSIONS, IN THE UNITED STATES. The United States has been slow in adopting old-age pensions. The proportion of aged persons in its population was considerably smaller than in some of the older countries; and its largely agricultural population did not show the evils of indigent old age so quickly as those of more thickly populated areas. Up to 1913, practically the only measures that had been taken to relieve the hardships of the old age of workmen were those of railroads and large industrial concerns, which provided for the retirement with pension of their own employees, usually at the age of 65. In most cases, no contributions from the beneficiaries were required.

The trade unions objected to this method of provision. The employer admitted no legal claim to a pension and retained the right to withdraw the pension offer if an employee was guilty of misconduct, which discouraged strikes and tied the worker's hands. Old-age insurance was offered by a very few trade unions and a few fraternal organizations. The pensioning of municipal, State, and Federal employees, though growing, was still quite limited. Retirement funds for teachers, policemen, and firemen, however, were becoming common. Some provision for old-age insurance through savings banks had been made in Massachusetts in 1908 and in Wisconsin in 1911; but the only comprehensive system was that of military and naval pensions; and in not one of the public measures was the lower-paid and most needy class of workers provided for.

In 1920 Congress passed a bill providing for the retirement of employees in the Civil Service, under which contributions by employees to the extent of 2½ per cent of their basic compensation, and retirement at 70 after 15 years of service, were compulsory, and old-age and total-disability pensions were granted in ratio to contribution and length of service. Beyond the unsuccessful launching of the Old-age Pension Bill in Ohio in 1917, nothing had been accomplished up to this time in the way of old-age pensions proper; but interest had by no means been dormant. In 1921–22 it gained impetus; labor organizations, church bodies, and industrial leaders took up the cry; in that year, old-age pension acts, of varying nature, were introduced in 15 State Legislatures and in Congress. Definite results came in 1923, when State laws for old-age assistance were passed in Montana, Nevada, and Pennsylvania.

The Nevada law required that applicants be at least 60 years of age, citizens of the United States for at least 15 years, and residents of the State for at least 10 years. The income of beneficiaries from pension and all other sources was not to exceed $1 per day. Those who had children capable of and responsible for support, also those who owned property exceeding $3000, were excluded. This act was repealed, however, in 1925 and another substituted in the same year which made the pensioning of aged persons voluntary. Decisions were to rest with the county commissioners, and the age limit was raised from 60 to 65 years. The act in 1929 was not being enforced.

The Montana law, like the amended Nevada code, placed the supervision of the act in the hands of county commissioners. Pensioners were to be 70 years old with incomes below $300 a year. Pensioners had to be citizens of the United States for 15 years and residents of the State for the same length of time. The maximum pension was fixed at $25 a month. At the end of 1926, 37 of the 56 counties were paying pensions to 448 persons. The cost of the pensions was $16.07 monthly on the average. The Pennsylvania law was similar to the Montana statute except that it fixed the pension at $1 per day. The law was to be administered for the State by a State commission and, in the counties, local boards were to be responsible for the enforcement of the act. The law was immediately contested in the courts and in 1924 the Dauphin County Court found the act unconstitutional. The next year, the State Supreme Court, on the ground that the act provided for legislative appropriations for charitable purposes, affirmed the decision of the lower court. Wisconsin passed a law similar to the Montana act in 1925 and placed administration in the hands of the counties. In 1927, when the law was in operation in four counties, 295 persons were being supported on pension rolls, at an annual expenditure of $50,000. The average pension amounted to $19.20 per month. By 1929 two other counties had adopted the system. In 1926 Kentucky passed a similar law, placing administration in the hands of county authorities. By 1929 none of the counties had seen fit to inaugurate the system. In 1927 Colorado and Maryland passed laws like the Wisconsin and Montana statutes, but by 1929 no action had yet been taken by any of the counties. Alaska passed a law in 1915 (amended 1923) giving to any pioneer, who had reached the age of 65 and had resided in the territory for 15 years or more since 1905, a monthly pension of $25 for men and $45 for women.

Massachusetts sought to cope with the problem of dependent old age by passing a law in 1908 authorizing savings banks to sell life-insurance and annuity policies; but at the end of 1927, the number of annuity contracts in force was only 513. The 1928 Legislature of this State created the Public Bequest Commission that was authorized to receive donations for the pensioning of aged persons. Disbursements from the fund were to be made from income only after the principal had reached $500,000.

With the year 1928, largely as a result of the formation of the American Association for Old Age Security, agitation for the pensioning of aged persons took on a new impetus in the United States. As a result of the increase in longevity, with a declining birthrate, and because the mechanization of industry was placing constantly a greater premium on youth, it was becoming apparent that the care of aged dependent persons was one of the chief social problems before the American people. It was being estimated that at least 1,800,000 persons over 65 (or two out of every five) were destitute or had to depend upon relatives, friends, or public and private charitable relief. As a result of this movement, the year 1929 saw a great variety of old-age pension bills being introduced in the State legislatures. In Arkansas, California, Connecticut, Delaware, Idaho, Illinois, Indiana, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, Oklahoma, Ohio, Oregon, Pennsylvania, Texas, Utah, Washington, and Wyoming, such bills had been introduced. It was expected that at least Oklahoma and Minnesota would pass laws. In the latter State, the Senate had approved the standard bill by a vote of 61 to 1.

Other Countries. The movement for old-age protection was not more than 25 years old, yet the year 1929 saw more than one-third of the entire population of the world and more than half the civilized nations with one kind or another of governmental systems of old-age security. China, India, and the United States alone were the only large countries without some programme for the care of superannuated wage-earners. At least 39 foreign countries had passed legislation for the protection of all or certain classes of their aged populations. In 26 of these, the pension schemes were based on the contributory basis; in 12, the scheme was non-contributory (as in those States of the United States where laws were already in operation); in 1, the scheme was an exclusive voluntary insurance scheme. In most countries, the pensionable age ranged from 60 to 65; 5 nations retired their male pensioners at 70; 1 (Newfoundland) paid pensions to males at 75.

The following countries had compulsory contributory old-age pension laws: Austria, Belgium, Bolivia (for postal and telegraph employees only), Brazil (railroad employees only), Bulgaria, Chile, Cuba (railroad employees only), Czechoslovakia, France, Germany, Great Britain, Greece, Iceland (certain classes only), Italy, Luxemburg, the Netherlands, Poland (salaried workers only), Portugal, Rumania, Russia, Jugoslavia, Hungary, Spain, Sweden, Switzerland, Uruguay. In the following countries, the State, as well as the employers and the workers, make contributions to the funds: Belgium, Brazil, Bulgaria, Chile, Czechoslovakia, France, Germany, Great Britain, Italy, Luxemburg, the Netherlands, Iceland, Portugal, Rumania, Jugoslavia, Hungary, Spain, Switzerland. In the following countries, the State paid the pensions: Australia, Canada, Cordoba (Argentina), Denmark, Finland, Greenland, Irish Free State, Guernsey, Mendoza (Argentina), New Zealand, Norway, Newfoundland, South Africa.

In Canada, where the Dominion government matched the contributions of the provinces (similar to the American system of Federal grants-in-aid), the following provinces by 1929 already had pension schemes in operation: British Columbia, Saskatchewan, Manitoba, Yukon, Alberta, and Ontario. In Japan, the voluntary insurance scheme prevailed. See SOCIAL INSURANCE.

Bibliography. An outstanding book on the subject of old-age pensions is the *Challenge of the Aged*, by Abraham Epstein (New York, 1928). The author whose previous work, *Facing Old Age* (New York, 1922), had attracted attention, was the secretary of the American Association for Old-age Security and credit for the intelligent campaign being waged in the United States after 1928 must go largely to him, and his enlightened board of directors. It is significant to note that organized philanthropy made no effort to aid the movement.

OLDS, ROBERT EDWIN (1875–). An American lawyer and Under-Secretary of State. He was born at Duluth, Minn., and was graduated from Harvard (*summa cum laude*, 1897, and LL.B., 1900). He practiced law at St. Paul until 1917. During the World War and until 1921, he was in the service of the American Red Cross in Europe. In 1923–25 he was American member of the Arbitration Tribunal to adjust claims between the United States and Great Britain under the treaty of 1910; and in 1924–25 he was a member of the League of Nations commission to report a plan in international coöperation for disaster relief. He was appointed Assistant Secretary of State in 1925, and Under-Secretary of State in 1927, resigning in 1928. In 1925 he supervised the negotiations of the United States with Mexico in regard to alien land and petroleum legislation. In 1929 he was appointed by the Reparations Commission as its American citizen member.

OLIVER, SIR THOMAS (1853–). A British physician born in Ayrshire, Scotland, identified especially with occupational hygiene and the prevention and treatment of occupational diseases. Educated at Glasgow University, he practiced at Newcastle on Tyne, and was successively professor of physiology and of the practice of medicine and president of the Durham College of Medicine. His book, *Diseases of Occupation*, was published in 1908 and in the same year he was knighted. His monograph, *Lead Poisoning*, appeared in 1914. Since 1902 he has edited the publication, *Dangerous Trades*, and for many years he was the medical expert to the Dangerous Trades Commission. He has contributed the articles on occupational disease to numerous standard reference works and has received many honors from governments and societies, for his services in this field.

OLMSTED, FREDERICK LAW (1870–). An American landscape architect (see VOL. XVII). From 1902 to 1917, he was landscape architect for the Baltimore Park Commission and after 1908, landscape architect for the Sage Foundation Homes Company, Forest Hills, L. I. He was professor of landscape architecture at Harvard University, 1903–14, a member of the National Commission of Fine Arts, and chairman of the Executive Committee of the National Conference on City Planning from 1910 to 1919, and governor of the American City Planning Institute. In 1917–18 he was a member of the Commission on Emergency Construction of the War Industries Board and during the same period, manager of the town-planning division of the United States Housing Corporation. Since 1926 he has been a member of the National Capital Park and Planning Commission.

OLYMPIC GAMES. The modern revival of the Olympic Games which played such a picturesque part in the history of ancient athletic Greece was due to the indefatigable efforts of one man, Baron Pierre de Coubertin, of France. Baron de Coubertin launched his campaign in 1892 with a colorful description of the classic Olympiads which he distributed among the leading press associations of the world. For a long time the lack of response to this appeal was most discouraging, but first the United States and then Great Britain expressed their desire to coöperate and eventually the Baron's goal was attained in 1896 when the first modern Olympics were held, in a most appropriate setting, at Athens, Greece. Since that date, the Olympics have been staged every four years with the exception of the period of the World War, 1912–20, at the following places: Paris (1900), St. Louis (1904), Athens (special,1906), London (1908), Stockholm (1912), Antwerp (1920), Paris (1924), Amsterdam (1928). The Olympiad for 1932 has been arranged for at Los Angeles.

The athletes of the United States were invariably returned the winners in each Olympiad until that of 1928, when their supremacy was seriously disputed by the German contestants. The United States retained its laurels in track and field contests and swimming, but the official check-up of the results in all branches of competition revealed that the Germans had secured a total of 45½ points, as against the United States' 39.

The growth in popularity of the Olympics throughout the whole world can be traced by the steady increase in the number of countries represented in the various Olympiads. From a mere handful of nations as participants in those first games at Athens, the 1928 Olympics found 33 different countries contesting. The 1928 revival also was noteworthy as marking the first time that women had held their competitions in conjunction with the men.

A comprehensive survey of the outstanding achievements in the various Olympiads, together with a comparison of the winning standards set in the several events, would be of much interest but would require more space than is available. It is only possible to point out a few striking illustrations of the progress attained. In 1896, for example, T. E. Burke, United States, captured the popular 100-meter-dash event in 12 seconds; whereas, four years later, F. W. Jarvis, United States, ran the distance in 10⅘ seconds, this time being equaled in 1908, 1912, 1920, and 1928. E. H. Flack, Great Britain, covered 800 meters in 2 minutes, 11 seconds in 1896; but D. A. G. Lowe, Great Britain, lowered this to 1 minute, 51⅘ seconds in 1928. More interesting still is the statistical history of the 1500-meter run. In 1896 Flack, Great Britain, sped this stretch in 4 minutes, 33⅕ seconds; whereas, in 1928 H. E. Larva, Finland, covered the same ground in 3 minutes, 53⅕ seconds, clipping the old time by almost a minute.

The one Olympic event which perhaps has a wider appeal than any other is the Marathon, the thrill and tragedy afforded by the historic story of that first runner, Philippides, leaving its deep impress upon each succeeding generation of sports lovers. Fittingly enough, the winner of the first modern Marathon in 1896 was S. Loues, a Greek, whose time for the 26 miles, 385 yards was 2 hours, 55 minutes, 20 seconds. By another vagary of fate, the victor in the 1928 Marathon was El Ouafi, from Algiers, just across the Mediterranean from the shores of Greece. El Ouafi, who ran under the colors of France, negotiated the distance in 2 hours, 32 minutes, 57 seconds, the second-best time ever made in this event. A throng of 40,000 packed the Amsterdam stadium to acclaim the triumphant finish of El Ouafi.

Reference has been made to the amazing progress made in establishing new records at the various Olympic Games and it would seem essential to enumerate here the standards officially accepted for track and field events.

Five men hold jointly the record for the 100-meter dash—10.6 seconds. They are D. F. Lippincott (U. S., 1912), H. M. Abrahams (Great Britain, 1924), Percy Williams (Canada, 1928), R. F. McAllister (U. S., 1928), J. E. London (Great Britain, 1928).

The 200-meter-run record of 21.6 seconds, set by A. Hahn (U. S.) at St. Louis in 1904, stood for twenty years, or until J. V. Scholz (U. S.) tied it at Paris in 1924. Herman Kornig (Germany) accomplished the same time at Amsterdam in 1928.

The holders of other important records follow: 400-meter run, 47.6 seconds, E. H. Liddell (Great Britain), Paris, 1924; 800-meter run, 1 minute, 51⅘ seconds, D. G. A. Lowe (Great Britain), Amsterdam, 1928; 1500-meter run, 3 minutes, 53⅕ seconds, H. E. Larva (Finland), Amsterdam, 1928; 5000-meter run, 14 minutes, 31.2 seconds, Paavo Nurmi (Finland), Paris, 1924; 10,000-meter run, 30 minutes, 18⅘ seconds, Paavo Nurmi (Finland), Amsterdam, 1928; 10,000-meter walk, 46 minutes, 28.4 seconds, G. H. Goulding (Canada), Stockholm, 1912; 110-meter hurdles, 14⅗ seconds, Weightman-Smith (So. Africa), Amsterdam, 1928; 400-meter hurdles, 52⅖ seconds, Lord Burghley (Great Britain) and F. M. Taylor (U. S.), Amsterdam, 1928; running high jump, 6 feet, 6 inches, H. M. Osborn (U. S.), Paris, 1924; running broad jump, Edward B. Hamm (U. S.), 25 feet, 4¾ inches, Amsterdam, 1928; hop, step, and jump, 50 feet, 11¼ inches, A. W. Winter (Australia), Paris, 1924; pole vault, 13 feet, 9⅜ inches, Sabin W. Carr (U. S.), Amsterdam, 1928; discus throw, 155 feet, $2\frac{15}{16}$ inches, C. L. Houser (U. S.), Amsterdam, 1928; javelin throw, 218 feet, 6⅛ inches, E. H. Lundquist (Sweden), Amsterdam, 1928; 16-pound shot, 52 feet, $\frac{11}{16}$ inch, John Kuck (U. S.), Amsterdam, 1928; 16-pound hammer, 179 feet, 8.4 inches, M. J. McGrath (U. S.), Stockholm, 1912; 56-pound weight, 36 feet, 11½ inches, P. J. McDonald (U. S.), Antwerp, 1920; pentathlon, 14 points, E. R. Lehtonen (Finland), Antwerp, 1920; decathlon, 8053.290 points, Paavo Yrjola (Finland), Amsterdam, 1928.

Aside from the United States and Germany, other nations to score points in the leading events at the Amsterdam Olympics were: Holland, 34½; Italy, 33½; Sweden, 32½; Finland, 25; Great Britain, 18; France, 16; Argentina, 12½.

The women's track-and-field competitions at Amsterdam resulted in a triumph for Canada, with the United States second and Germany third. The winter sports were won by Norway, the United States being second and Sweden third. In lacrosse, a triple tie existed among the United States, Canada, and Great Britain.

The team records in the 1928 Olympic contests were:

Track and field—United States, first; Finland, second; Great Britain, third; Germany, fourth; Sweden, fifth; Canada, sixth.

Rowing—United States, first; Great Britain, second; Switzerland, third; Italy, fourth; Germany, fifth; Australia, sixth.

Swimming—United States, first; Germany, second; Great Britain, third; Sweden and Holland, tied for fourth, Japan, sixth.

Boxing—Argentina and Italy, tied for first; United States, third; Holland, fourth; Sweden, fifth; New Zealand and Hungary, tied for sixth.

Catch-as-catch-can wrestling—Finland, first; Sweden, second; Switzerland, third; United States, fourth; Canada, fifth.

Greco-Roman wrestling—Germany, first; Finland, second; Switzerland, third; Hungary, fourth; Estonia, fifth; Egypt, sixth.

Fencing—Italy, first; France, second; Hungary, third; Germany, fourth; United States, fifth; Argentina, sixth.

Gymnastics—Switzerland, first; Czechoslovakia, second; Jugoslavia, third; France, fourth; Finland, fifth; Italy, sixth.

Yachting—Norway first; Sweden, second; Denmark, third; Holland, fourth; Estonia, fifth; Finland, sixth,

Cycling—Holland, first; Denmark, second; Great Britain, third; France, fourth; Italy, fifth.

Modern pentathlon—Sweden, first; Germany, second; Holland, third; Italy, fourth; Finland, fifth; Great Britain, sixth.

Equestrian sports—Holland and Poland, tied for first; Germany and Spain, tied for third; Sweden, fifth; Norway, sixth.

Soccer—Uruguay, first; Argentina, second; Italy, third; Spain, fourth.

Field hockey—British India, first; Holland, second; Germany, third; Belgium, fourth.

Weight lifting—Germany, first; France, second; Austria, third; Italy, fourth; Egypt, fifth; Estonia, sixth.

OMAHA. The largest city of Nebraska. The population rose from 156,231 in 1910 to 191,601 in 1920 and to 222,800, in 1928, by estimate of the U. S. Bureau of the Census. A comprehensive zoning ordinance was adopted in 1920. In the same year, the Metropolitan Utilities District, controlling the city-owned gas and water systems, was organized with plant equipment valued at $13,000,000. In 1928 the city had 520 miles of water mains and 460 miles of gas mains; of the 1100 miles of streets, 457 miles were paved. The school-building programme since 1923 has included the erection of the new Technical High School at a cost of $3,500,000; the North High School at a cost of $750,000; the Benson High School at a cost of $700,000; and a $718,000 addition to the South High School. The construction of elementary schools and improvements represent an expenditure of $5,000,000. Omaha holds second place among the live-stock markets of the United States. Its 14 meat-packing plants consume about 65 per cent of the butcher stock received; the output of meats and other packing-house products is valued at approximately $200,000,000 a year. The Live Stock Exchange costing $1,000,000 and a $750,000 traffic viaduct have been constructed; facilities for receiving motor-truck shipments of live stock, which total nearly 2,000,000 head annually, also have been improved. The Omaha municipal airport, comprising 200 acres, is the central airport on the New York-San Francisco air route and a terminus on the Omaha-Kansas City route. On Nov. 6, 1928, the city voted bonds amounting to $250,000 for the improvement of the facilities of the field. Building construction has been active. Among the structures erected since 1924 are the Omaha Bee-News Building, Union State Bank Building, Medical Arts Building, Jewish Community Centre, Ak-Sar-Ben Coliseum, Knights of Columbus Home, and the Paxton Hotel. In 1928 the Joslyn Memorial Building, a $3,000,000 headquarters for musical, art, and cultural organizations, and the Union Bus Depot were under construction. An agreement was reached in 1929 for the combination of the two separate but adjacent passenger terminals of the Union Pacific and Chicago, Burlington & Quincy railways as a joint terminal to cost $4,200,000. In 1925, 15,463 persons were employed in the city's industrial establishments and received $21,048,000 in wages; the value of products manufactured was $339,004,000. Bank clearings in 1928 amounted to $2,311,913,000. The assessed valuation of property in 1927 was $342,322,000; the net debt was $33,231,000.

OMAN. See ARABIA.

ONCKEN, ŏnk′en, HERMANN (1869–). A German historian and professor at the University of Berlin (since 1928). He contributed largely to the World War literature of his country. Among his works are *Amerika und die grossen Mächte: Historisch-politische Aufsätze* (1914); *Das alte und das neue Mitteleuropa* (1917); *Ueber den Zusammenhang von innerer und Äeusserer Politik* (1918); *Weltgeschichte* *und Versailler Friede* (1921); *Die Utopie des Thomas Mores und das Macht-problem in der Staatslehre* (1921); *Staatsnation und Kulturnation* (1922); *Lassalle* (1922); *Die historische Rhein-politik der Franzosen* (1922); *Aus Rankes Frühzeit* (1922); *Die Rheinpolitik Kaiser Napoleons III, 1865–71, und der Ursprung des Krieges, 1870–71* (1926).

O'NEILL, EUGENE (GLADSTONE) (1888–). An American playwright, born in New York City, the son of James O'Neill, a celebrated actor. He was educated at De La Salle Institute and Princeton (1906–07) and Harvard (1914–15) universities. In 1909 he went to San Francisco and thence to Central America on a gold-prospecting venture. After 1914, devoting himself to playwriting, he produced *The Moon of the Caribbees and Other Plays of the Sea* (1919); *Beyond the Horizon,* a tragedy in six acts (1919); *Thirst and Other Plays* (1914); *Emperor Jones,* an extraordinary monologue depicting the psychology of fear; *Diff'rent* (1921); *The Straw* (1921); *Gold* (1921); *Anna Christie* (1922); *The First Man* and *The Hairy Ape* (1922); *The Fountain* (1923); *Welded* and *All God's Chillun's Got Wings* (1924); *Desire Under the Elms* (1924); *Marco Millions* (1924); *The Great God Brown* (1925); *Lazarus Laughed* (1926); *The Strange Interlude* (1927); *Dynamo* (1928). He is among the outstanding American dramatists. Some of his plays have been produced in Europe. Consult *Studies on Six Plays of Eugene O'Neill,* by Alan D. Mickle (1929).

O'NEILL, NORMAN (1875–). A British composer and conductor, born in London. After studying with Dr. A. Somerwell during 1890–93, he went to Frankfort, completing his studies at Hoch's Conservatory under I. Knorr in 1897. In 1908 he became musical director of the Haymarket Theatre, in London, which post he has held since then, with the interruption of one season at the St. James Theatre (1919–20). In 1919 he was elected treasurer of the Royal Philharmonic Society, and in 1924 joined the staff of the Royal Academy of Music as professor of composition. As a composer, he is best known for the excellent quality of his incidental music to many plays, including *Hamlet*; *Macbeth*; *King Lear*; *Julius Cæsar*; *The Merchant of Venice*; Maeterlinck's *Blue Bird*; and Philips's *The Lost Heir.* He also wrote two overtures, *In Autumn* and *In Spring Time*; *Scotch Rhapsody*; a set, *Miniatures,* for small orchestra; *Woldemar,* a fantasy for soli, chorus, and orchestra; *La belle dame sans merci,* for baritone and orchestra; a piano quintet, a 'cello sonata, and other chamber music.

ONIEGIN, SIGRID (1891–). A celebrated German dramatic mezzo-soprano, born of German parents in Stockholm. She was brought up in Wiesbaden, studied singing with Resz and Weiss in Frankfort, and later with di Ranieri in Milan, and made her début as a concert singer in Leipzig in 1912, under her maiden name, Hoffmann. The same year, she married Eugen Oniegin, a talented composer and excellent pianist, who traveled with her as her accompanist until his death in 1919. She made her début in opera in Stuttgart, and in 1919 became a regular member of the Nationaloper in Munich. Since her American début at the Metropolitan Opera House as Amneris (*Aida,* Nov. 22, 1922), she has been a great favorite there. In 1920 she married the Munich physician, Fritz Pentzold.

ONTARIO. A Canadian province, with an area of 407,262 square miles, of which 365,880 square miles are land area. Population in 1911, 2,527,292; in 1921, 2,933,662, or a gain of 16 per cent; estimated in 1927, 3,187,000; and in 1929, 3,271,300. In 1921 the rural population made up 41.8 per cent of the total, as compared with 47.4 per cent in 1911. The male population numbered 1,481,890; female, 1,451,772, in 1921. The leading cities, with their populations in 1926, were: Toronto, 556,691 (381,833 in 1911); Ottawa, the capital of Canada, 119,254 (87,062 in 1911); Hamilton, 114,151 in 1921 (81,969 in 1911); London, 60,959 in 1921 (46,300 in 1911).

Industry. While agriculture is the leading activity of the province, it is evident that by no means all its possibilities are yet exploited. Only 14,000,000 acres were under cultivation in 1928 and it is estimated that northern Ontario alone contains some 20,000,000 acres ready for the plow. Diversified farming, including dairying, is becoming the rule. In 1927, 10,434,401 acres were under field crops; the more important were hay and clover, 3,382,722 acres; oats, 2,689,295; wheat, 870,957; there are also considerable yields of barley, peas, corn, fodder corn, sugar beets, and other root crops. The total value was $261,264,000 ($196,220,000 in 1914). The growing attention accorded dairying and the meat industry is indicated in the increase of live stock. Cattle in 1927 numbered 2,714,954 and 2,601,086 in 1913; sheep in 1927 and in 1913 were 956,267 and 705,848. The number of swine in 1927 was 1,883,177. In 1927 there were 1040 creameries and factories which produced products valued at $73,482,546 (about $18,000,000 in 1910). Fruit culture, particularly apples, and the production of tobacco and sugar beets are rapidly spreading in the southern districts. In 1926 all agricultural products for the province were valued at $482,481,000, the total for the Dominion being $1,668,175,000. Farmers' organizations are widely prevalent, and many of them concern themselves seriously with the problem of coöperative marketing. Such plans for the dairymen and fruit growers receive the support of the Government. Attention also was directed by an interested agricultural ministry to the necessity of creating coöperative credit societies. Other industries yielded: fisheries, in 1926, $3,152,193, made up of fresh-water catches of herring, pickerel, pike, trout, and whitefish; forest products in 1926, $32,146,671, made up of lumber, shingles, and lath. In the manufacture of pulp and the production of paper, Ontario was second to Quebec. For 1926 pulp worth $38,008,752 was produced.

In mining activities in 1927, Ontario led all the other provinces. Figures for metallic production for 1927 were: Gold, $33,627,000; silver, $5,230,402; nickel, $5,674,448; copper, $2,832,536; total, including all others, $62,766,450. Nonmetallic minerals, including natural gas, crude petroleum, structural materials, and clay products, yielded $27,073,119. Grand total for 1927, $90,283,447; for 1911, $42,796,162. The estimate for 1928 was $100,000,000. Under the active administration of the Hydroelectric Commission, the extension of the use of water power for energy went on. By 1929, 558 municipalities were being served. Revenues for 1926 were $22,677,999, and costs of maintenance, etc., together with the sinking fund, $20,343,231; this left a surplus of $2,334,768. (Revenues for 1913 were $2,611,918). The growth of this experiment in public ownership may be gathered from the following: 1910: horse power, 750; municipalities and townships, 10; 1926: horse power used, 536,119; municipalities, etc., 249. Total assets of the commission and the municipalities, in 1913, $11,907,826; in 1926, $82,739,409. Many projects are under way; one of the most important is the Chippewa Canal scheme which was completed in 1925 and produces 522,790 horse power at a construction cost estimated at $76,302,489. This plan, because of its ambitious nature, aroused discussion of a very controversial character.

In 1926 there were 9457 industrial establishments (8001 in 1910), capitalized at $1,985,165,921, and employing 280,351 workers (238,817 in 1910). Cost of materials were $908,044,673 and the value of the output was $1,677,933,504 ($579,810,225 in 1910). Leading industries are machinery, building construction, milling, packing, leather, boot and shoe production, hosiery, and rubber products.

Trade and Communications. In 1926 there were 10,870 miles of railway, as compared with 9000 in 1913. In 1925 there were 1,241,647 miles of telephone wire and 511,286 telephones in 1926. In 1926–27 exports amounted to $514,395,535 ($132,756,532 in 1913) and imports to $518,815,245 ($301,651,328 in 1913).

Government. For 1913–14 revenues and expenditures were $11,121,382 and $11,819,311; by 1927–28 they had become $55,790,000 and $55,613,000. The Dominion subsidy and receipts from lands and forests have shown no increase, but new revenues were derived from succession duties and corporation taxes. The direct liabilities of the province by 1926 had risen to $366,629,582. Under an act of 1921, the province was empowerd to enter the banking business for the carrying of savings accounts and life-insurance business. The purpose was the application of such funds toward agricultural credits. There were, in 1927–28, 7581 elementary and secondary schools attended by 725,085 pupils (518,605 pupils in 1911). The 1926 budget bore $10,516,440 for education ($842,278 in 1912). Total expenditures on education, provincial and local, in 1912, $13,492,108; in 1927, $48,602,727. The provincial university, the University of Toronto, was attended by 5480 students in 1925–26. Women were granted the ballot in 1918 and permitted to stand for the provincial Legislature. In the Dominion Parliament, the representation is: House of Commons, 82; Senate, 24.

OPIE, Eugene Lindsay (1873–). An American pathologist (see Vol. XVII). During the World War, he served in the U. S. Army Medical Corps in France, attaining the rank of lieutenant colonel. He left Washington University in 1923 to become professor and head of the pathology department at the University of Pennsylvania and director of laboratories at the Henry Phipps Institute there. He was engaged in a study of trench fever, pneumonia, and influenza from 1917 to 1919 and of immunity and tuberculosis after 1920. In 1921 he published *Epidemic Respiratory Disease.*

OPPENHEIM, E. Phillips (1866–). An English author educated at the Wyggeston Grammar school, Leicester, who published his 107th novel in 1928. His novels, which are mostly stories of adventure, include *The Lighted Way* (1912); *The Kingdom of the Blind* (1917); *The Great Impersonation* (1920); *The Great Prince Shan* (1922); *The Evil Shepherd* (1923); *The Wrath to Come* (1924); *The Golden Beast* (1926); *Miss Brown of Xyo* (1927); and *Matorni's Vineyard* (1928).

ORANGE FREE STATE. See South Africa, Union of.

ORATORIO. See Music.

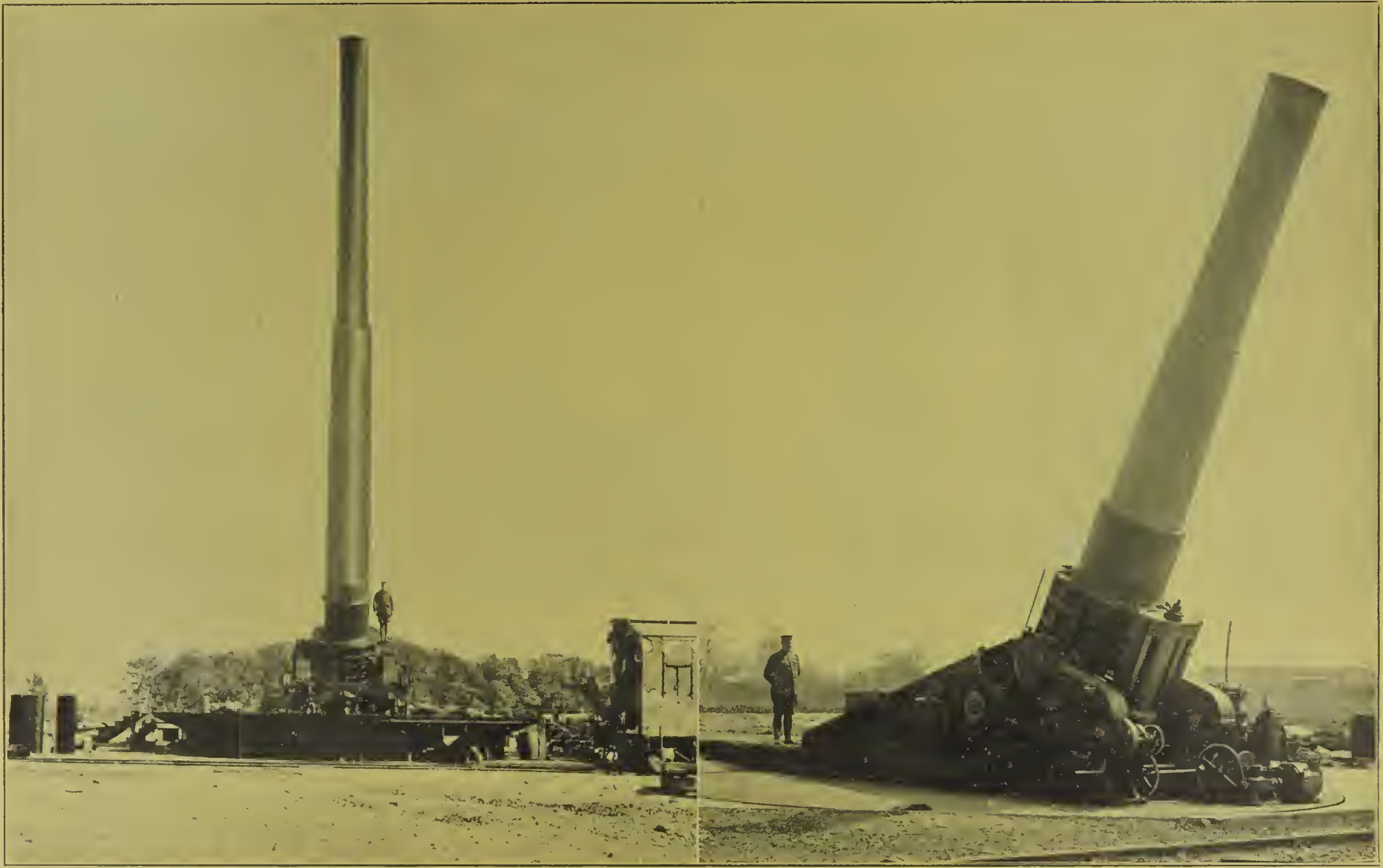
ORCHARDS. See Horticulture.

ORDNANCE. The World War—greatest of international conflicts—had a correspondingly great effect on the development of implements of war, collectively called ordnance. The ingenuity of a nation fighting for existence, with its back to the wall, is stimulated to the utmost in developing means for overcoming the common enemy.

Science, engineering, and industry united in strenuous endeavors to make more effective the nation's man power by supplementing it with every mechanical improvement over man himself. Matériel, as contrasted with personnel, became to a greater and greater extent the determining factor in warfare—but another phase of the industrial revolution characteristic of the last century. Ordnance comprises all the things the soldier fights with, as distinguished from the material things that merely provide him with a more or less comfortable existence, such as food, clothing, shoes, shelter, fuel, means of transportation, and so forth. The ordnance equipment of a modern army includes about 1200 separate and distinct types of units, which in their assembly require the manufacture of 250,000 separate and distinct components.

The infantryman requires shoulder rifles by the million; cartridges for them by the billion; light one-man automatic rifles by tens of thousands for use in tight places calling for short concerted bursts of fire; heavy machine guns by thousands for playing the continuous leaden stream of the modern machine-gun barrage; sensitive sights and rugged tripods with elevation and traverse devices to insure placing the deadly hail with safety to his own advancing lines and maximum damage to the enemy; carts to carry his machine guns and water jackets to cool them; rifle grenades and rifle attachments to throw them; explosive hand grenades for defense against enemy raiding parties and for mopping up trenches on the offensive; gas grenades for making enemy dugouts uninhabitable and Thermit grenades for fusing the breech mechanism of captured enemy cannon and machine guns, continued possession of which is doubtful; bayonets and bolos, trench knives, helmets, periscopes, range finders, etc., not to mention the "baby" 37-mm. cannon for wiping out hostile machine-gun nests and 3-inch trench mortars of simple yet most effective design.

The artilleryman requires field pieces by the thousand for divisional artillery—the "75" gun and its companion piece, the 105-mm. howitzer; heavy pieces for corps artillery—the 4.7-inch gun and its companion piece, the 155-mm. howitzer; high-powered, medium-calibre pieces for army artillery—155-mm. guns and 8-inch howitzers; 8-, 10-, 12- and 14-inch guns and 16-inch howitzers on railway mounts to reach the enemy's back area; 16-inch guns on permanent barbette emplacements for coastal defense; self-propelled caterpillar mounts for all calibres from the 75-mm. gun to the 240-mm. howitzer, capable of negotiating steep grades, accompanying its tactical unit at all speeds and ready to go into action immediately on arrival at the

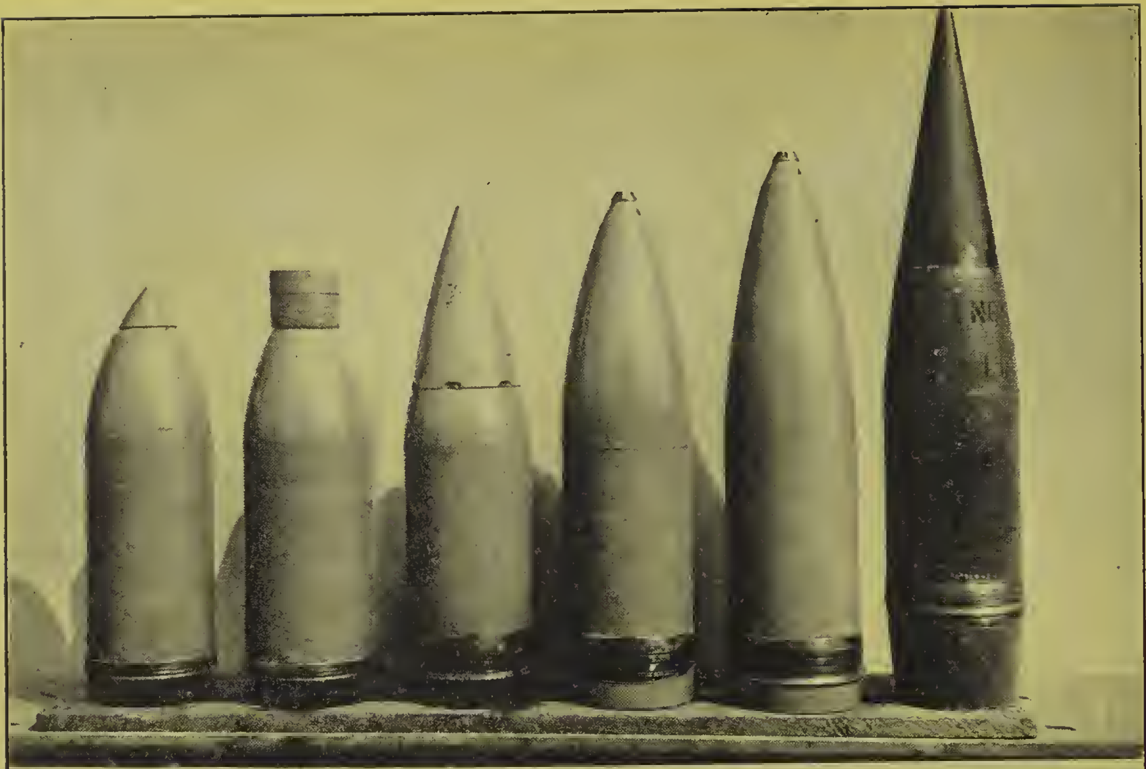


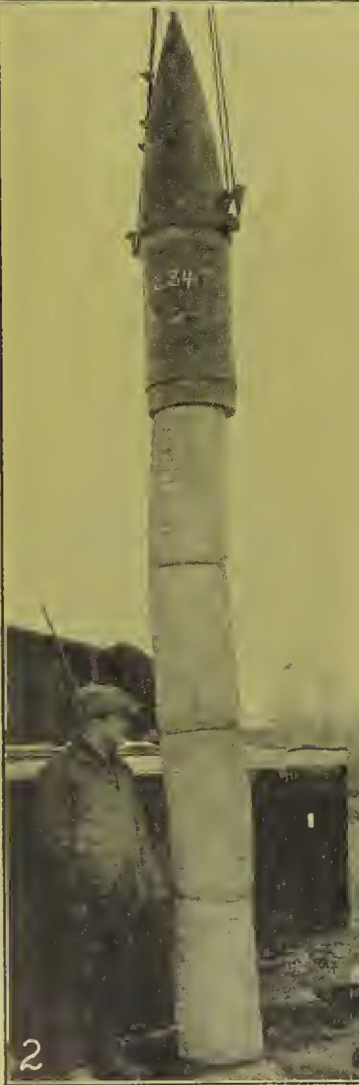
Photographs, Ordnance Department, United States Army

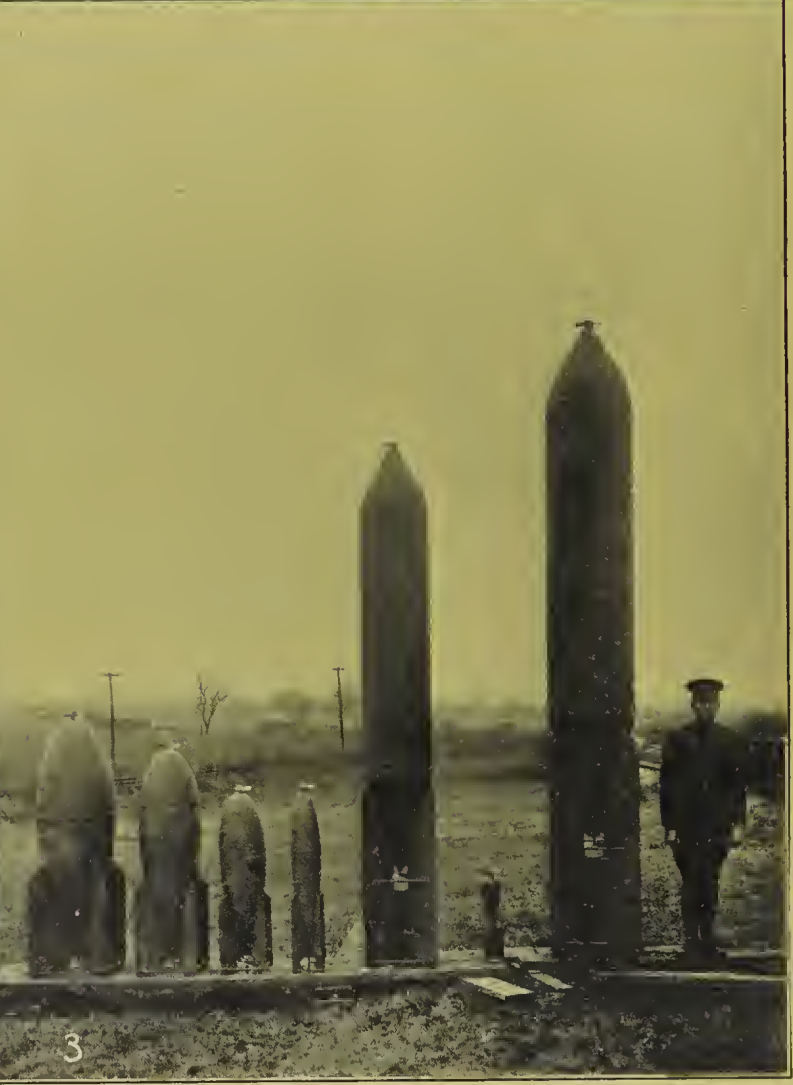
UNITED STATES ARMY ORDNANCE

Sixteen-inch Gun, M 1919 MII, on Barbette Carriage, M 1919
Elevation, 65 Degrees

Sixteen-inch Howitzer, Mounted on Howitzer Carriage, Model 1920
Elevation, 65 Degrees







Photographs, Ordnance Department, United States Army

UNITED STATES ARMY ORDNANCE

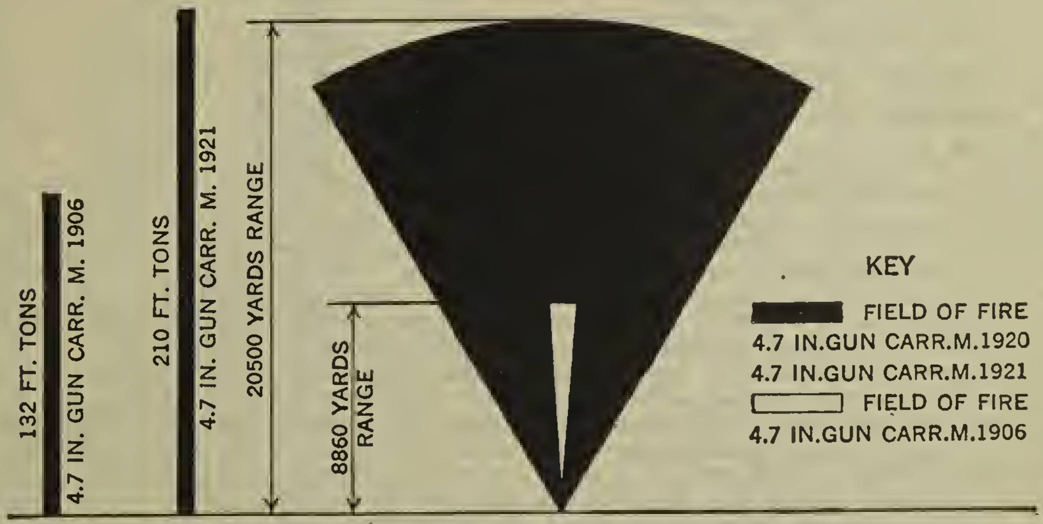
1. Various Types of 6-inch Projectiles
2. Projectile (Weight 2340 Pounds) and Powder Charge (850 Pounds) for 16-inch United States Army Gun for Range of 55,000 Yards
3. Types of Drop Bombs (25 to 4000 Pounds)

firing point and depart to safer regions immediately after its mission is accomplished. For the effective use of his weapons, the artilleryman requires vast quantities of ammunition: shrapnel, high-explosive shells, and gas shells by millions of rounds, each an intricate mechanism in itself.

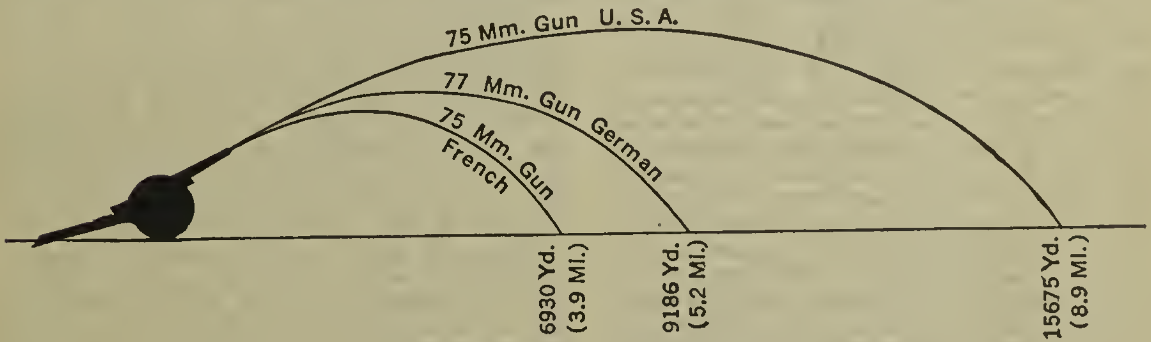
The aviator requires stripped machine guns speeded up to 1400 shots per minute, adjusted with inconceivable nicety to shoot between the rapidly revolving blades of his propeller; electric heaters to prevent freezing of the lubricating system of his gun mechanism at high altitudes; shot counters to indicate the available amount of ammunition remaining; armor-piercing bullets for use against armored airplanes or in low-flying action against tanks; incendiary bullets to ignite the gas contents of enemy captive balloons and dirigibles; tracer bullets to assist in correcting his aim; ingenious sights to correct automatically for the relative speed and direction of his own plane and his target; airplane bombs, from the small 25-pound-fragmentation type for use against enemy troops, to the 4000-pound bomb for attack on battleships or fortified enemy positions; bomb sights to determine the proper instant for release, and release mechanisms to carry his huge instruments of destruction with safety to himself and to release them accurately in order to inflict the most damage on the enemy.

To supplement the waves of attacking infantry, light two-man tanks equipped with a single machine gun; heavy tanks equipped with 37-mm. cannon and four machine guns—urged irresistibly forward by 500-horse-power Liberty engines, crossing trench systems, shell craters and other obstacles by means of its powerful caterpillar track-laying mechanism—are needed.

Pyrotechnics are drafted into war service to obtain communication among the various elements of attacking waves, to smoke-screen daylight raids, to illuminate the immediate foreground and thereby prevent surprise night attacks, as well as to guide night-flying airmen to a safe landing on an otherwise unilluminated landing field.



DIAGRAMATIC COMPARISON OF U. S. A. 4.7-INCH FIELD GUNS
Models of 1906 and 1920–1921



COMPARISON OF LIGHT FIELD ARTILLERY
Weight of Projectile
U. S. Army Gun—15 lb. French Gun—12.2 lb. German Gun—14.96 lb.

The cost of equipping a modern army with necessary amounts of up-to-date ordnance can be sensed from the estimates of 12½ billion dollars made for the equipment of the first five million American troops called to the colors during the War. The impetus given to ordnance design by that conflict has continued, inasmuch as the length of time in which the United States was actively in the War did not permit the full development of many promising devices. While accurate information in regard to advances in the field of ordnance design by other armies is not available, it can safely be assumed that they have made at least as much progress in this direction as a recent announcement indicates has been made in the United States Army. A general idea of the relative effectiveness of ordnance used during the War and that developed since the Armistice can be gained from the statement that in the United States Army, the new 75-mm. gun has twice the range of the French "75" used in 1918; the new 4.7-inch gun has two and one-half times the range of the pre-war model and fires a heavier projectile; the new 155-mm. gun outranges the French gun of the same calibre used during the War, by nearly five miles; the largest aërial bomb effectively used during the War weighed only 400 pounds; the latest successful development weighs 4000 pounds and contains over a ton of explosive; the 50-calibre super-machine gun shoots a bullet weighing four times as much as the 0.30-calibre Browning and has three times the range of the weapon used in the War; the latest caterpillar mount for divisional artillery has attained a maximum speed of 30 miles on good roads, as contrasted with the 8- or 10-mile-per-hour maximum during the War. See Artillery; Explosives; Guns, Naval; Projectile; Small Arms; Trench Warfare Material; Strategy and Tactics.

ORE DEPOSITS. See Geology, under *Economic Geology*.

OREGON. The ninth State in size (96,699) square miles) and the thirty-fourth in population; capital, Salem. The population increased from 672,765 in 1910 to 783,389 in 1920, or by 16.4 per cent; estimated population 1928, 902,000. The number of whites increased from 655,090 (1910) to 769,146 (1920); Indians decreased in number from 5090 to 4590; Chinese, from 7363 to 3090; the number of Japanese increased from 3418 to 4151; of Negroes from 1492 to 2144; and native whites from 552,089 to 666,995. The foreign-born white population decreased from 103,001 to 102,151. Both urban and rural populations mounted during the decade: the former from 307,060 to 391,019; the latter from 365,705 to 392,370. The growth of the principal cities was as follows: Portland (q.v.), from 207,214 in 1910 to 258,288 in 1920; Astoria, 9599 to 14,027; Salem, 14,094 to 17,679.

Agriculture. As Oregon is one of the important grain-growing States, agricultural conditions have reflected the fluctuations in price and production of grains during, and subsequent to, the World War. This situation is treated in detail under Agriculture, Corn, Wheat, Barley, etc. The number of farms increased 10.3 per cent, or from 45,502 in 1910 to 50,206 in 1920, and rose farther to 55,911 in 1925; the acreage in farms increased from 11,685,110 to 13,542,318 and to 14,130,847 (1925). The percentage of total land area in farms increased from 19.1 in 1910 to 22.1 in 1920 and 23.1 in 1925. The total value of farm property rose by 55 per cent or from $528,243,782 in 1910 to $818,559,751 in 1920, but diminished to $714,410,119 in 1925; the average value per farm was $11,609 in 1910, $16,304 in 1920, and $12,778 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 45,887 were operated by owners; 618, by managers; and 9406, by tenants. The corresponding figures for 1910 were 37,796; 847; and 6859. White farmers in 1920 numbered 49,633, compared with 44,875 in 1910; colored farmers numbered 573, compared with 627. Farms reported as under mortgage, 17,843 in 1920, numbered 20,990 in 1925. The total number of cattle was 851,108 in 1920; 784,459 in 1925. Of these, 280,411 in 1920 were dairy cows; 205,057 in 1925. The number of swine was 266,778 in 1920; 216,065 in 1925; the number of sheep was 2,002,378 in 1920; 1,775,093 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 2,952,000 bushels; wheat, 23,318,000; oats, 10,944,000; barley, 3,675,000; potatoes, 6,240,000; apples, 6,950,000; and hay, 2,323,000 tons. Comparative figures for 1913 are corn, 598,000 bushels; wheat, 15,717,000; oats, 15,228,000; barley, 4,200,000; potatoes, 6,750,000; and hay, 1,732,000 tons.

Mining. The mineral resources of Oregon are not fully developed. Among the minerals produced are sand and gravel, gold, copper, silver, cement, and stone. The production of gold, copper, and silver subsequent to 1914 was as shown in the table. In addition to the minerals mentioned above, the State also produces mineral waters and small quantities of lime and platinum. The total value of the mineral products in 1926 was $6,941,355, compared with $5,496,253 in 1920; $3,962,822 in 1919; $4,191,740 in 1918; and $3,331,132 in 1914.

	Gold	Silver	Copper
Year	Valued at	Fine ounces	Pounds
1914	$1,591,461	142,552	39,248
1916	1,902,179	231,342	3,581,886
1918	1,270,465	107,323	2,451,016
1920	1,017,490	82,743	2,355,276
1921	822,034	42,120	174,300
1926	273,759	29,733	41,504
1928	225,968	30,924	358,463

Manufactures. Oregon is not one of the most important industrial States, but its manufacturing activities are firmly established. In 1920 there were in the State four cities with more than 10,000 inhabitants, forming 38.4 per cent of the total population of the State; and in 1919 these reported 60.4 per cent of the State's manufactured products. There were 2246 manufacturing establishments in the State in 1909; 2707 in 1919; 1907 in 1925; and 1779 in 1927. Wage earners in manufactories numbered 58,559 in 1919; 59,563 in 1925; and 61,401 in 1927. The capital invested amounted to $89,081,873 in 1909 and $237,254,736 in 1919. The value of products amounted to $93,004,845 in 1909; to $366,782,627 in 1919; to $352,763,595 in 1925; and to $342,852,371 in 1927. The increase in the value of products evidenced in 1919 was in great measure due to changes in economic conditions brought about by the War and cannot be taken as an index of the growth of manufactures during the war period; but an increase in the average number of persons employed has clearly shown steady growth in the manufacturing activities of the State. The first industry in point of value of products is that relating to lumber and timber: these attained $30,200,000 in 1909; $95,264,000 in 1919; $130,496,672 in 1925; $112,242,264 in 1927. Flour-mill and gristmill products rank second in this respect: they were $8,891,000 in 1909; $42,550,000 in 1919; $28,179,224 in 1925; $21,201,405 in 1927. Foundry and machine-shop products, high in rank, were valued at $3,135,000 in 1909; $3,823,000 in 1914; $31,689,000 in 1919; $8,273,299 in 1927. Slaughtering and meat packing, also important, had products valued at $5,880,000 in 1909; at $7,487,000 in 1914; at $15,868,000 in 1919; and $15,310,566 in 1927. The chief manufacturing city is Portland; others are Astoria, Eugene, and Salem. In 1909 there were in Portland 649 manufacturing establishments, with a product valued at $46,861,000; 846 in 1919, with $196,380,000; in 1927 products were valued at $146,973,636.

Education. Effort to maintain the high standard of efficiency has continued without interruption. A compulsory-education law was adopted by the people at the general election held in November, 1922. The history of the State is required to be taught in the schools, and there are also courses in moral instruction and physical education. In 1918 the Legislature enacted a physical-education law making it mandatory that all pupils in the elementary and secondary schools receive physical training for an average of at least 20 minutes a day. Progress was made during the decade in the rural schools and in nearly every county of the State consolidation was under way. The total number of consolidations for elementary schools for 1923 was 77, with an enrollment of 5585 pupils. In 1914 the State adopted a uniform system of standards for country and village schools. A movement for junior high schools developed. The Legislature of 1919 established a State Board for Vocational Education and substantial progress was made in this field, in agriculture, home economics, and technical training. The total enrollment in the elementary schools in 1925–26 was 142,711; in the high schools, it was 39,180; and the expenditure for public day schools was; current, $14,782,738; outlays, $4,167,209. Illiteracy decreased from 2.2 per cent in 1910 to 1.8 per cent in 1920; in the native white population, it remained at 0.5 per cent; among the foreign-born white, it decreased from 5.9 to 5.4 per cent; among the Negro, it increased from 3.7 to 5.5 per cent.

Finance. State expenditures for the year ended Sept. 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $11,976,691 (of which $442,844 was aid to local education); for conducting public-service enterprises, $3769; for interest on debt, $2,906,486; for permanent improvements, $7,182,648; total, $22,069,594 (of which $9,822,556 was for highways, $3,137,610 being for maintenance and $6,684,946 for construction). Revenues were $22,954,710. Of this, property and special taxes formed 26.4 per cent; departmental earnings and charges for officers' services, 5.8 per cent; sales of licenses and taxation of gasoline, 50.7 per cent. Property valuation was $1,110,677,349; State taxation thereon, $5,286,824. Net State funded debt on Sept. 30, 1927, was $36,155,029. Highway bonds outstanding were $34,466,750.

Political and Other Events. In 1914 the Republican candidate for governor, James Withycombe, was elected; the Democrats reëlected Senator Chamberlain. An amendment to the constitution, adopted by a large majority, prohibited the sale or manufacture within the State of intoxicants, but permitted importations. An amendment abolishing capital punishment also was adopted, but six years later, capital punishment was restored by vote of the people. Women participated in the elections for the first time in 1916. Minor State officers only were chosen. In the presidential voting of that year, Hughes received 126,968 votes; Wilson, 120,125. The prohibition section of the constitution adopted in 1914 was amended to prohibit importation of intoxicants into the State. An amendment empowering the governor to veto single items in appropriation bills also was carried. On June 7, 1916, the Columbia River Highway, a great scenic roadway, was dedicated. In 1917 the policy of expending automobile-license revenues on permanent highway construction was adopted. Through capitalization of these revenues, more than $40,000,000 was expended on pavement of trunk highways. In 1918 Governor Withycombe was reëlected and Charles L. McNary, who had been appointed on the death of Senator Lane, was elected to the Senate. Governor Withycombe died in office, Mar. 3, 1919, and was succeeded by Ben W. Olcott. In 1920 Robert N. Stanfield, Republican, was elected Senator. In the presidential vote, Harding received 143,592; Cox, 80,019. In 1922 the Democrats elected Walter M. Pierce governor. The voters adopted a compulsory-school law which required that children over 8 and under 16 years of age be sent to the public schools during the school year. This law was framed with a view to suppressing private and parochial schools. It was sponsored by the Scottish Rite Masons and was supported by the Ku Klux Klan. The law was declared unconstitutional by the United States District Court, Mar. 31, 1924, and in 1925 by the United States Supreme Court. The vote for President in 1924 was: Coolidge, 142,579; Davis, 67,589; La Follette, 68,403. I. L. Patterson was elected governor by the Republican vote in 1926. In 1928 the vote for President was: Hoover, 205,341; Smith, 109,223.

Legislation. In 1915 a law was enacted, in accordance with the vote of the people in 1914, to prohibit the sale or manufacture of liquor in the State; but it permitted importations in limited quantities to individuals. In 1917, at the request of Secretary Lansing, the Legislature withdrew certain anti-alien bills designed to prevent Japanese from owning land in the State. Provision was made for a rural-credit system and for the establishment of county tuberculosis sanitoria and hospitals. This Legislature also passed a "bone-dry" prohibition bill. Amendments in the laws relating to the judiciary were made in 1917 and 1919. An enactment of 1919 forbade the display of the red flag or any other like symbol. In 1921 the Legislature provided for the State Board of Aviation, created the State Board of Control and the Budget Commission, and made provision for the Americanization of the foreign-born. It adopted, subject to approval by the people, thereafter given, optional cash or loan bonuses to veterans of the War. In 1923 the Legislature passed an income-tax law and an eight-hour law for lumber workers. It also established the Judicial Council with the Chief Justice as chairman. At this session, measures were passed against the holding of land by aliens, and requiring voters to be able to read and write English. A literacy requirement for Oregon voters was proposed as a constitutional amendment in 1925.

The Legislature in its session of 1929 passed an act for the more complete control of State-supported higher education. By the provisions of this act there was created a State board of higher education. Under its administration were placed the University of Oregon and the Oregon State Agricultural College, as well as the State normal schools, three in number. Its functions commenced on July 1, 1929. Among the services that it was expected to perform was that of eliminating duplication of courses and of departments, with a view to greater economy of effort. The creation of the board was likewise advocated as likely to rid the higher educational institutions of direct political rivalries, which were asserted to have interfered to some extent with their successful operation while independent of one another.

OREGON, University of. A State institution of higher learning for men and women, at Eugene and Portland, Ore., founded in 1872. During the years 1914–28, the enrollment increased from 1765 to 3237, with a summer-school registration in the latter year of 1295, and a faculty in the autumn of 1928 of 211 members. The income of the University for the year 1928 was $1,687,862. The main library was increased from 53,000 to 195,491 volumes, in addition to which there were 9734 volumes in the medical school library. The schools of education, physical education, and sociology were founded between 1914 and 1924; the department of drama and the speaking arts was abolished in 1925 and a small amount of work in play production was placed in the department of English; the department of pre-engineering work also was discontinued during the same year and the work organized under the department of physics. Women's Hall, erected by funds raised by popular subscription, contained, besides the social hall in one wing, the Murray Warner Collection of Oriental Art of the Oregon Museum of Fine Arts, which was given to the university during the period, and several hundred volumes which were added to this collection in 1924. Other buildings erected included: McKenzie Hall, the school of medicine building, the commerce building, the women's dormitory, and the school of education group; Condon Hall to house the departments of geology and psychology and a reserved section of the university library, a building for the University Press, the Dorenbacher Hospital for crippled children on the medical school campus in Portland, in 1925; and in 1928 a men's dormitory at a cost of $338,683. Numerous important gifts were received during the period, including a tract of 88 acres of land adjoining the campus of the medical school in Portland, a $10,000 pipe organ for the newly completed recital hall of the school of music, a subscription of $219,000 for a student-union building, and $240,000 for a memorial court, all in 1924; $128,500 from the General Education Board for the medical school, and a bequest valued at approximately $50,000 from Mrs. Mary Ross Woodward, for the construction of the men's dormitory, mentioned above, in 1927; and in 1928, the sum of $36,000 from the General Education Board, for the University of Oregon School of Medicine at Portland, a bequest of $28,722 from the late Elizabeth H. Harmon for a fine-arts building; additions to the Murray Warner Oriental Art Collection; and land valued at $15,000. President, Arnold Bennett Hall, J.D., LL.D.

OREGON STATE AGRICULTURAL COLLEGE. A State institution of higher education for men and women, at Corvallis, founded in 1868, when the State designed Corvallis College as the recipient of the Federal land-grant funds and began to appropriate State funds. In 1870 it became the State Agricultural College and in 1885 wholly a State institution. The college includes three main divisions: resident instruction; agricultural and engineering experiment stations; and extension service. The resident-instruction division in 1928 comprised 10 schools: Agriculture, chemical engineering, commerce, engineering and mechanical arts, forestry, home economics, military science, mines, pharmacy, and vocational education. These schools have 45 subdivisions offering degrees. In addition, the school of basic arts and sciences and other service departments afford instruction supplemental to the degree curricula. The total enrollment, in all courses in 1928–29 was 5462. Of these, 3213, were men and 2249 women. The regular enrollment totaled 3828, with summer and other short-session enrollment, 1634. The income for 1927–28 from the original land-grant fund and other Federal funds, from the State of Oregon (millage tax), student fees, and certain appropriations from Oregon counties for extension work totaled $2,116,226; of this amount, approximately $1,902,500 was from the State and Federal governments. In addition to the 28 classroom buildings, there are three halls of residence for women and five for men. In 1927 the Memorial Union Building, costing $500,000, was erected by student and alumni subscriptions. Other new buildings erected since 1926 include a women's dormitory, a men's dormitory, and a physics laboratory. The library contains about 87,000 volumes. Besides the campus and farms at Corvallis, there are eight branch experiment stations located in different parts of the State. The president in 1929 was William Jasper Kerr, D.Sc., LL.D.

ORELLANA, ō'rā-lyä'nȧ, José Maria (1872–1926). A President of Guatemala, who was born in Jicaro and educated at the Escuela Politecnica, a military institution. Entering the army at an early age, he rose to the rank of general. He was chief-of-staff to the President of the Republic, military instructor of the Eastern Army Division, military vocal of the Supreme Court, and commander-in-chief of the Army. He also served as Minister of Public Instruction, deputy in the National Congress, Counselor of State, and in December, 1921, was elected President. His administration was marked by road construction, financial reforms, and the economic reorganization of the country.

ORGANIC CHEMISTRY. See Chemistry.

ORGANIZATION, Military. See Armies and Army Organization.

ORGANOTHERAPY. See Secretions, Internal.

ORIENTAL PEACH MOTH. See Entomology, Economic.

ORLAN'DO, Vittorio Emanuele (1860–). An Italian statesman who was born at Palermo. He began his career as a professor of law, was elected deputy for Partinico in Sicily in 1897, and was Minister of Education in the Giolitti-Tittoni cabinet (1903–05) and of Justice under Giolitti (1907–09), and again under Salandra (November, 1914). He favored Italy's intervention in the World War, but later when he was Minister of the Interior under Boselli (June, 1916–October, 1917) he was blamed for the spread of defeatist propaganda. On the resignation of Boselli, he formed a new cabinet, retaining the portfolio of the Interior, and was Prime Minister at the time of the Peace Conference, and headed the Italian delegation there; but his cabinet fell in June, 1919, owing to his failure to secure a favorable settlement of Italian claims in Paris. He was president of the Chamber in 1919–20. When Mussolini made up the lists for the election of deputies in 1924, Orlando was one of the few non-Fascists to appear on it; but in August, 1925, he resigned because his views differed too greatly from those of the Fascists. See Peace Conference and Treaties; Italy, *History*.

ORNSTEIN, Leo (1895–). A Russo-American pianist and composer, born at Krementchug, Russia. Until 1906 he studied at the

St. Petersburg Conservatory. He then came to New York and completed his education at the Institute of Musical Art under Bertha Feiring Tapper. His début in 1911 aroused great expectations, for he showed himself an artist of splendid technical equipment and keen insight. But as early as his second season, he discarded acknowledged musical standards and made up his programmes from the works of the extreme futurists, whom he also joined unreservedly as a composer. His numerous compositions are almost exclusively for piano or chamber ensembles. In 1924 he settled in Philadelphia as teacher of piano and composition at the Zeckwer-Hahn Musical Academy. Consult F. H. Martens, *Leo Ornstein: The Man, His Ideas, His Works* (New York, 1917).

ORPEN, Sir William (1878–). An Irish painter, born at Stillorgan near Dublin. He entered the Dublin Art School at the age of 11, but owed his chief training to the radical Slade School in London. In 1899 he first exhibited at the New English Art Club, in which a powerful portrait of Augustus John brought him membership in 1900. In 1904 he was elected to the Royal Hibernian Academy and in 1910 became an Associate of the Royal Academy. Orpen was a versatile painter, brilliant in technique and facile in execution. His color was bright and strong, his treatment of light especially successful, his design striking, sometimes bizarre. He was thoroughly Irish in spirit, often whimsical and satiric, and delighted in Irish figure subjects, such as "The Irish Volunteer." One of his specialties was "portrait interiors," in which the sitter was represented in the intimate surroundings of his home. Two whimsical portraits of the artist himself in studio surroundings are in the Metropolitan Museum, New York City, and the Carnegie Institute, Pittsburgh. His commissioned portraits were more conventional in style; others, in which he attacked given technical problems, were freer, and many of himself, such as "The Artist at the Front" and "The Man from Arran." In 1918 he presented a number of his paintings of the World War to the nation, and in the next year exhibited two large pictures of the Peace Conference at Versailles. He was knighted in 1918 and has been president of the International Society of Sculptors, Painters, and Gravers since 1921. He wrote *An Onlooker in France* (1921) and *Stories of Old Ireland and Myself* (1924).

ORTHOGENESIS. See Zoölogy.

O'RYAN, John F. (1874–). An American lawyer and soldier, born in New York City and educated at the College of the City of New York and the law department of New York University. In 1898 he was admitted to the bar. A member of the 7th Regiment of New York, he rose to the rank of major of field artillery and in 1912 was appointed major general of the New York National Guard. At the entrance of the United States into the World War in 1917, he was appointed major general in the National Army, and from 1917 to 1919, commanded the 27th Division of the American Expeditionary Forces in Belgium and France. This regiment participated in some of the most severe fighting of the War. He received decorations from foreign governments and the American Distinguished Service Medal. He was a member of the Public Service Commission of New York in 1922–26. In 1924 he conducted as counsel the investigation into the conduct of the Veterans' Bureau. From 1926 on, he gave much attention to the development of air transport.

OSBORN, Henry Fairfield (1857–). An American palæontologist (see Vol. XVII). Until 1924 he was vertebrate palæontologist of the U. S. Geological Survey. Since that date, he has been senior geologist of the Survey, retaining the presidency of the American Museum of Natural History (N. Y.) and the research professorship of zoölogy at Columbia University. His publications include: *Origin and Evolution of Life* (1917); Impressions of Great *Naturalists* (1924); *The Earth Speaks to Bryan* (1925); *Evolution and Religion in Education* (1926); *Creative Education* (1927); and *Man Rises to Parnassus* (1927).

OSBURN, Raymond Carroll (1872–). An American zoölogist born in Newark, Ohio, and educated at Ohio State University and Columbia University. He was instructor in biology at Starling Medical College (1898–99); professor of biology at the Fargo (N. D.) College (1899–1902); instructor at the New York High School of Commerce (1903–07); instructor in zoölogy (1907–10) and assistant professor (1910–15) at Barnard College; professor of biology at Connecticut Women's College (1915–17); and professor of zoölogy at Ohio State University (1917–). Professor Osburn published taxonomic papers on the bryozoa and was for a number of years on the investigation staff at the United States Bureau of Fisheries Laboratory at Woods Hole, Mass.

O'SHAUGHNESSY, Edith Coues (Mrs. Nelson O'Shaughnessy) (?–). An American writer, born in Columbia, S. C., and educated under private tutors. In 1901 she married Nelson O'Shaughnessy of New York, who was in the diplomatic service. While the latter was chargé d'affaires in Mexico in 1916, she made careful notes of political and social affairs which enabled her to write *A Diplomat's Wife in Mexico,* an enlightening and entertaining account of stirring events in that country. This was followed by *Diplomatic Days in Mexico* (1917); *My Lorraine Journal* (1918); *Alsace in Rust and Gold* (1919); *Intimate Pages of Mexican History* (1920); *Viennese Medley* (1924); *Married Life* (1925).

OSLER, ōs′lẽr, Sir William (1849–1919). A British physician and author (see Vol. XVII). During the period from 1914 to the time of his death, Dr. Osler wrote two major works, *A Concise History of Medicine* (1919) and *The Evolution of Modern Medicine* (1921). Since his demise, extracts from his works have been edited by C. N. B. Camac with the title, *Counsels and Ideals* (1921). Consult *The Life of Sir William Osler,* by Harvey Cushing (2 vols., 1925).

OSLO (formerly Christiania). The capital and commercial centre of Norway. The population at the census of 1920 was 258,483. In the rapidly growing suburbs of Oslo live more than one-third of the inhabitants of Norway. Garden suburbs have been laid out, under the auspices of the municipality, at Ullevall, Lille-Thöien, Lindern, and Thorshaug. Between 1912 and 1923, the city spent about 100,000,000 kroner ($27,000,000) in erecting low rental buildings. In 1928 a subway, the only one in Scandinavia, was opened and in its first year carried 3,200,000 passengers. There were 21 cars in operation. Oslo's export traffic has shown a marked increase since 1920 primarily as a result of the ever-increasing development of oversea routes. It is the starting point of more oversea routes than any other port in Scandinavia. The Oslo quays have a total length of 34,000 feet, and the adjacent areas belonging to the port cover about 360,000 square yards. Vessels with a draught up to 32 feet can be accommodated. In 1927, 2125 vessels of 1,766,539 tonnage entered the port, and 1543 vessels of 1,451,369 tonnage were cleared.

Oslo is widely known for its valuable collections of Scandinaviana. The most famous is the University Collection of Norse Antiquities, which includes two Viking ships excavated from burial mounds at Gokstad and Oseberg in 1880 and 1903. The Oseberg ship was the pleasure launch of Queen Aasa, the grandmother of Harald the Fairheaded; in death, it served as her coffin. With the queen were buried a bondwoman, her beautifully carved sleighs and carriage, food, and numerous articles which were intended to be of use to her on her journey to Valhalla. The museum also includes the collection brought home by Roald Amundsen and the Gja Expedition from the country of the Netchill Eskimos. At Bygd, one of the suburbs of Oslo, is the Norsk Folkemuseum, an open-air museum consisting of several ancient homesteads which were removed to this ideal setting from various parts of Norway and which give a vivid impression of the life of the Norwegian peasants since the time of the Vikings. The entire "parish" clusters about an old timber church which was used for more than 800 years at Gol in Hallingdal. The State Gallery of Fine Arts, opposite the Historical Museum of the Royal Frederik University, contains a representative collection of Norwegian art. In the Museum of Arts and Crafts are found examples of the home industries and crafts of the peasantry. The Ski Museum contains the equipments used by several Norwegian polar explorers; the most important is the one used by Amundsen on his conquests of the South Pole and of the Northwest and Northeast passages.

In the summer of 1924, the Norwegian Storting (Parliament) decided by an overwhelming majority to alter the name of the capital from Christiania to Oslo, the change to take effect Jan. 1, 1925. Oslo was the name of Norway's old capital founded, according to tradition, by King Harald Haardraade in 1048. When in 1624 a great fire laid waste the ancient town, King Christian IV of Denmark, under whose rule Norway was at that time, forbade the inhabitants to rebuild on the old site. Instead, they were commanded to erect their dwellings on the other side of the bay under the walls of the Akershus fortress and to name the town Christiania. The Oslians chose the 300th anniversary of the founding of Christiania to shake off this memory of foreign domination.

OSSENDOWSKI, Ferdinand Antoni (1876–). A Polish writer, explorer, and scientist. He was head of a polytechnic school at Tomsk, Russia, from 1902 to 1903, and was arrested for his part in the Polish Revolution of 1905 and exiled to Siberia, where after the Russian revolutions of 1917, he joined Kolchak's anti-Bolshevist forces. Following Kolchak's death in 1920, he escaped into Tibet and western China, where he encountered the adventures related in *Beasts, Men and Gods* (1922; English trans., 1923). The book has been translated into more than 20 languages and over 1,000,000 copies sold in three years. During 1922–24 he taught in the commercial academy at Warsaw. Later, he conducted explorations in Asia and Africa. His other works published in English, with the date of translation, include *Man and Mystery in Asia* (1924); *The Shadow of the Gloomy East* (1925); *From President to Prison* (1925); *The Fire of Desert Folk*, on travels in Morocco and Tunisia (1926); and *Slaves of the Sun*, concerning explorations in the Congo (1928). Lewis Stanton Palen collaborated in the translations. Consult *Ossendowski und die Wahrheit*, by Sven Anders Hedin (1925).

OSTWALD, ōst′vȧlt, Wilhelm (1853–). A German chemist and philosopher (see Vol. XVII). He was editor of *Der Monist* (1912–15). He published *Der Farbenatlas* (1917); *Die Farbenlehre* (1918–19); *Die Harmonie der Farben* (1918); *Goethe, Schopenhauer, und die Farbenlehre* (1918); *Die Farbkörper* (1919); *Die Farbschule* (1919); *Einführung in die Farbenlehre* (1919); *Die Harmonie der Formen* (1922); *Die Welt der Formen* (1922–24); *Farbenkunde* (1923), and an autobiography (1926–27). He lectured at Columbia and Harvard universities and founded a laboratory for color study in Dresden in 1920.

OTIRA TUNNEL. See Tunnels.

OTTAWA. A city of eastern Ontario and capital of the Dominion of Canada. The population in 1928 was estimated to be 121,000. The area is more than 5000 acres. Ottawa is governed by the Board of Control composed of a mayor and four controllers and a council of 18 aldermen elected annually. The mayor and controllers are elected by general vote; the aldermen are elected by wards, two for each ward. The mayor, by virtue of his office, is chairman of the Board of Control and is represented on all committees and commissions appointed by the council. On Feb. 3, 1916, the imposing group of Parliament Buildings was almost totally destroyed by fire but was rebuilt on practically the same plans, with an additional story, at a cost of $10,000,000. In 1928 Parliament voted $3,000,000 to be expended on the beautification of Ottawa; the plans included the creation of an open space in the heart of the city to be known as Confederation Park. About $200,000 also was granted each year for 16 years for the maintenance of an elaborate system of parks and driveways under the jurisdiction of the Federal District Commission appointed by the Dominion government. This commission functioned for many years as the Ottawa Improvement Commission, until in 1927 it was reconstituted with wider powers as the Federal District Commission.

The Champlain Bridge across the Ottawa River at Remic Rapids was constructed between 1924 and 1929 under the auspices of the Federal District Commission as part of the scheme for the beautification and improvement of Ottawa. The bridge was named in honor of Champlain, as its site was adjacent to the portage used by the French explorer to reach the Ottawa River. The type of construction was that of deck plate-girder spans, each span consisting of a pair of girders supporting steel floor beams. There were 22 plate-girder spans of 70 feet each and four spans of 125 feet, carried on reënforced concrete piers faced with pre-cast artificial stone. The width of the roadway is 24 feet and of the sidewalks, 5 feet 6 inches each. The total length of the bridge is about one mile, including the steel viaduct on Bate Island, 260 feet in length. The cost of construction was approximately $750,000. In 1929 a research filtration laboratory was established in Ottawa, preparatory to the construction of a $1,315,000 sand-filtration plant at Lemieux Island in the Ottawa River.

In 1928 Ottawa had 18 public schools and 41 separate schools with an aggregate attendance of 24,000 pupils, 2 collegiate institutes, 1 university, and 10 colleges. Bank clearings in 1928 amounted to $375,000,000 and the assessed valuation of property, to $146,428,131; the output of 203 industrial plants was valued at $60,000,000. The headquarters of the Canadian Air Force are located at Ottawa, which serves as the main technical and stores depot. The hundredth anniversary of the city's founding was celebrated in August, 1926.

OVERMAN, Lee Slater (1854–). A United States Senator (see Vol. XVII). He was reëlected to the Senate for a third term in 1914. This was the first senatorial election by a direct vote of the people of North Carolina. In 1920 and 1926, he was also reëlected. He was one of the most conspicuous of the Democratic members of the Senate.

OVERTON, Grant (Martin) (1887–). An American writer, born at Patchogue, N. Y. He studied at Princeton University from 1904 to 1906 and for several years was on the staffs of newspapers in New York, Denver, and San Francisco. After a trip at sea before the mast, he became an editorial writer for the New York *Sun* in 1910 and was later its literary editor and a contributor to several magazines. He was fiction editor of *Collier's*, 1924–27, and consulting editor after May, 1927. His books include *The Women Who Make Our Novels* (1918); *Mermaid* (1920); *World without End* (1921); *The Answer*, a novel on the life of Walt Whitman (1921); *Island of the Innocent* (1923); *The Thousand-and-first Night* (1924); *The Philosophy of Fiction* (1928). He edited *Mirrors of the Year* (1926–27); *Cream of the Jug*, humorous stories (1927); and *The World's 100 Best Short Stories* (1927).

OVIDIO, dō-vēd'yō, Francesco d' (1849–1924). An Italian philologist (see Vol. VII). His later books include *L'avversione di Ruggiero Bonghi alla triplice alleanza* (1915); *L'origine della presenta guerra* (1915); and *Benevenuto da Imola e la legenda vergiliana* (1916).

OWEN, Robert Latham (1856–). A United States ex-Senator from Oklahoma. He first took his seat in 1907 and was reëlected in 1912 and again in 1918 for the term expiring Mar. 3, 1925. He was active in the passage of the Federal Reserve Act and the Farm Loan Act in the Senate.

OXFORD AND ASQUITH, Earl of. See Asquith, Herbert Henry.

OXYGEN. See Chemistry.

OZONE. See Chemistry.

P

PACIFIC OCEAN ISLANDS. The more important groups of islands in the Pacific Ocean are given below. For American possessions, see Philippine Islands, Hawaii, Guam, Samoa. For the Yap agreement, see Yap. For a discussion of the political problem of the Pacific, see Washington Conference.

Caroline and Pelew Islands. A group of islands in the Western Pacific, formerly part of German New Guinea, but since 1918 a Japanese mandate territory. The islands are divided into two groups: (1) the Eastern Carolines with Ponapé as the centre; and (2) the Western Carolines with Yap as the centre. The population reported (1928) was made up of 2892 Japanese, 57 foreigners, and 37,484 natives. Copra is the chief export. See Yap for the dispute between the United States and Japan over the disposition of this island.

Cook Islands. A group in the Southern Pacific belonging to New Zealand. Total area, 280 square miles; population, in 1926, 13,877. In 1915 the laws for the islands were consolidated and a member of the New Zealand Executive Council was made Minister of the Cook Islands. In 1927 imports totaled £130,612 and exports £152,707. Trade is largely with New Zealand, exports being mainly fruits. Copra is sent to the United States (£40,279 in 1927). Revenues for 1927–28 were £25,053 and expenditures, £23,924. A wireless station is maintained on Rarotonga, the chief island. Many of the islands are leased to private coconut companies for exploitation. The Niué Islands have a population of 3795 and are concerned largely with copra production.

Fiji Islands. A group of 250 islands in the Southern Pacific, constituting a British Crown colony. The largest are Viti Levu and Vanua Levu. Total area, including Roturna (a dependency), 7083 square miles; population (1927), 171,644, made up of 4184 Europeans, 89,401 Fijians, 68,733 Indians, 987 Chinese, 3071 half-castes, and 5268 others. In attendance at the Methodist churches in 1927 were 80,991 natives. Out of 1000 schools on the islands, the Government was wholly supporting nine and aiding 55 in 1927. Expenditure on education in 1927 was £34,027. In 1927 there were under cultivation by Europeans and Indian settlers 47,713 acres of coconuts, 49,121 acres of sugar cane, 7392 acres of rice. Bananas, maize, tobacco, rubber, and beans are other crops. Exports in 1913 were £1,425,940; in 1927, £1,997,374 (sugar, £1,125,215). Imports for the same years were £903,968 and £1,223,303. The trade is carried on largely with British possessions. Revenues and expenditures for 1913 were £266,037 and £258,792; for 1927, £586,574 and £534,939. There was a public debt in 1927 of £153,550 (£93,515 in 1911). Wireless telegraph stations were erected at Suava, Labasa, Taveuni, and Savusavu. The Governor of Fiji is also high commissioner for the Western Pacific.

Gilbert and Ellice Islands Colony. These islands were annexed as a colony to Great Britain in November, 1915. The Gilbert Islands are on the equator and have an area of 166 square miles, and a population in 1926 of 23,410. The Ellice Islands have an area of 14 square miles, and a population of 3582. Ocean Island, the colony headquarters, has a population of 2386. A wireless station here maintains telegraph communication with the outside world via Fiji and Australia. The very rich phosphate deposits on the island were, after 1921, worked by the British Phosphate Commission. Other islands in the colony are the Union or Tokelau group, and the American Islands. Of the latter, Christmas Island is the largest atoll in the Pacific. It was leased in 1914 to the Pacific Coconut Plantations, Ltd., for exploitation; population, 4 Europeans and 28 Tahitians. Fanning and Washington islands, also in this group, are being worked by a coconut company. Total revenues for the whole colony for 1926–27 were £52,925 and expenditures £44,869. The trade in 1926–27 amounted to £113,453 (incomplete figures) for imports and £395,728 for exports (phosphates, £355,815; copra, £39,341).

Marianne(mā′rĭ-an′) or **Ladrone Islands.** A group of islands in the Western Pacific, formerly part of German New Guinea, but since 1918 a Japanese mandate territory. Native population numbered in 1926, 48,994 and the Japanese, 8395. Guam (q.v.), the largest island, belongs to the United States.

Marquesas (mär-kā′sȧs) **Islands.** A group of islands in the Western Pacific belonging to France and administered from Papeete. Total area, 480 square miles; population, 2255. Hivaoa and Nukahiva are the principal islands.

Marshall Islands. A group of islands in the Western Pacific, formerly part of German New Guinea, but since 1918 a Japanese mandate territory. The group is made up of two chains, viz., Ratack (13 islands) and Ralick (11 islands). The population consists of 260 Japanese, 11 Europeans, and 9390 natives. Coconut-palm plantations cover 1705 hectares, and the chief export is copra.

Nauru. An island in the Western Pacific just south of the equator, formerly part of German New Guinea, but since 1920 administered by Great Britain under a mandate from the League of Nations. It is a circular atoll only 12 miles in circumference. Population in 1928: 131 Europeans, 1051 Chinese, 1297 Nauruans, 20 other South Sea Islanders. The important phosphate deposits were placed in the hands of the British Phosphate Commission representing the governments of Great Britain, Australia, and New Zealand. Costs of administration, if ordinary revenues did not suffice, were to be met out of the phosphate sales. Phosphate exports increased from 101,267 tons in 1917 to 318,185 tons in 1927. Imports were valued at £82,649 in 1927. The German wireless station, though dismantled by the Germans, was soon restored. The island fell in September, 1914, before a British naval force and from 1915 on was occupied by a civil administration.

New Caledonia. A French colony in the Western Pacific consisting of the island of New Caledonia (area, 8548 square miles) and four groups of island dependencies. Population (1921), 47,505, made up of 14,172 free settlers, 2310 of convict origin, and 25,123 Melanesians and Polynesians. Nouméa, the capital, had 9336 inhabitants, of whom 6328 were free (1921). Leading products are nickel, chrome iron, manganese, and cobalt, as well as copra, hides, and preserved meats. Local blast furnaces produced 4435 tons of nickel valued at 12,475,006 francs in 1926. Total exports for 1913, 1920, 1927 were 15,838,405 francs, 43,043,449 francs, 87,195,849 francs. Imports for 1927 were 154,771,189 francs. The budget for 1927 balanced at 28,080,437 francs. The Loyalty Islands, which belong to this group, possess rich guano deposits; on the Wallis and Horn Islands, copra is the leading product. The latter islands were formed into a colony in 1913.

New Hebrides, hĕb′rĭ-dēz. These are administered jointly by French and British officials. Area, 5700 square miles; population (1926), 60,000. Several French and British trading companies operate here. Imports in 1926 were 30,457,405 francs; exports (maize, copra, coffee, cotton, sandalwood, cocoa), 43,267,835 francs. French trade represented 20,326,172 francs of the imports and 34,371,306 francs of the exports. Intercourse is mainly with Sydney and Nouméa (New Caledonia). The joint revenues and expenditures in 1927 balanced at 3,209,000 francs. The local budget for 1928 was 5,148,000 francs. Beginning with 1919, the islands became the seat of a strong agitation for the termination of the condominium (1906) and accession by France. The question was discussed at the British Imperial Conference in 1921, and again later in the year, when an offer was made by a French private company to buy out the British rights. Complaints were frequent, particularly over the cumbersome methods of administrating justice. However, the condominium was renewed by the protocol of London on Mar. 18, 1922.

Norfolk (nôr′fa̤k) **Island.** An island in the Southern Pacific, a dependency of Australia. Area, 13 square miles; population (1926) 853. Up to 1914, it was governed from New South Wales. Imports in 1926–27 were £27,869 and exports, £13,578.

Phœnix Group. This is made up of eight islands with a total area of 16 square miles, and a population of 59. They belong to Great Britain but are leased to a trading company for coconut planting.

Samoa. A group of islands in the Western Pacific, formerly a German possession, but since 1920 administered by New Zealand under a mandate from the League of Nations. The group, comprising the large islands of Savaii and Upolu and several adjacent islets, was given the name Territory of Western Samoa. Area, about 1300 square miles; population (1927), 2564 Europeans and half-castes, 39,215 native Samoans, 939 coolie laborers, 147 other islanders. Education is in the hands of the London Missionary Society, the Methodist Mission, the Catholic Mission, and the Latter-day Saints' Mission. Imports for 1927 were £304,369 and exports £335,978 (copra and cocoa beans largely). Revenues for 1927–28 were £126,038 and expenditures £143,121. The United States takes most of the copra exported. New Zealand forces occupied the islands on Aug. 29, 1914. In 1918, 7500 natives died from influenza, the region being one of those that suffered most severely. A wireless station was erected at Apia, the Territory's port. The local administration has made provision for a nominated legislative council in which native Samoans have seats. For the American Samoan Islands, see article SAMOA.

Society Islands. A group in the Western Pacific belonging to France. Total area, 650 square miles; population, 10,422. Tahiti, the most important island, has an area of 600 square miles, and a population of 8585 (census of 1926). Papeete, on Tahiti, is the seat of administration of the French establishments in Oceania, and possesses a wireless station. It has 4601 inhabitants of whom 2126 are French. The chief industries of Tahiti are the preparation of copra, sugar, and rum. Vanilla, coffee, and cacao are cultivated. Other islands belonging to the Society group are Moorea (area, 50 square miles; population, 1837) and Iles-sous-le-Vent (area, 363 square kilometers; population, 6689).

All the French establishments (i.e., Society Islands, Marquesas, Tuamotu, and Tubuai groups) have a total area of 1520 square miles, and a population in 1926 of 35,862, made up of 870 French, 217 English, 3989 Chinese, and the rest natives. Leading exports are copra, mother-of-pearl, hides, coconut oil, phosphates, coffee, vanilla, cotton. Exports in 1913, 1920, 1927 were valued at 11,554,507 francs, 24,360,900 francs, and 49,032,248 francs. Imports in 1927 were 50,596,237 francs. The budget for 1927 balanced at 15,167,573 francs; in 1911 it was 1,745,000 francs. Some 5000 lives were lost in these islands in the influenza epidemic of 1918.

Solomon Islands. A British protectorate in 8°S. and 160°W., made up of 15 large islands and the following groups: Lord Howe group, Santa Cruz Islands, Mitre Islands, and the Duff or Wilson group. Total area, 11,000 square miles; European population (1922), 493; native population, 150,000; Asiatics, 63. Coconuts are cultivated over 30,000 acres; other products are rubber, fruits, copra (22,316 tons in 1926–27). Imports for 1927–28 were £261,741; exports (mainly copra), £386,546. Revenues for 1927–28 were £75,664; expenditures, £73,993. The islands in the group owned by Germany became part of the Australian mandate territory of New Guinea after the World War. See NEW GUINEA.

Tonga or Friendly Islands. A group of islands in the Western Pacific, forming a British protectorate. Total area, 385 square miles; population (1926 estimate), 27,048, made up of 25,918 Tongans, 235 half-castes, 365 other Pacific islanders, 530 Europeans. The natives are Christians, belonging to the Free Church of Tonga, Methodist, and to Catholic churches. Copra is the chief product, more than half of it going to the United States. Imports in 1927 were valued at £157,783; exports, at £235,391. Revenues in 1926–27 totaled £72,562 and expenditures, £83,513. A wireless station at Nukualofa is in touch with Samoa and Fiji. The reigning sovereign, Queen Salote, came to the throne in 1918.

Tuamotu (tōō'ȧ-mō'tōō) **Islands.** A group in the Western Pacific belonging to France and administered from Papeete. Total area, 55 square kilometers; population, 4276. Makatéa, the principal island, has important phosphate deposits. In the Gambier Islands, pearls and mother-of-pearl are the leading products.

Tubuai Islands. A group in the Western Pacific belonging to France and administered from Papeete. Area, 115 square miles; population, 3170. Coffee is grown there.

PACK, Charles Lathrop (1857–). An American forester and economist, born at Lexington, Mich., and educated in the public schools at Cleveland. He studied forestry in Germany. For several years, he explored forests in Canada, the Northwest, Louisiana, and Mississippi. He was a director and official in many important financial institutions and, from 1917 to 1919, president of the National War Garden Commission. He was president also of the American Forestry Association from 1916 to 1920 and of the National Conservation Congress in 1913. He was chairman of the French Agricultural Committee of the American Commission for devastated France. For his services in France, he was awarded several medals. He wrote much on agricultural subjects, including *The War Garden Victorious*; *Memorial Trees*; *Roads of Remembrance*; *School Book of Forestry* (1922); *Trees as Good Citizens* (1923); *Forestry Primer* (1926).

PACKING INDUSTRY. See Live Stock.

PADELFORD, Frederick Morgan (1875–). An American college professor, born at Haverhill, Mass., and educated at Colby College, Yale, and Oxford. He was for one year a fellow at Yale and from 1889 to 1901 was professor of English at the University of Idaho. In the latter year, he became professor of English at the University of Washington, and in 1920 dean of the graduate school at that university. He was a member of several societies and author of *Old English Musical Terms* (1900); *Early Sixteenth Century Lyrics* (1906); *Samuel Osborne, Janitor* (1913); *George Dana Boardman Pepper, a Biographical Sketch* (1914); and *The Poems of Henry Howard, Earl of Surrey* (1920). He also made translations, edited English texts, and contributed to *The Cambridge History of English Literature* and to European and American magazines. With W. Howe and H. M. Ayres, he edited the *Modern Students' Book of English Literature* (1924).

PADEREWSKI, pä'de-rĕf'skē, Ignace Jan (1860–). A Polish pianist and composer (see Vol. XVII). On May 9, 1917, he made at the Metropolitan Opera House, on the occasion of a gala performance in honor of General Joffre, his farewell appearance, which he declared was to close forever his pianistic career. He then plunged into the midst of the political turmoil. At the beginning of the World War and after, he had appeared at his concerts also as a political orator of no mean ability and contributed the greater part of the proceeds to the cause of Poland. After 1917 he devoted his entire time and energy to recruiting from among the Poles in the United States an army of 100,000 men and 50 officers, which subsequently constituted the greater part of the Polish Army in France. As soon as circumstances permitted, he went personally to Poland (1918), where he became the leader of the Conservative Party and was largely instrumental in organizing the new Polish Republic, of which he became Premier and Minister of Foreign Affairs (Jan. 26, 1919). In this capacity, he took active part in the Peace Conference at Versailles. The unsettled conditions in Poland brought about the the downfall of the cabinet in December, 1919; and Paderewski, his health seriously impaired by the stress of events, retired to his estate at Paso Robles (California). Here, however, he kept in close touch with the political situation of his native country. As he had sacrificed the greater part of his fortune to the cause of Poland, he found himself compelled to rescind the resolution regarding his artistic career, and on Nov. 22, 1922, he reappeared amidst scenes of indescribable enthusiasm at a recital in New York. Fortunately for art, he continued his distinguished artistic career and proved that the intervening five years of political excitement had not in the least impaired his supreme mastery. See Poland, *History*.

PAGE, Herman (1866–). An American Protestant Episcopal bishop, born at Boston, and educated at Harvard and at the Episcopal Theological School. He was ordained in 1891 and until 1900 was in charge of mission churches in Idaho. He was rector of St. Paul's Church in Chicago from 1900 to 1914 and was consecrated Bishop of Spokane, Wash., in 1914. He became Bishop of Michigan in 1923.

PAGE, Thomas Nelson (1853–1922). An American writer and diplomat (see Vol. XVII). He was appointed Ambassador to Italy by President Wilson in 1913 and served in that capacity through the difficult period of the World War, until 1919. His later books included *The Land of the Spirit* (1913) and *Italy and the World War* (1920).

PAGE, Walter Hines (1855–1918). An American publisher, writer, and diplomat (see Vol. XVII). In 1913 he was appointed Ambassador to Great Britain. His strong and frankly expressed sympathy with the English attitude during the years in which he held this post made him a popular figure in England. Much of his time, as indicated in his letters, was spent in convincing President Wilson and the officers of his government of the necessity of taking a more aggressive attitude and in favor of the Allies. During his ambassadorship, he won high praise in all quarters by the tact which he displayed and his skill in dealing with delicate and complicated problems. His strength was unable to withstand the strain imposed on him. He resigned his post in 1918 and returned to the United States, where he died on October 12. His *Life and Letters*, by Burton J. Hendrick, published in 1922, is one of the most illuminating records of the events of 1914 to 1918 in international politics. *The Earlier Life and Letters of Walter H. Page*, by Mr. Hendrick, appeared in 1928.

PAGE, William Herbert (1868–). An American lawyer and teacher, born at Mount Union, Ohio, and educated at Yale University and the law department of Ohio State University, where he was professor of law from 1896 to 1917. In the latter year, he assumed a like position at the University of Wisconsin. His many writings on legal subjects included *Page on Wills* (1901); *Page's Ohio Digest* (1914); *Compact Code* (1921); *Annotations to General Code* (1922). He is editor-in-chief of the *Wisconsin Law Review*.

PAHANG. See Malay States, Federated.

PAHLEVI I, SHAH OF PERSIA. See RIZA KHAN PAHLEVI.

PAIN, BARRY (1867–1928). An English author (see VOL. XVII). After his visit to the United States (1914–15), he served in the Royal Naval Volunteer Reserve (1915–16), and then on the London Appeal Tribunal. His later works, chiefly parodies or humorous stories, were: *The Short Story* (1915); *The Problem Club* (1919); *The Death of Maurice* (1920); *Marge Askinforit* (1921); *This Charming Green Hat Affair* (1925); and *Essays of To-day and Yesterday* (1926).

PAINE, ALBERT BIGELOW (1861–). An American author and editor (see VOL. XVII). His later writings include: *The Boy's Life of Mark Twain* (1916); *Mark Twain's Letters* (1917); *George Fisher Baker, a Biography* (1919); *A Short Life of Mark Twain* (1920); *The Car That Went Abroad* (1921); *In One Man's Life* (1921); *Single Reels* (1923); *Joan of Arc* (1925); *The Girl in White Armor* (1927).

PAINLEVÉ, păn'le-vâ', PAUL (1863–). A French statesman and scientist, particularly interested in mathematics and aviation (see VOL. XVII). He became a member of the Institute of France and the Academy of Science. In October, 1915, he was appointed Minister of Instruction and Inventions affecting national defense, in the Briand cabinet, later succeeding General Galliéni as Minister of War. He was also a member of the War Committee and from September to November, 1917, Prime Minister and Minister of War. As Minister of War, he was accused by the supporters of General Nivelle of having interfered with the French offensive of April, 1917. In 1920 he was appointed advisory director general of Chinese government railways. He was chosen President of the new Chamber in the spring of 1924, resigning in April, 1925, to form a cabinet of his own, in which he held the War portfolio. He continued as Minister of War in most succeeding governments. He resigned the premiership on Nov. 28, 1925, but as Minister of War, he supervised operations against the Druse revolt in Syria and that of Abd-el-Krim in Morocco. He also served as French delegate to the League of Nations and as president of the Committee of International Coöperation. He is the author of several scientific books and *A Life of Nurse Cavell*.

PAINTING. The history of painting in recent years has been a continuation of the struggle which became acute during the first decade of the twentieth century, between the movement known as modernism, or post-impressionism, or, better still, as expressionism, and impressionism, and other more conservative factors in painting. The year of the World War almost completely checked artistic production in Europe except in so far as it could be drafted into war service, and most of this war painting was propaganda rather than art. At the end of the War, the situation was very much the same as just before it and the struggle was still continuing in 1928. Painters were concerned with studying the means of artistic production rather than with producing real works of art. Many theories were expounded and still more pictures put on canvas to demonstrate them, but relatively little of real value had been created. It was the threshold of a new epoch, but what the result would be no one could tell. One encouraging sign was that painters of the new tendencies were so much concerned with expression, with the inner truth, with the essence, rather than with the mere aspect, of nature.

France. By the end of the first decade of the twentieth century, impressionism had conquered its rivals, realism and other academic tendencies, and had become dominant in official, as well as in artistic, circles. From 1913 to 1921, Paul Albert Besnard (1849–), an impressionist painter, was head of the École de France at Rome and after 1922 director of the national École des Beaux Arts at Paris. It was he above all others who applied the impressionist technique to mural painting. He was highly successful also as a portrait painter of women. Among other decorators of note were Jules Cheret, who united impressionism with the tradition of Fragonard; Henri Martin, the painter of Languedoc; and Edmond Aman-Jean. Most mural painters, however, never fully accepted impressionism. Among painters affected by it, Lucien Simon, with an admixture of realism, painted homely scenes; Charles Cottet, Parisian society. The chief pioneers of impressionism had for the most part passed on, Dégas in 1917, Renoir in 1919, both active and developing till the end; and Claude Monet continued painting his scintillating landscapes till his death in 1926. Among the younger men of strict impressionistic technique were Albert André, who is best in still life, Maufra, Moiret, and Casals for Spanish subjects.

Great as were the achievements of impressionism, it had a serious defect which induced a speedy reaction. Concerned only with the representation of light, with the appearance of things, it had no inner life and lacked the gift of psychology. The various modernist movements therefore insisted on expressionism, i.e., that the painting should represent not so much nature itself as the painter's reaction toward nature, the emotions roused in him by the object depicted. This led to the rejection of nature as a norm. Rejecting also the flat surfaces of impressionism, the post-impressionists strove for solidity and structure. Design should be organized and not haphazard, as it is in nature; color and form symbolic, rather than realistic. One form of this reaction was symbolism, which presents nature in a symbolic, as distinct from the actual, form. Its foremost exponent was the delightful pastellist and illustrator, Odillon Redon (1840–1916). The group included such staunch modernists as Paul Serusier, Maurice Denis, Pierre Bonnard, and Édouard Vuillard. The art of the first two is mystic and religious, while that of the others is decorative; Vuillard especially has been influenced by Japanese art. One group's reaction against impressionism consisted of imitation of Italian fifteenth-century art, or what the English call Pre-Raphaelitism. Foremost among them were Félix Valloton and Jean Frélaut, both painters of Breton subjects.

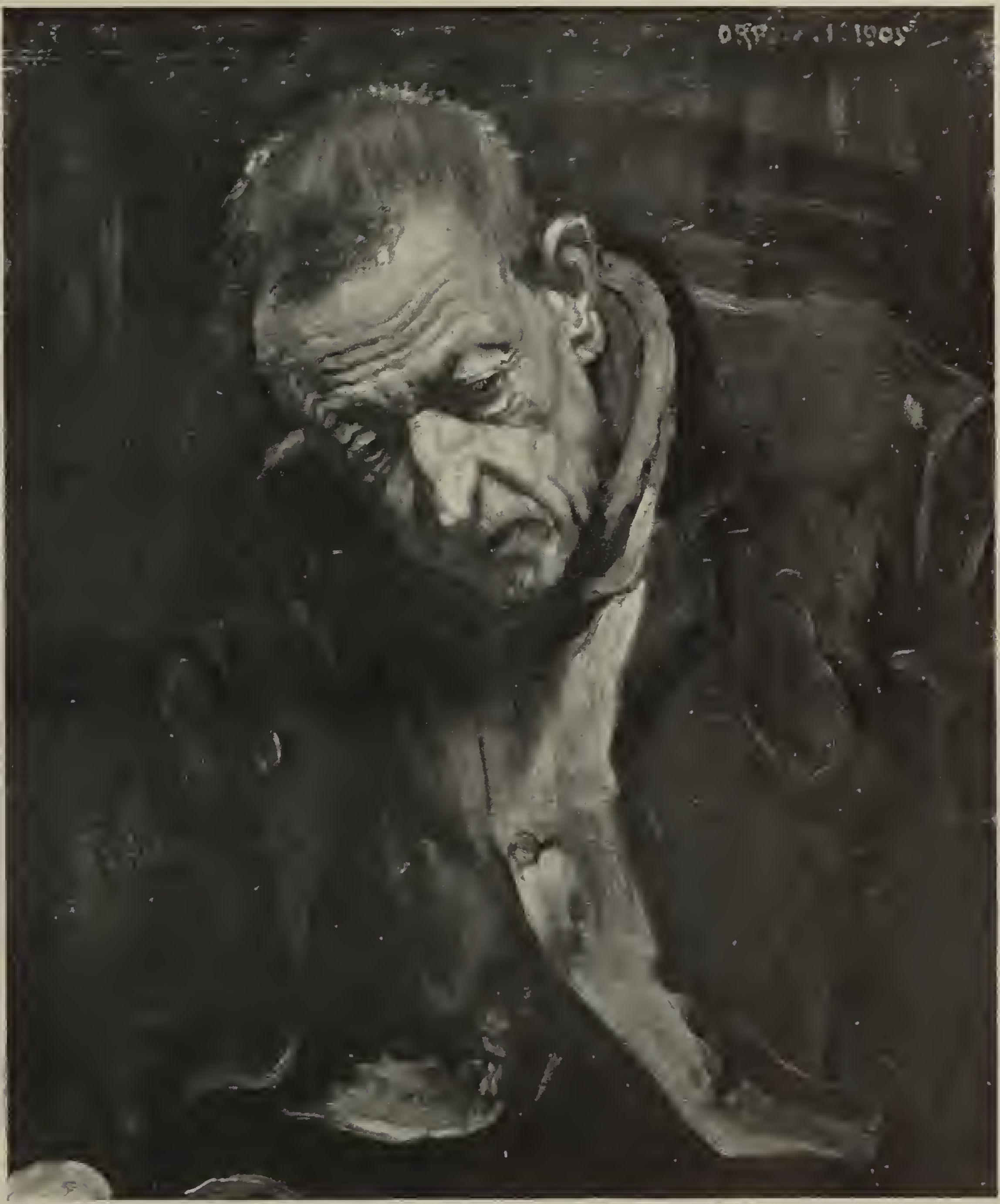
The group known as "Les Fauves" was at first made up chiefly of pupils of Gustave Morot (1826–98), a symbolist. Rejecting their master's academic tendencies, they expressed themselves with such wildness that this term, signifying "wild beasts," was applied to them. Foremost among this group was Henri Matisse 1869–), a very abstract painter who pushes simplification to the utmost, striving indeed to attain the vision of a child. Both in line, of which he is a consummate master, especially of outline, and in color, his art recalls Chinese and Japanese painting. The group included also Kees van Dongen (born 1877), a Dutchman, who achieved fame in portraying distinguished members of Parisian society, and Modigliani (1889–1920), an Italian, who created simply colored figures based on the conventions of Negro art. Others of the "Fauves" afterward developed in various directions, some becoming cubists, others following Cézanne's lead. As time went on, Cézanne became more and more the dominant influence in modernist art. His closest follower was André Derain (born 1880), an artist of great power, both in figure and landscape, whose color became increasingly severe. Another important figure was Maurice de Vlaminck (born 1876), a highly dramatic landscape painter of brilliant technique. It was he who discovered Negro art as revealed in the wooden fetishes of the African savages, carved before their association with white men. Here was an art of pure plastic quality, simplified to the utmost, abstract in form, and with very remote resemblance to actuality. It greatly influenced the new movement, especially cubism. Among other artists once classed among the "Fauves" who were affected by cubism were Albert Marquet, Othon Friesz, Jean Marchand, and Segonzak. There was at the close of this period an increasing tendency among them to use forms based on nature rather than pure abstractions. Henri Rosseau (1844–1910), a customs official of Paris, began painting late in life in a quaint, primitive style, charmingly bourgeois in spirit. His subjects were portraits, the environs of Paris, and exotic landscapes, reminiscent of his military service in Mexico. George Rouault (born 1871) is known for his strange figure subjects, and Maurice Utrillo (born 1883), a drunken genius, paints streets and buildings, solidly constructed as if by a mason, fair white cathedrals, and the like. A curious outgrowth of the modernist movement was feminism in painting. There have been women painters at all epochs, but their art has not differed materially from that of men. The art of Marie Laurencin, subtle in design, exquisite in color, is essentially feminine in spirit and conception, such as no man could have produced. That of Elizabeth Fuss-Amoré is very rich in color and subtly personal.

As a reaction against the flat surfaces of impressionism, cubism is concerned particularly with the expression of bulk and solidity. This it does by means of colored cubes and cylinders, following the dictum of Cézanne: "Nature can be expressed by the cube, the cone, and the cylinder. Anyone who can paint these simple forms can paint nature." It is an art of organized space, linear form, movement, and color, dissociated from the actual appearance of things. The influences which contributed to its formation were Cézanne (q.v.), Seurat, the pointillist, and especially Negro and Polynesian sculpture. Matisse gave it its name and aided at its formation in 1908, but the real founder and leader had been and still was Pablo Picasso (born 1881), a Spanish sculptor. He was the author of its conventions, such as the guitar, clay pipe, the bottle of alcohol, printed letters, etc. He has well been called "the chameleon artist," as he has worked in many different manners, with cubism as a phase of his development. His color, at first sombre, had finally become frank and clear. Georges Braeque was the purist of the group, a logical, rigid cubist; Fernand Leger represented the mechanical aspect. Albert Gleize, a facile writer on cubism, was painting in two rather than three dimensions, while Jean Metzinger was an orthodox cubist of the cylinder and cube variety. Among other followers of the movement were Auguste Herbin, André L'Hote, half cubist, half realist; Jacques Villon; Marcel Duchamps, and François Picabia. Two poets, Guillaume Apollinaire and André Salmon, belonged to the cubist group and wrote in its interest. The influence of cubism, wide and in some respects wholesome, was in the direction of solidity and expression. Many painters in different lands experimented with and to some extent adopted it; but, in its rigid form, cubism is on the wane. Picasso's later works were more representative, under the influence of Ingres, and the tendency of the younger generation is to modify its austerities in the direction of romanticism—a distinct improvement. Among the most important of the younger men in Paris is Giorgio De Chirico, born 1888 in Greece of Greek parents resident in Italy. Influenced in youth by Böcklin, after passing through a youthful romantic period, he emerged as *surréaliste.* His art is mystic and symbolic, but with strange realistic effect, and his Greek origin is evident in the subject and spirit of most of his works.

There had latterly been many secessions from cubism, mostly ephemeral, such as Orphism and synchronism, which are concerned with arrangements of color irrespective of volume or actuality, and Dadaism, founded in Switzerland in 1917, by Tzarra, a Rumanian. This form of presentation, which had followers in France and Germany, is a kind of skepticism in painting, and was followed by others equally grotesque, and directed especially against cubism. It clears away the past and is satirical in character, better adapted to cartoons than to paintings, but is no longer of importance.

Italy. A later and more radical movement, futurism, forms Italy's peculiar contribution to modernism. It began as a protest of a band of young writers, painters, and sculptors against the idea that their country was nothing more than a vast museum of the past. Unlike the other modernists, the futurists break utterly with the past and look only toward the future; hence their name. The function of painting as they see it is to represent movement and growth, the dynamic forces of modern life. Many of their paintings bear the title "Dynamics" of this or that subject. As their manifesto put it: "We must make a clean sweep of all hackneyed subjects and express henceforth the whirlwind life of our day, dominated by steel, egotism, feverish activity, and speed." This they often seek to accomplish by means not unlike those of cubism, combining in the canvas not only what the artist sees but all he knows about the subject. A typical futurist feature is the use of so-called "force lines," certain linear rhythms whose convergence or divergence conveys to the artist the dominant thought or emotion he wishes to express. Color is purely arbitrary and may be used to heighten the effect. So may all manner of extraneous objects, which are simply pasted onto the picture. Futurist art indeed is cinematographic, except that it tries to show all at once what the moving picture unfolds in a given space of time.

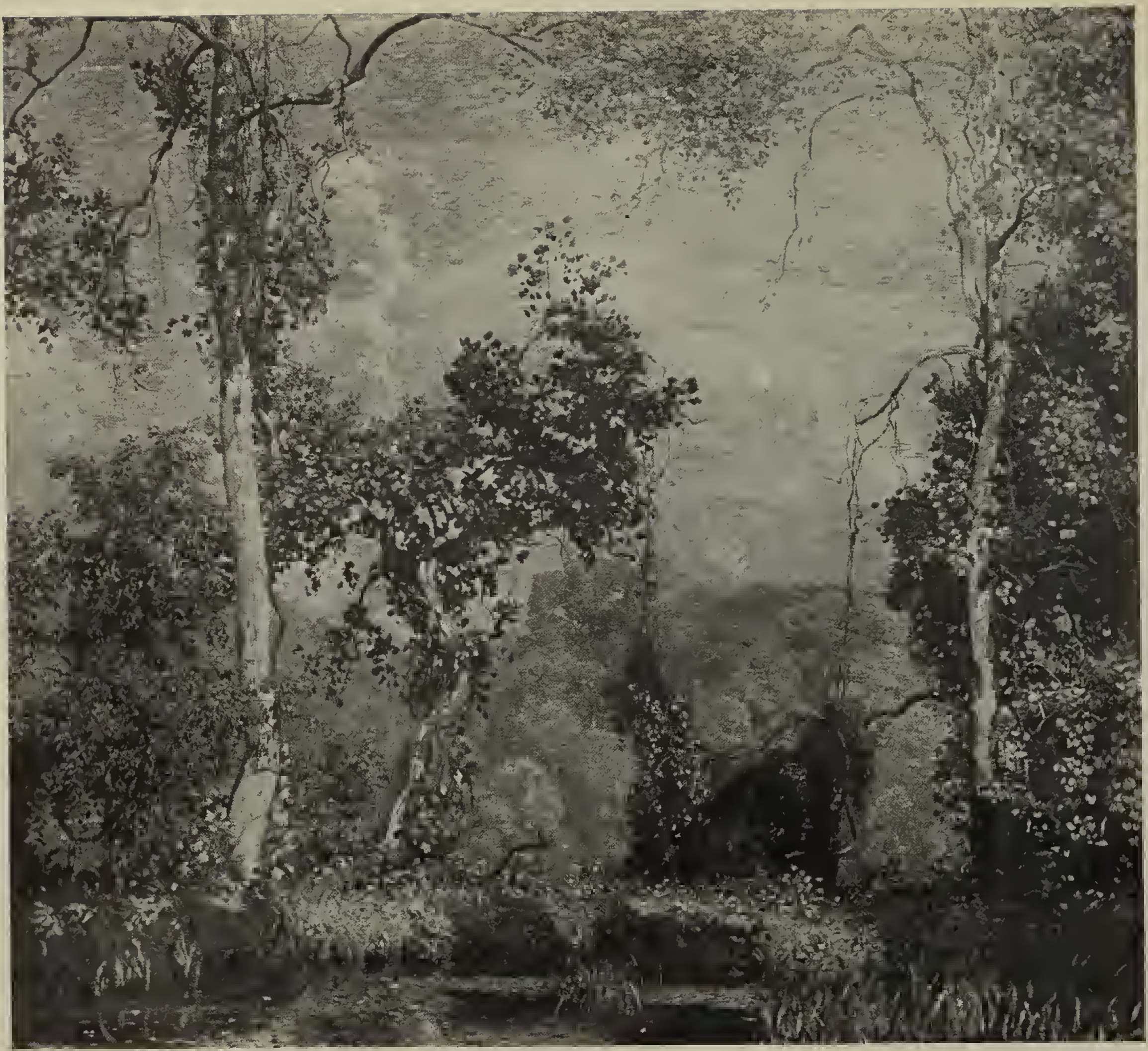
The founder of the movement was the poet Marinetti, who wrote its eloquent manifestoes.



From the Original in the Worcester Art Museum, Worcester, Mass.

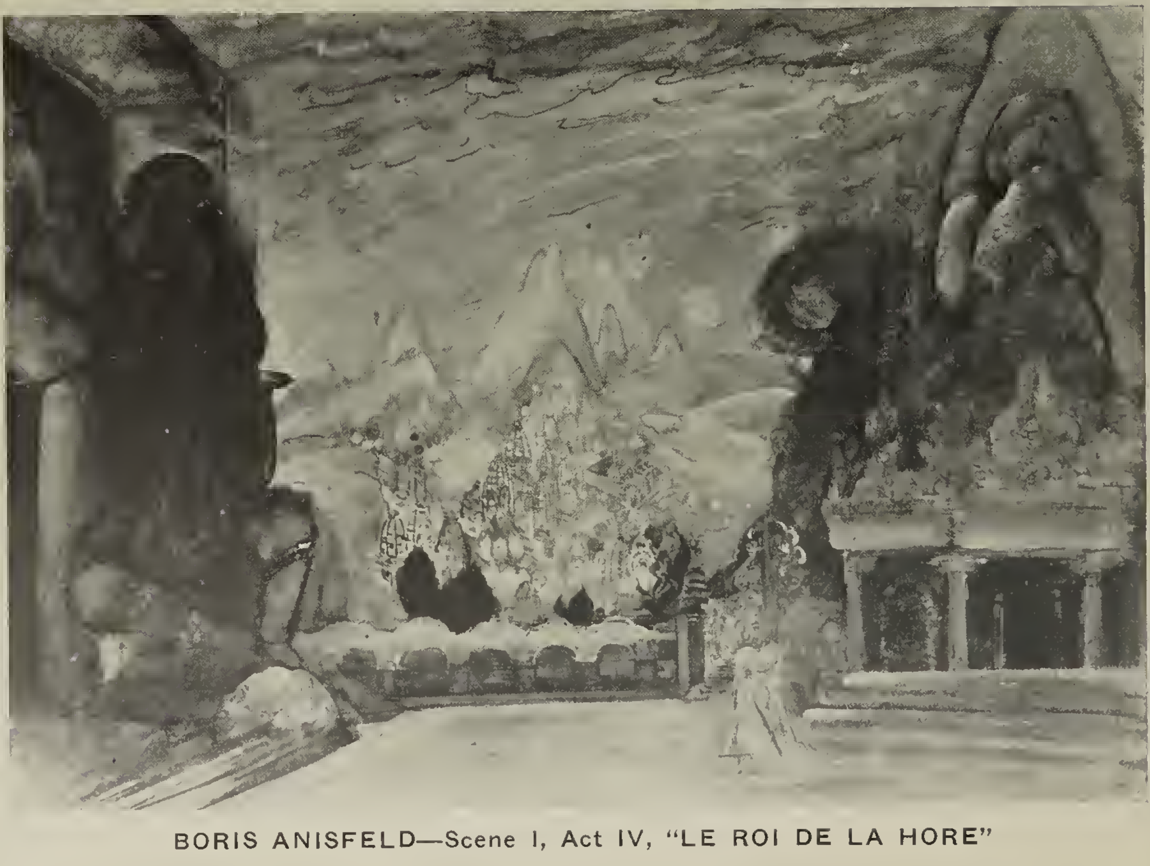
SIR WILLIAM ORPEN

"THE COSTERMONGER"



Courtesy of the Reinhardt Gallery

DANIEL GARBER—"HAWKS' NEST"



BORIS ANISFELD—Scene I, Act IV, "LE ROI DE LA HORE"

From 1910, when their first exhibition was held at Milan, to 1924, Lugi Russolo represented futurism in its most logical form. Umberto Boccioni, also a sculptor, was an able theorist on æsthetics, whose paintings are often of interesting design. Gino Severini was the illustrator of futurism, Carlo Carrà, its most genuine painter, who, unlike the others, uses gay color. Giacomo Balla's work is merely pretty. Many of the cubists were influenced by futurism and experimented with it, and vice versa. It had won but few new disciples and seemed destined to decline.

Great Britain. The latest effusion of modernism, vorticism, is a product of conservative Great Britain; but, before examining it, a brief survey of recent British art should be made. Although the chief influence was French, impressionism in its pure form never played a great part in Great Britain. It was rather the modified form of early impressionism, as introduced by the American Whistler during his long residence in London, which prevailed. This was concerned rather with decorative and tonal effects than with the pure study of light, especially in the case of the Glasgow school, out of which came Sir John Lavery (born 1856), especially known as a portraitist. The methods of the brilliant Irish painter, Sir William Orpen (born 1878), are more akin to impressionism, while Augustus John, a Welshman (born 1876), in his powerful characterizations, tends rather to modernism. Mention also should be made of two Americans, active in London, John Singer Sargent (1856–1925), whose superb technique combined realism with impressionism, and James J. Shannon (1862–1923), whose illustrative art ranges him properly among British painters. Frank Brangwyn (born 1867) represented rather the realistic point of view in his superb decorations for the Panama-Pacific Exposition and the Missouri State Capitol. The powerful individual landscapes of P. Wilson Steer show a transition from impressionist to modernist technique. An important figure in the introduction of French post-impressionism into England was Roger Fry, especially by his writings and exquisite connoisseurship. It was mainly the influence of Cézanne and Van Gogh that made itself felt and the aim was greater plastic effect but with more reference to nature than in France. Among the leaders were Spencer F. Gore (1878–1914) and Harold Gilman (1876–1919), who tended more strongly toward modernism, and Charles Ginner.

According to the theory of vorticism, "every concept, every emotion, presents itself to the vivid consciousness in some primary form. It belongs to the art of this form." The "vortex" is the artist's faculty through which the emotions and conceptions pass to take concrete shape on canvas. Through it, they pass from the general to the concrete. In common with post-impressionists, vorticists do not reject the old masters; but they agree with the futurists that modern art should reflect present-day industrial civilization, with its dominance by the machine. Their paintings are in general geometric and abstract, not unlike cubism. Their aim is to purify painting, and they rely especially on the primary pigment of their art, resembling in this regard the Orphists and synchronists. There was nothing essentially new and original in their art, which began in 1913, although several interesting painters had taken it up. The founder and principal leader was Wyndham Lewis (1884–), with whom were associated Cuthbert Hamilton, Frederick Etchels, Edward Wadsworth, and William Roberts. The poet of vorticism was an American, Ezra Pound; the sculptor was Henry Gaudier-Brzeska (1891–1915). Vorticism was also a passing phase in the development of C. R. W. Nevinson, who experimented in other styles, including cubism and futurism, only to return in his later work to a more conservative academic art.

During the War, the British government made the interesting experiment of employing several painters at the front, and many of their pictures were purchased by the Imperial War Museum. Most of the men employed were actually engaged in warfare and so painted from experience, as well as observation. In the choice of artists, a wise eclecticism was followed; not only accepted academicians but the most radical groups were included. And it was just these radicals whose art seemed especially adapted to the mechanical character of modern warfare. Among the most prolific of war painters was Sir William Orpen, a major in the army, whose portraits of the chief commanding officers are well known; James McBey, official painter of the Army of the Near East; George Clausen, and Augustus John, who painted important commissions for the Canadian government. The futurist technique of C. R. W. Nevinson grappled most successfully with searchlights, shells, and especially aëroplanes. Paul Nash, a visionary post-impressionist, depicted what might be called nature's "dance of death," while vorticism, through its leaders, Wyndham Lewis and William P. Roberts, showed itself well capable of representing the dynamics of modern warfare. All these artists wisely confined themselves to episodes of warfare and did not attempt battle paintings on a grand scale. One of the few good results of the War was the destruction of the old-fashioned battle picture, with its photographic detail, most characteristically seen in the works of Meissonier. The modern battle extending along a front of many miles cannot be painted. The brave array of soldiers has been replaced by the invisible crowds of the trenches. The brightly colored uniforms are now sombre browns, grays, and greens, and the modern soldier is little different in aspect from a workman. (See *War Paintings and Drawings*, by British artists, New York, 1919; and Charles Holme, "The War Depicted by Distinguished British Artists," in *The International Studio*, 1918.)

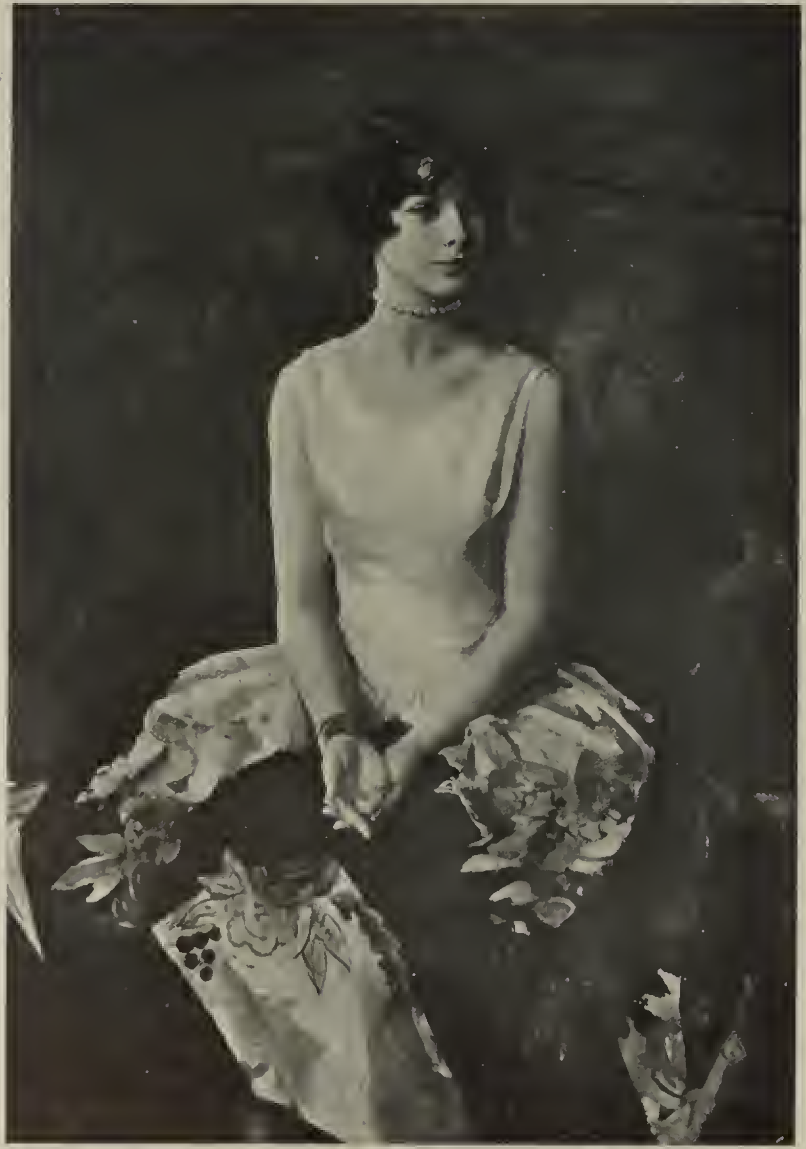
Germany. The World War and the succeeding years levied a heavy death toll on the painters of Germany. At the close of the period 1914–29, many of the older men were still active in the manner of their earlier work; Edward Gebhardt, religious painter, at Düsseldorf; Arthur Kampf, realist, at Berlin, and Max Liebermann, chief representative of impressionism and leader of the North German secessionists, also in Berlin; but these have since died. In Munich, the "decorative school," led by Franz Stuck, was somewhat akin to modernism in its realistic representation of mystic and allegorical subjects, inaugurated by Böcklin; but even this was considered conservative and official a little later. Impressionism was an importation which never secured a firm foothold in Germany. The native tendency was all toward its antipode, expressionism, for which the soil was well prepared by earlier painters. In the early sixteenth century, Matthias Grünewald distorted nature to express emotional mysticism much as El Greco did later in Spain. Hans von Marées (1837–87), rebelling against realism and early impressionism, sacrificed the appearance of things to volume and symbolic expression, in his noble decorative figures. The Swiss, Ferdinand Hodler (1853–1918), a powerful and arbitrary painter, developed in his later works a thoroughgoing expressionism. The influence of Cézanne, Van Gogh, and to a less extent Gauguin was early felt in Germany; but it was an exhibition of the works of the Norwegian, Edvard Münch, in Berlin which caused the separation of the new movement from the Berlin secession. Cubism and futurism never obtained an important following, for the principal German tendency was toward forms of purer expressionism. There were two chief groups, at Berlin and Munich. The former group was the less radical. The facile and decorative art of Max Pechstein is more akin to the post-impressionism of other lands, and so is that of Albert Werszgerber and Carl Caspar, all of whom were influenced by Cézanne. Among the members of a more radical group at Berlin called "Die Brücke" were E. L. Kirchner, its founder, a visionary who changes city scenes into fairyland; Erich Heckel, a painter of landscapes romantic in subject; Karl Schmidt-Rottluff, whose tendency is to the colossal and even brutal; and Otto Müller, who prefers rather lyric subjects, painted in tempera.

At Munich, Russian artists contributed to produce the most radical type of expressionism. Foremost among them was Wassily Kandinsky (born 1866), a theorist who writes as well as he paints. He maintains that the rhythm of line and color and of color in juxtaposition to color should be built up architecturally, on fixed principles of construction, as in music. Such an art appeals to the eye, independent of all representation, very much as music affects the ear. His pictures are arrangements of abstract line and color without attempt to represent nature. It was he who with a few others seceded from the other post-impressionists to form the group called, from its publication, "Der blaue Reiter." An important member of this group was Franz Marc (1880–1916), who painted impressions of animals in symbolic color. Others are Baroness Werefkin, Auguste Macke, Gabriel Munter, Adolf Block; Heinrich Campendonck, whose quaint presentations of village and other subjects are essentially imaginary and unreal; Oskar Kokoschka (born 1866), an Austrian painter, the most radical and perhaps the most powerful of all, less abstract, but equally eccentric, and powerful to the point of brutality; and also Emil Nolde and Carl Hofer, both at Berlin, who paint in a similar vein. Another Berlin painter, George Gross (born 1893) passed through various stages, including Dadaism, to become an ironical observer of society from the Marxian point of view, especially in his lithographs. Jules Pascin (born 1886), a Bulgarian, a clever and delightful draughtsman and painter, is well known in the United States for his Negro and similar subjects, painted in Florida and Cuba.

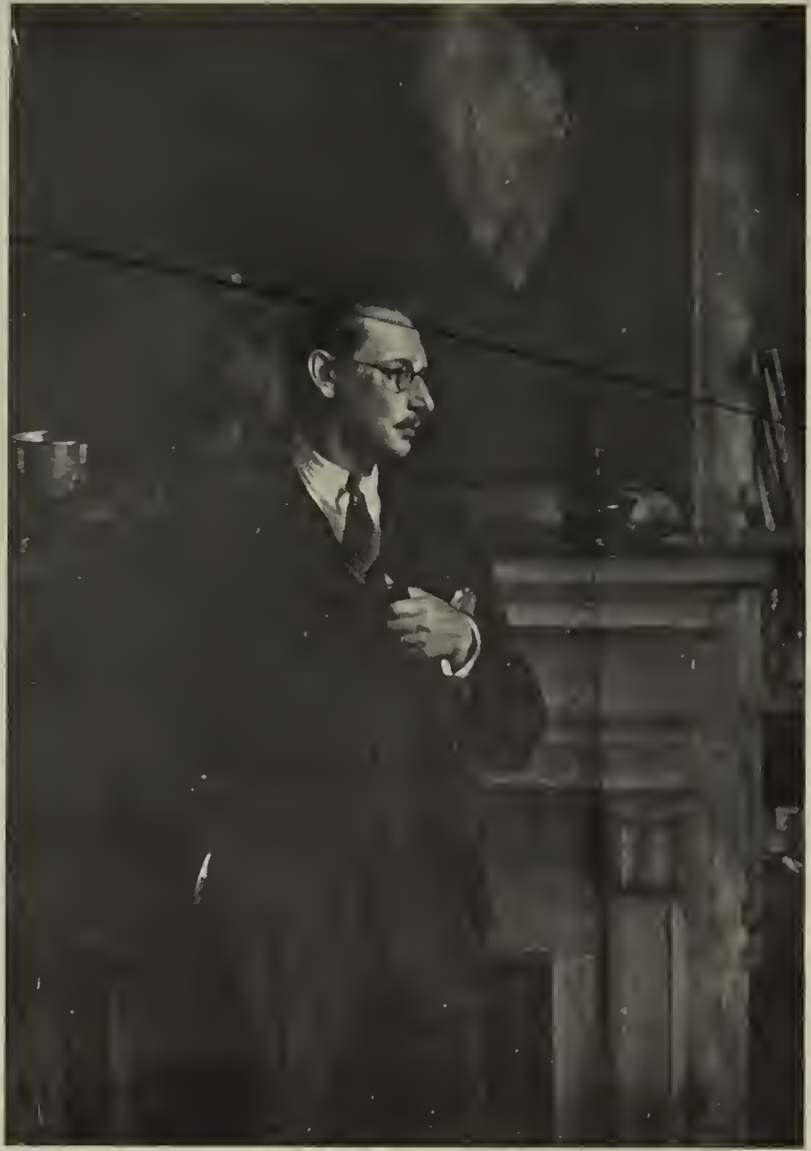
Russia. At the outbreak of the War, the Russian school of painting was of great importance and promise. Two factors contributed to make it unlike any other school: stage decoration and peasant art. The unparalleled success of the Russian ballet in Europe and America was due as much to its artistic settings as to superb dancing. Of unprecedented power and imagination, these decorations were all the work of Russian painters. Diaghilev (died, 1929), one of this St. Petersburg group, was the pioneer and the greatest painter-impresario in dramatic history. Other great designers were the painters Benois, Golovine, Léon Bakst, Anisfeld, and Larianov. The astonishing freedom of presentation in modern Russian painting and its highly imaginative and decorative qualities were due largely to this training. It was also profoundly affected by the pure, bright color schemes and the picturesque settings and costumes of native peasant art, and on its imaginative side by a vital school of book illustration, particularly of folk tales and subjects. The most important reaction against the realism of the Wanderers, chief of whom was Ilya Repin, was the "Mir Iskousstva" (Artistic World) at Leningrad. Unlike the former, which painted Russian contemporary life, this group sought subjects in the past, was cosmopolitan in character, and showed French influence. Alexander Benois chose the age of Louis XIV in France and that of Elizabeth in Russia; Constantine Somov, the period of 1830; Nicholas Roerich, the Viking age and, after his removal to the United States, Oriental subjects, especially Chinese and Tibetan. The Moscow group was less learned and more pictorial and chose Russian subjects. Its best-known representatives are Igor Grabar, a *pointilliste*, an influential figure in Soviet Russia, and especially Maliavin, who depicted the gay, animal side of the Russian moujik.

Meanwhile, various modernist tendencies had appeared in Russia, and their influence was beginning to be felt. The War put a stop to painting, and during the revolution and the years following most of the artists emigrated from Russia, chiefly because the wealthy class which patronized art had ceased to exist. They migrated to different centres, many joining the large Russian art colony in Paris, where they maintained their vital national art. Exhibitions of their works were held at various places in the United States. The exiles, who in Paris kept up their national art, included Fechin, a pupil of Repin, Choukhaiev, Jakolev, Sorin, a rather conservative portraitist, Soudeikin, Stelletski, Burliuk, and especially Boris Grigoriev, whose apocalyptic hallucinations of the Bolshevist Revolution and representations of the Russian populace, particularly on their brutal and bestial side, caused a sensation. Best known in the United States was Boris Anisfeld, who exhibited repeatedly in New York and in other cities.

In Russia itself, the revolution wrought little damage to existing art works. The more important public museums, such as the Hermitage in Leningrad and the Tretikov Gallery in Moscow, were greatly enriched by the confiscation of private collections; and the Imperial and other important palaces were transformed into museums. Throughout the length and breadth of the land, new museums were established. The successful management of public art institutions, which was conceded to be better than ever before, was due to the efforts of Lunacharski, Minister of Public Instruction. One of the daring schemes of Soviet Russia is the establishment of a new proletarian art. Rejecting cubism and futurism as bourgeois products, they acclaimed a new art, "suprematism," which denied not only all representation but even the styliza-



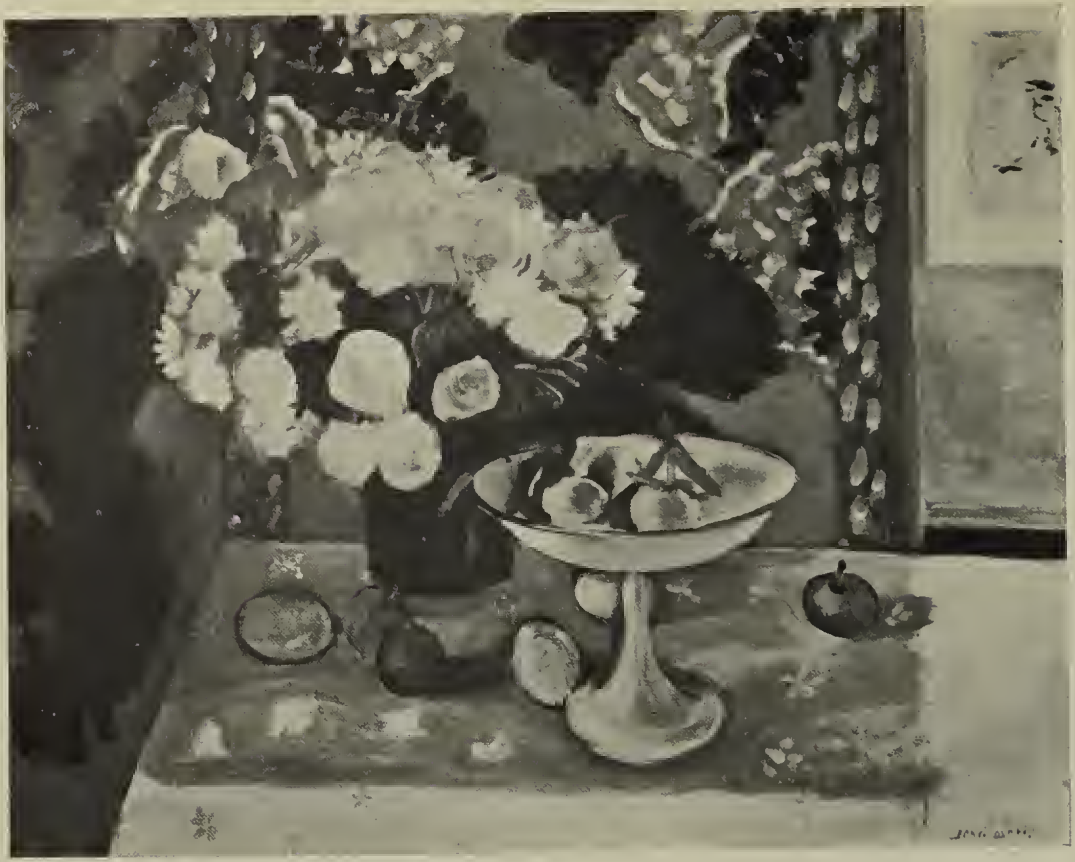
"MY DAUGHTER"
Henry R. Rittenberg



Courtesy of Grand Central Art Galleries

"SELF PORTRAIT"
Leopold Seyffert

MODERN AMERICAN PAINTING

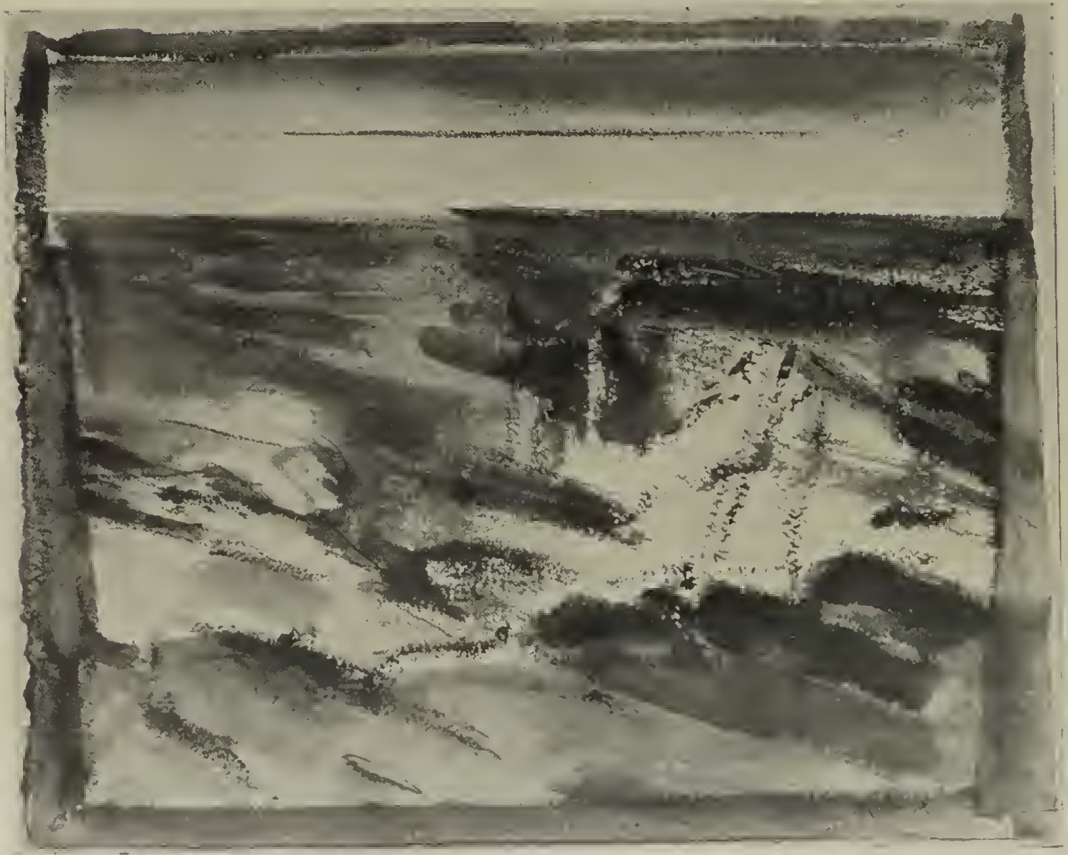


Courtesy of Carnegie Institute, Pittsburgh

"STILL LIFE"

HENRI MATISSE

First Prize Winner in Twenty-sixth Carnegie International, 1927



"GRAY SEA"

JOHN MARIN

Collection of Duncan Phillips

tion of natural forms. Kandinsky, whose art most approached this norm, was called from Munich to aid in its establishment, as well as in that of the provincial museums. Official exhibitions of Bolshevist paintings were held at Berlin in 1923, New York, 1929, and elsewhere. It was about the most modern exhibition ever seen. The paintings were usually labeled "constructions" or "compositions" and were built up mathematically. Simplification went even beyond Kandinsky's in the works of such as Malevitch and Robchenko. Everywhere, the search for new forms of art was in evidence. There were also many works of a more conventional character, and the impression of the whole was that of a living and vital art of telling forms and splendid color. Whether such modernist paintings fulfilled the requirements of a Soviet art as enunciated by Kamenev, "an art comprehensible to workmen and to peasants," is another question. In subject, it is indeed proletarian, but representation was confined almost to posters and black and whites.

Other European Countries. The virile national impressionism of Sweden suffered great loss in the death of its two chief representatives, Anders Zorn (1860–1920) and Carl Larsson (1853–1919). Liliefors painted wild animals, and Gustav Fjaestad painted snow and water scenes in *pointilliste* technique. Zorn's successor in painting the Dalecarlian peasantry was Mas Olle, another good portraitist. Sweden had also its due proportion of modernists, such as Axel Törneman; Gabriel Strandberg, who painted the outcasts of Stockholm; John Bauer, whose quaint imagination found expression in fairy tales; and Ossian Elgström, with a touch of the Laplander.

The dominant figure in Norwegian art was Edvard Münch, who was also something of a modernist, influenced somewhat by Cézanne. Ludvig Karsten was his most prominent follower. The foremost talent of the neo-impressionist group was Hendric Lund, while Sören Ansorger was known for his nudes. Norway also had its expressionist cult, influenced chiefly by Matisse; among its foremost representatives were Hendrik Sorensen and Axel Revold. The painting of Denmark was more conservative, although modernism had its representatives.

Belgium and Holland were strongly affected by the new movement, especially Holland. In a country which in its art had been so closely attached to the past and was realistic in character, it was astonishing to what extent the new movement had spread. Although Van Gogh, one of its chief pioneers, was a Dutchman, his last and most radical works were painted in France, and his influence entered Holland quite late; nevertheless, it was powerful. Among the chief representatives of the new development were Jan Toorup, Thorn-Prikker, Willem van Konijnburg, J. J. Isaakson, and Jan Sluyters.

The death of Sorolla in 1923 removed the foremost representative of impressionism in Spain. The most interesting manifestation of contemporary Spanish painting was the nationalist school of the North, founded by Zuloaga and ably seconded by numerous followers, including the Zubiaurre brothers. In subject and treatment, it was thoroughly national and continued the traditions of El Greco and Goya. It was a school decorative in style, with heavy outlines, rich, sombre color, and vivacious expression.

United States. Since 1914 American painting has followed a normal development, less changed by recent radical tendencies than other important schools. It was also less affected by the World War. During the early years of the conflict, artistic production was in no wise curtailed, and it was not until after the entry of the United States in 1917 that there was any perceptible diminution in the output. There was comparatively little painting of war subjects. The death toll among older American artists during the period was heavy. To mention a few of the most prominent, William Merritt Chase and Thomas Eakins died in 1916; Albert Ryder and Carroll Beckwith in 1917; Henry Golden Dearth in 1918; C. Y. Turner, Frank Duveneck (q.v.), Ralph A. Blakelock, James Alden Weir, and Kenyon Cox in 1919; Abbott H. Thayer and J. Francis Murphy in 1921; Hamilton Easter Field in 1922; Elihu Vedder, Joseph R. Decamp, Max Bohm, Paul Cornoyer, and George W. Maynard in 1923; D. Ridgeway Knight, Thomas Allen, and Jay Hambridge in 1924; John Singer Sargent, Henry Reuterdahl, and George Bellows in 1925; George Inness, Jr., Joseph Pennell, Thomas Moran, Mary Cassatt, and Ben Foster in 1926; Edward Henry Potthast and Frederick Melville Dumond in 1927; Harry Siddons Mowbray, Arthur B. Davies, Frederick S. Lamb, and Warren Davis in 1928. The former radicals of the Society of American Artists were the conservatives of the day, and even those of the next younger generation were now among the elect. All these continued their work, and many figured at the exhibitions and as medalists, such as Douglas Volk, Irving Wiles, Dewitt Lockwood, Cecilia Beaux (q.v.), Mary Cassatt, Frank Benson (q.v.) and Edmund C. Tarbell, among portraitists and figure painters; Waugh, Woodbury, and Emil Carlsen, as marine painters, the last especially taking many medals in the later years for marines and still life; Edward Redfield, Elmer Schofield, and Gardner Symonds, as painters of winter subjects; and Childe Hassam (q.v.), most pronounced impressionist among the older men.

Arthur B. Davies, (q.v.), known as leader of the modernists, continued his idyllic subjects with no end of variety and charm until his death in 1928. In the years following 1914, he passed through a cubist period, which added volume and construction to his rather decorative art but never exercised a dominant influence. So also did Robert Henri (q.v.), whose virile production and influence continued almost undiminished. Of his former pupils, George Bellows (1882–1925; q.v.), achieved great distinction through his bold and powerful portrait and figure subjects, which won medal after medal. Other important members of this group were George Luks, William Glackens, John Sloan, and Eugene Speicher. Powerful alike in characterization and technique are the portraits by Leopold Seyffert and those by Wayman Adams. Other portraitists known also as figure painters were John C. Johansen, Karl Anderson (q.v.), Joseph Pearson, Jean M. Lane, Louis Betts (q.v.), Leon Kroll, and Henry R. Rittenberg, also a consummate master of still life.

In the first rank of American figure painters was Charles W. Hawthorne (q.v.), who paints the inner life with beautiful and highly characteristic color. Of pronounced impressionistic technique among the younger men were Richard Miller, Frederick Frieseke (q.v.), and James

Weiland. Another characteristic branch of American painting is Indian subjects. The Taos group of painters, so called from their place of residence in New Mexico, in recent years painted many interesting representations of Indians, chiefly of the Southwest. Among their number were Julius Rolshoven, Carl Rungius, Walter Ufer, Ernest L. Blumenschein, Edward Potthast, and O. E. Berninghaus. Their work was generally impressionistic or realistic in character and of fine illustrative quality. The production of mural paintings has continued with unabated regularity. Among the most important series were the decorations of the Boston Museum of Fine Art, by John Singer Sargent (1856–1925); a series of 116 panels, the "Opening of the Book of the Law," by Violet Oakley (born 1874), in the Pennsylvania State Capitol at Harrisburg; and Augustus Tack's decorations of the governor's suite in the Nebraska State Capitol at Lincoln (1927), entitled "The Virtues of the Human Race," in a novel style reminiscent of Greek vase painting. Robert Chanler is known for his screens showing Chinese influence but independent and modernistic in conception and execution, and Arthur Crisp for various mural paintings.

Landscape painters among the younger generation were many. One of the strongest was Ernest Lawson, whose winter scenes are particularly fine. These subjects were preferred also by John Folinsbee and by Charles Rosen, who afterward changed his style in accordance with the modernist formula. Jonas Lie painted landscapes, industrial scenes, and, lately, marines, and Gifford Beal (q.v.), brightly colored landscapes, while Guy Wiggins was more tonal. Among the marine painters, Paul Dougherty painted the Maine Coast with powerful effect, and William Ritschel the Pacific, brilliantly and with versatility, while Hayley Lever was known especially for his boats, though he later painted varieties of landscapes with equal ability.

The entry of the United States into the World War had small permanent effect on painting. Among pictures intended to fire patriotic endeavor, the best known is "Carry On," by Edwin Blashfield (Metropolitan Museum, New York). An interesting series by Childe Hassam depicted Fifth Avenue in war time. An important series of war portraits, authorized by the National Art Commission and paid for by subscriptions in the principal cities of the United States, was presented to the National Museum at Washington. They were exhibited at the Metropolitan Museum in New York City in 1921; all were by painters of conservative tendencies. The most important was a large picture, "Signing of the Treaty of Versailles," by John C. Johansen. The others were portraits of the chief war celebrities of all the Allies, by Cecilia Beaux, Jean McLane, Joseph Decamp, Charles Hopkinson, Edmund C. Tarbell, Douglas Volk, and Irving R. Wiles. Another series presented to the National Museum consisted of portraits of Americans prominently identified with the War. Several of these were painted by J. H. von Rehling-Quistgaard, an able painter of rather conservative tendencies.

The brilliant success with which modernism was launched in New York and Chicago in 1913 gave great promise for the future of the movement; but this promise was not realized. Factional differences soon disrupted the International Association of Painters and Sculptors, which had organized the exhibition; and beyond separate exhibitions of smaller groups, little was heard of the new painting. In 1917 the Society of Independent Artists was founded with unrestricted membership to anyone paying the nominal initiation fee. Each member is entitled to send a limited number of paintings or sculptures to the annual exhibition. As there was no jury of acceptance and the paintings were hung in alphabetical order of authorship, these exhibitions presented a strange medley of pictures excellent and worthless, academic and modernist. Nevertheless, they formed an open forum, uncontrolled by official juries, for the radicals. The most interesting feature in the later years was the work of a group of native Indian artists, without technical training and therefore modernist enough. Their chief subjects were Indian ceremonial dances, painted in pure, bright water color. Modernist paintings were on constant exhibition at certain of the dealers', and in such altruistic institutions as the Intimate Gallery, conducted by the distinguished artist-photographer, Alfred Stieglitz, and the Société Anonyme, founded by Katherine Dreier—both in New York.

A very important event was the official recognition of modernism by the National Academy of Design in whose Spring Exhibition of 1927 modernist pictures were not only admitted but predominated. Among painters of modernistic tendencies were Rockwell Kent (q.v.), especially in his Labrador subjects; Kenneth Hayes Miller, of much influence as a teacher; Maurice Sterne and Max Weber, both admirable teachers; Andrew Dasburg, a follower of Cézanne, Samuel Halpert, and Henry McFee; Walter Pach, a cubist still-life painter; Abraham Walkowitz, an able draughtsman, William and Marguerite Zorach, and most important of all, John Marin, whose water colors are generally accepted. He is a painter of startling originality and real creative genius. Distinctly creative also, and very original are the flower paintings of Georgia O'Keefe. More cosmopolitan and less distinctively American than the two just mentioned are Marselen Hartley, Arthur G. Dove, Charles Demuth, S. McDonald Wright, Thomas Benton, Preston Dickinson, and Kuniyoshi, a Japanese who paints Western life with strange Oriental vision. Other representatives of modernism are Oscar Bluemner, Charles Sheelor, Walt Kuhn, Alfred Maurer, Peggy Bacon, Ben Benn, John Covert, A. S. Baylinson, Man Ray, Morgan Russell, Jay Van Everen, James Daugherty, and Henry Fitch Taylor. A new and interesting figure (1928)is Emil Ganso, born in Germany and self-educated in spare moments of a baker's labor. An original and powerful draughtsman, he excels in engraving, etching, and lithography, as well as in painting. The foremost representative of futurism in the United States was Joseph Stella, who with rare ability depicted the Brooklyn Bridge, the subway, and other characteristic features of New York.

Mexico. The 1928 revolution in Mexico brought in its wake an amazing development of mural painting by Diego Rivera, a native Mexican, and his followers. Schooled in Mexico and in Europe, where he was prominent as a modernist, he returned home to establish a truly national art. His mural paintings in the National Preparatory School, entitled "Creation" (1927) and executed in encaustic, symbolize the formation of the Mexican people. Those of the patio of the Ministry of Public Education upon which he is still engaged (1929), symbolizing native agriculture, industries, and arts and crafts, are grandiose and elemental in style and technique. They are painted *al fresco* by an ancient Mexican process in which the colors are mixed with the juice of leaves of the prickly pear, forming a soft smooth surface of dull lustre, but clear, distinct color.

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PALACIO VALDES, pä-lä′thyo väl-dās′, ARMANDO (1853–). A Spanish novelist (see VOL. XVII). His later works include *La guerra injusta* (1917), and *Años de juventud del doctor Angélico* (1918).

PALÆONTOLOGY, PALÆOLITHIC CULTURES. See ANTHROPOLOGY.

PALÉOLOGUE, pȧ′lȧ′ō̇′lō̇g′, MAURICE GEORGES 1859–). A French diplomat and man of letters (see VOL. XVII). He was Ambassador to Russia during the World War until May, 1917, and then returned to the Quai d'Orsay. On the resignation of Berthelot as director general of the Foreign Office, Paléologue succeeded him, in December, 1921, and served until 1925. In 1927 he was elected to the French Academy. His *An Ambassador's Memoirs* (3 vols., trans. 1923–25) throw a vivid light on the decomposition of the Russian Empire under the stress of the War. His other later works include: *The Romantic Diplomat* (1924, trans. 1926); *Cavour* (1926, trans. 1927); and *The Tragic Empress; Intimate Conversations with the Empress Eugénie* (1901–19) (1928).

PALESTINE, păl′ĕs-tīn). A British mandate territory and the Jewish national homeland, since July 1, 1920, under a civil administration. It includes that part of historic Palestine which lies to the west of the Jordan and which before the World War was a vilayet of the Turkish Province of Syria. Area, estimated at 10,000 square miles. The population, according to the census of Oct. 23, 1922, was 757,182, comprising 590,890 Moslems, 83,794 Jews, 73,020 Christians, 7028 Druses, 163 Samaritans, and 265 Bahais. The estimated population July 1, 1927, 882,000, included 648,556 Moslems, 147,687 Jews, and 76,839 Christians. The capital, Jerusalem, had a population of 62,678. Other principal cities are (populations in parentheses): Jaffa (47,709), Haifa (24,634), Gaza (17,480), Heckron (16,577), Nablus (15,947). Jewish immigration, which was resumed after the War, totaled 130,000 by Mar. 1, 1928; in 1927 immigration totaled 3395, while the emigrants numbered 6978. Jaffa is the principal port of entry; the immigrants came largely from Poland, Russia, Morocco, Austria, Syria, Bulgaria, Rumania, Egypt, Hungary, etc. Moslem interests are represented by a Supreme Moslem Council; Jewish interests are the concern of the Palestine Zionist executive.

Jewish Colonies. These colonies, totaling 115 in number, are grouped in four districts, viz., Judæa (43), Samaria (18), Lower Galilee (43), Upper Galilee (11). The colonies possess schools, synagogues, public libraries, hospitals, and baths. By the end of 1927, the total population of these colonies numbered more than 32,000 and the lands which they worked included some 267,000 acres. The colonies are owned or established by the Jewish National Fund, the Palestine Land Developing Company, Baron Edmund de Rothschild, and the Jewish Colonization Association. Tel Aviv, near Jaffa, founded by Jewish colonists in 1909, has a population estimated at 15,000 to 20,000.

Education. In 1927 there were 314 government schools. The Christian and Jewish children attended non-government schools. Christian schools numbered 183 (15,145 pupils), the Jewish schools 255 (26,481 pupils). There are Jewish high schools at Jerusalem and Jaffa, three teachers' training colleges, schools of music at Jerusalem, Jaffa, and Haifa, and a technical college at Haifa. In all these, Hebrew is the medium of instruction. The majority of the non-government schools were receiving state aid. There is a Hebrew University in Jerusalem, which was opened in 1925.

Industry. The productive portion of the country is the narrow strip of plain running along the Mediterranean from Gaza to Haifa. The richest region, in the neighborhood of Jaffa, was developed by Jewish colonists who carried orange and lemon cultivation here to a high degree of production. In 1927 crop production was: wheat, 99,406 tons; barley, 44,524 tons; durra, 37,441 tons; olives, 1866 tons; lentils, 3155 tons. There was in the country the following live stock: 242,625 sheep, 385,762 goats, 22,569 camels, 596 buffaloes. The orange crop, which constitutes the principal export item, totaled 2,214,000 cases during 1926–27. Mineral resources include sulphur, iron, coal, salt, limestone, sandstone, and gypsum. The Government is applying itself to reforestation and the reclaiming of the dunes. Trade, carried on largely through the ports of Jaffa, Haifa, and Gaza, consisted of imports of $31,339,416 in 1927; exports, $9,251,400. The chief articles of export are oranges, soap, melons, wine, apricot paste, and almonds; the chief articles of import are cottons, cigarettes, sugar, petroleum, and rice. The principal countries of origin in 1927 were Egypt, the United Kingdom, Syria, and Germany. Exports went to Egypt, Syria, and Great Britain. Imports from the United States were valued at $1,335,400 and exports to the United States amounted to $231,000.

Finance. Receipts for 1928 were estimated at £P2,322,935 and expenditures at £P2,443,677 (the new Palestine pound is equivalent in value to the pound sterling). The revenue was derived principally from: customs, £P750,000; port and marine, £P5200; licenses, taxes, etc., £P740,400; fees of court, etc., £P215,200; posts and telegraph, £P176,850; railways, £P368,000. A new currency, based on the pound sterling, was introduced on Nov. 1, 1927, and is guaranteed by both the British and Palestine governments. The Palestine pound, as the new unit is called, is divided into 1000 mills, and replaces the Egyptian currency hitherto in circulation. The exchange of currency was completed Mar. 31, 1928.

Railways. There were in operation in 1928 737 miles of railways, of which 612 miles were being operated by the government of Palestine, and 125 miles by the Palestine Railways for the British Air Ministry. The most important lines are the Kantara-Haifa (259.5 miles), Jaffa-Jerusalem (54.2 miles), Rafa-Beersheba (37 miles).

Government. By the constitution of Sept. 1, 1922, executive power was vested in the High Commissioner, appointed by Great Britain. A legislative council, of 10 official members and 12 unofficial, of which at least two were to be Christians and two Jews, was given the power to legislate for the mandate territory. The High Commissioner might veto any ordinance, or the British government might disallow it. By 1929 the Legislative Council had not yet been convened because of the abstention of the Arabs from the polls. The Jews chose an elected assembly, which in turn appointed a national committee to treat with the Palestine government. The British mandate for Palestine was approved by the League of Nations Council on July 24, 1922, and was promulgated on Sept. 29, 1923. On July 1, 1920, Sir Herbert L. Samuel became High Commissioner. He was succeeded on July 1, 1925, by Field Marshal Lord Plumer, who was followed on July 6, 1928, by Lieut. Col. Sir John Chancellor. See also JEWS AND JUDAISM; ZIONISM.

History. By the secret Sykes-Picot Agreement of May 16, 1916, France and England had agreed that the ports of Haifa and Akka in Palestine should be assigned to Britain, and that Palestine as a whole should be "separated from Turkish territory and subjected to a special régime to be determined by agreement between Russia, France, and England." Not content with this ambiguous pledge, the British government manœuvred to obtain sole jurisdiction over the region. Of fundamental importance in this British move was the celebrated Balfour Declaration of Nov. 2, 1917. This utterance pledged the British government to "establishment in Palestine of a National Home for the Jewish People . . . it being clearly understood that nothing shall be done which may prejudice the civil and religious rights of existing non-Jewish communities in Palestine or the rights and the political status enjoyed by Jews in any other country."

The British policy set forth in the Declaration proceeded from two motives. As a war measure, the Declaration was calculated to win the international Jewry to the cause of the Entente. Of much greater importance, however, was the knowledge that Palestine had been from time immemorial the connecting link between Mesopotamia and Egypt and that it was the strategic point which potentially controlled the road to India by land and by sea. The establishment of a Zionist state under British protection gave Great Britain this coveted possession, and, while it cemented the foundations of the British Empire, homage was done at the same time thereby to the Allied slogan of "self-determination of nations." The British project, a combination of altruism and imperial *Realpolitik,* had some serious drawbacks which had been left out of consideration. First, modern Palestine was not a Jewish country. Secondly, Arab nationalism, of which Great Britain itself had been the chief instigator during the War, was naturally opposed to the whole idea. Finally, Palestine was not only the natural link between Mesopotamia to the northeast and Egypt to the southwest, but it was also at the mouth of a great reservoir of Arab man-power to the south. The attempt to close this outlet by an artificial Jewish state under the protection of the British Empire was naturally fraught with danger, and all the more so since the Balfour Declaration conflicted, in the opinion of the Arabs at any rate, with the British commitments to the Sherif of Mecca in 1914 and 1915.

Palestine was in an exhausted condition. The land was untilled and production had fallen to a low ebb. The population had decreased considerably during the War and the whole system of civil government had fallen to pieces. Immediately after the occupation, the British set up a military administration which after much effort succeeded in bringing about an improvement. Gradually, cultivation was restored and normal life began to return, but much more had to be accomplished. Palestine had always been undeveloped and underpopulated under Turkish rule, and the British aim was to bring out the great latent fertility of the country. As for the Jewish population, which had been very small during the nineteenth century and had risen to about 100,000 before the War, it formed in 1918 only a fraction of a total population which was predominantly Arabic.

On Sept. 27, 1919, Zionism, which had been a force in the Jewish world for some time before the War, pleaded its case before the Supreme Council and asked for the recognition of the historic title of the Jews to Palestine and for the right to reëstablish there a national home. Furthermore, the Jews requested that Palestine be assigned to Great Britain as a mandate. After a long delay, during which the first manifestations of Arab national sentiment against this proposed settlement occurred, the Supreme Council at the Conference of San Remo, Apr. 25, 1920, granted the mandate to Great Britain and in July of the same year the military administration was replaced by a civil régime under Sir Herbert Samuel, a prominent English Jew, as High Commissioner. In October, 1920, an advisory council was set up, consisting of 10 officials of the administration, 4 Moslems, 3 Christians and 3 Jews. Much attention was given to local government and 22 municipalities and 14 local village councils were established. As for education, the Turkish system was reorganized and extended. The Moslem children attended the government schools where Arabic was the principal medium of instruction, but most of the Jewish children went to schools conducted by the Zionist Organization and the Christian children attended the schools maintained by the ecclesiastical and charitable bodies. Considerable progress was made in the direction of public health and sanitation. The law of the land was in substance that of the Turkish code. The abolition of the Capitulations, which had been decreed by Turkey at the outbreak of the War, was maintained, except in the case of the United States. Foreigners were tried by a British magistrate or by a court with a majority of British judges. Public security was maintained by a police force and gendarmery recruited from all sections of the population.

The Zionist claims to Palestine were recognized in the Peace Treaty of Sèvres, and the Balfour Declaration was incorporated in the text of that document. After much contention between the English and the French over the boundaries between Palestine and Syria, a convention defining these was signed on Dec. 23, 1920. A final agreement relative thereto was concluded on Feb. 3, 1922. The draft for the Palestine mandate was submitted to the League of Nations on Dec. 7, 1920, and approved in July, 1922. Its promulgation was delayed, however, due to the opposition of the Italians to the French Syrian mandate with which the Palestine mandate was bound up. The mandate realized practically all the demands of the Zionists at the Paris Conference in 1919. The region to the east, known as Transjordania, was under the authority of the High Commissioner, but was not included in the area of the Jewish National Home. Subsequently, Abdullah, son of the King of the Hedjaz, was established as Amir of this region.

Meanwhile, the nationalist sentiment of the Arab majority chafed against these arrangements. Serious riots took place in Jerusalem in April, 1920. In February, 1921, a congress of the Palestinian Arabs was held, at which protests were registered against the Balfour Declaration and demands were made for a national government and a legislative assembly to be elected by the Arabic-speaking population residing in the country before the War. A permanent committee was set up to work in this direction. On May 1, 1921, the anti-Jewish feeling manifested itself in widespread disturbances in the course of which military force had to be employed to restore peace. This led to a thorough investigation of the affairs in Palestine by a commission, in the report of which the Arab grievances were analyzed and both sides were exhorted to refrain from all expression of extremism and to work in a spirit of moderation for a lasting understanding and for the development of the country; but the report upheld the policy of the Balfour Declaration and said nothing which could allay the apprehensions of the Arabs. In order to settle the difficulties, the British government drafted a constitution for Palestine, the chief provisions of which were given to the press in February, 1922. According to this document, supreme executive authority was to be vested in the High Commissioner, who was to be assisted by an executive council. Provision was made for the establishment of the Legislative Council, to consist of 10 officials and 12 unofficial members, the latter to be elected under a system of primary and secondary elections. The acts of the Legislative Council were to require the assent of the High Commissioner or in certain cases that of the British government. In regard to the judicial system, provision was made for the setting up of separate Moslem, Christian, and Jewish religious courts with English, Arabic, and Hebrew as the official languages. The British government was to be the arbiter in complaints regarding nonfulfillment of the terms of the mandate, but the procedure in such cases was to be prescribed by the League of Nations.

After the publication of the draft of the Constitution, a delegation, claiming to represent the entire Christian-Moslem population of Palestine, went to England to protest against the provisions. The chief complaint of the Arabs centred on the limited self-government which was to be bestowed on Palestine and it was claimed that such restriction was contrary to Article 22 of the Covenant of the League of Nations. The reply of the British government made clear that a different course and in particular the establishment of a national government was not open to Great Britain, since this would involve an abandonment of the pledge regarding a Jewish National Home. The British, in fact, could not repudiate the policy of the Balfour Declaration if they wished to retain their hold on Palestine. In view of the powerful possibilities inherent in Arab nationalism, it was doubtful whether an Arab Palestine would have been as pliable an instrument in British hands as a Jewish Palestine was. The Arabs, on the other hand, could not very well recede from their position of opposition to Zionist rule in view of the fact that the Jews constituted only a fraction of the total population of Palestine. According to the figures of the official census of 1922, which divided the population along religious lines, the total population in that year was 755,000, composed as follows: Moslems, 589,564; Christians, 73,026; Jews, 83,794; Druses, 7028; other religions, 1446. Most of the Christians spoke Arabic, were racially akin to the Arabs, and sided with the latter against the Jews.

A lengthy declaration of the British policy, issued in July, 1922, attempted to allay the apprehensions of the Arabs. It referred to these as "partly based upon exaggerated interpretations of the meaning . . . of a Jewish National Home in Palestine" and stated at the same time that the Balfour Declaration was "not susceptible of change." While the Zionist Organization declared itself satisfied with this declaration, the Arab delegation refused to accept it and returned home in the fall of 1922. Thereupon, the Arabs decided to boycott the elections for the Legislative Council which were held in the beginning of 1923. Sir Herbert Samuel then suspended the part of the constitution dealing with the Legislative Council and substituted an appointed Advisory Council. This Advisory Council, which was to consist of eight Moslems, two Christian Arabs, and two Jews, was, however, impossible of formation, because, under pressure from the Nationalists and particularly from the Arab delegation which had recently returned from London, most of the prospective members refused to serve on it.

Meanwhile, there were rumors of an agreement between Great Britain and the King of the Hedjaz under which Palestine was to become part of the domain of the latter. In spite of the Government's denial of the truth of these rumors, considerable excitement ensued and the Sixth Palestine Arab Congress, which met in June, 1923, found it necessary, in view of the conflicting opinions prevailing among Moslems, Christians, and Jews, to declare that it was opposed to any such course. After the Congress, another delegation was sent to London, which soon returned, its mission having been a failure. The confirmation in 1923 by the League of Nations of the British mandate for Palestine and the consequent legalization of the existing status failed to impress the Arab population, which continued its intransigent attitude. The Government's offer for the creation of an Arab Agency similar to the Jewish Agency meeting the adamant opposition of the Arabs, the Government proceeded to form an Advisory Council consisting of officials only. At the same time, a new moderate Arab Liberal Party sprang into existence, which, in spite of its opposition to the old party, failed to evince much moderation in its programme. The year 1923 was marked by a final settlement of the frontiers of Palestine and Syria through agreement between the mandatory powers and by Great Britain's recognition of Abdullah's Transjordanian government as an autonomous state under British protection. See TRANSJORDANIA.

In 1924 the League Mandates Commission drew the attention of the League Council to the difficulty involved in trying to establish a Jewish National Home and protecting the rights of an overwhelming Arab majority in the same small mandate; but neither the Council nor England made a move at the time. Meanwhile, Jewish immigrants flocked into Palestine, chiefly from Poland and other parts of eastern Europe where they were being persecuted. The year 1925 saw 33,801 Jews enter the land, but this was an exceptional year. Many of the newcomers, however, found the agricultural labor so thankless and so utterly distasteful, that they left the country again. Thus, in 1925 the emigrants numbered 2141. In 1926 the number of Jews entering was 13,081, while over 9000 left, and in 1927 only 2713 came into Palestine, while 5071 went out. Naturally, the greater the number of Jews who entered the Holy Land, and the more they developed Jewish industries (e.g., the Palestine Electric Company), farms, and schools, the more bitter and resentful did the Arabs become. A constantly recurring series of crises was reached over the so-called Wailing Wall incidents. See ZIONISM.

The Wailing Wall supposedly was a relic of Solomon's Temple, and the Jews had an age-old practice of worshiping and praying alongside it. The Moslems, on the other hand, worshiped at the Mosque of Omar, adjoining the Wailing Wall. The spot was sacred to them since they believed that Mohammed sojourned there during a miraculous visit to Jerusalem. It was at this mutually holy place that many of the riots and conflicts of post-war Jerusalem had their origin. The severest of these outbreaks down to 1929 took place late in August of that year, while Sir John Chancellor, who had succeeded Sir Samuel on July 6, 1928, was High Commissioner. This time, the Arabs, egged on by the Grand Sherif of Mecca, as some believed, instituted a wholesale massacre of Jews throughout the mandate. The British government (the second MacDonald Labor government) rushed several warships and air squadrons to the scenes of disorder, and restored comparative quiet within two or three weeks. For a time, it seemed as though the Arabs from the French mandate of Syria might invade Palestine and aid their kinsmen, but the French took active steps to prevent this. The number of Jewish dead was well over 100. The Arabs, who were mercilessly attacked by the British, lost an approximately equal number.

At the September, 1929, meeting of the League Assembly at Geneva, Premier MacDonald announced his government's intention to continue adhering to the Balfour Declaration and to refuse to countenance any change in the mandatory arrangement. Chancellor remained as High Commissioner, and a committee of investigation was appointed to study and report upon the fundamental causes for the inability of the Arabs and Jews to live side by side in peace. See also ARABIA; CALIPHATE.

PALMER, A(LEXANDER) MITCHELL (1872–). An American lawyer and United States Attorney General, born in Moosehead, Pa., and educated at Swarthmore College. After studying law, he was admitted to the bar and practiced for several years in Stroudsburg, Pa. He was a member of Congress from 1909 to 1915 and in the latter year was appointed judge of the United States Court of Claims. This post he resigned after a few months. He was appointed Alien Property Custodian in 1917 and served until 1919, when he was appointed Attorney General in President Wilson's Cabinet. He was prominently mentioned as a presidential candidate in 1920. Following his retirement from political life, he resumed the practice of law.

PALMER, FREDERICK (1873–). An American author and war correspondent, born at Pleasantville, Pa., and educated at Allegheny College. From 1895 to 1897, he was a newspaper correspondent in London. As a war correspondent, he witnessed the Greek War in 1897. During the Spanish-American War, he was in the Philippines and accompanied the expedition for the relief of Peking, China, in 1900. Other campaigns in which he was correspondent were those in Central America and in Macedonia in 1903. He was also a correspondent in the Russo-Japanese War and accompanied the American Battleship Fleet in its round-the-world cruise (1907–08). He investigated conditions in Central America in 1908–09 and witnessed the Turkish revolution in 1909 and the Balkan War of 1912. From 1914 to 1916, he was accredited correspondent of the American press with the British Army and fleet and in 1917 was commissioned major and lieutenant colonel in the United States Army Signal Reserve Corps. His writings include *Going to War in Greece* (1897); *The Ways of the Service* (1901); *Central America and Its Problems* (1910); *My Year of the War* (1915); *My Second Year of the War* (1917); *America in France* (1918); *Our Greatest Battle* (1919); *The Folly of Nations* (1921); *Invisible Wounds* (1925), and *Clark of the Ohio: A Life of George Rogers Clark* (1929).

PALMGREN, SELIM (1878–). A Finnish composer, born at Björneborg. After graduating from the Helsingfors Conservatory, he continued his pianistic studies in Berlin with Ansorge, Berger, and Busoni. He was conductor of a choral society in Helsingfors from 1902 to 1904 and during 1909–12 conducted the orchestral concerts of the Music Society in Åbo. He has appeared extensively as a concert pianist and guest-conductor in Finland and Scandinavia. In 1909 he married the famous Finnish soprano, Maikki Pakarinen. In 1921–22 both artists made a very successful tour of the United States. Palmgren's compositions are original and beautiful music and yet conform to established standards. He wrote two operas, *Daniel Hjort* (Helsingfors, 1910) and *Peter Schlemihl* (not produced); a symphonic poem, *Floden;* incidental music to *Tukkimo;* three concertos for piano and orchestra, and songs and male choruses. Special mention should be made of his compositions for piano solo, which show his genius at its best and deserve to rank with similar works of Grieg.

PAN-AFRICAN MOVEMENT. See AFRICA.

PANAMA, păn'á-mä'. A Central American republic situated between Colombia and Costa Rica. Area, 32,380 square miles; population, census of 1923, 442,522, a gain of 29 per cent over 1910. The Canal Zone (not included in the above) had 71,682 inhabitants in 1911 and 28,002 in 1928, of whom 7482 were Americans. Panama, the capital, in 1920 had 59,458 (37,505 in 1911); Colon, 31,203 (17,748 in 1911). In the 446 government public schools, 54,214 children were enrolled in 1927. In 1911 a national college, the Instituto Nacional, was erected.

Industry and Trade. Only a small area is cultivated. The leading crops are bananas, coffee, cacao, caoutchouc. Sugar and tobacco are beginning to attain importance. As a result of the extensive cattle raising, the export of hides is large. In 1927 banana export reached 4,623,000 bunches, valued at $2,987,000. The coffee crop for the year 1928 was estimated at 1,800,000 pounds, twice as much as in 1926. In 1927 imports were valued at $14,109,552 and exports, at $3,795,660. In 1919 imports were valued at $11,407,000 and exports, at $3,757,000. In 1925 the United States supplied 67.6 per cent of the imports and took 88 per cent of the exports. Similar figures for Great Britain were 9.4 and 3.9. Bananas annually account for more than half of the exports. Others are coconuts, balata, hides, gum, sugar. Principal imports are cotton, iron, steel, flour. All the international commerce of Panama moves through the ports of Colon, Panama City, and Cristobal and Balboa in the Canal Zone.

Finance. The finances, reorganized by an American fiscal agent, are based on a biennial budget and are under the control of the fiscal agency of the Panama government whose duties are outlined in an executive decree of June 20, 1929. For the period 1913 and 1914, the budget balanced at $7,682,428; for 1929–31 the budget balanced at $17,031,907 with every effort being made to increase revenues and introduce economies. The public debt on Oct. 1, 1927, exclusive of bonds of the National Bank guaranteed by the Government, totaled $13,491,000 (external debt, $10,333,500).

History. The constitution, as amended Dec. 26, 1918, provided for a President directly elected and ineligible as his own successor, and a directly elected Chamber of Deputies. In each case, the term was for four years. The provincial governors were also to be popularly chosen. Presidents for the period were: 1912–1916, Belisario Porras; 1916–1920, Ramon M. Valdez (died), Ciro L. Urriola; 1920–1924, Belisario Porras; 1924–1928, Rodolfo Chiari; and from Oct. 1, 1928, Florencio Harmodio Arosemena.

By the Thompson-Urrutia treaty between the United States and Colombia (finally ratified in 1921), the latter recognized Panama's independence, and the Colombian boundary to the east was finally fixed. A protocol signed at Washington, May 8, 1924, established diplomatic relations between Colombia and Panama. Panama having been an Associated Power in the War, became an original member of the League of Nations. Panama's continued refusal to accept the White decision (1914) in respect to her boundary dispute with Costa Rica led troops of the latter to seize the town of Coto on Feb. 28, 1921. The danger of general hostilities caused the United States to offer its good offices, which both sides accepted on March 9. The United States insisted that the White award be accepted, and Panama, still protesting, was compelled to withdraw her troops from Coto. The question remained unsettled so far as Panama was concerned, though diplomatic relations with Costa Rica, broken off in 1921, were restored on Oct. 1, 1928, at the initiation of Chile. In 1922 the Hay-Bunau-Varilla Treaty of 1903 with the United States was the subject of discussion in Washington, the purpose being the removal of those causes of friction under which Panama had chafed for two decades. These included property valuations for the Canal Zone, a free port, docking privileges, etc.

In 1924 negotiations were begun for the revision of the Taft agreements of 1904 regarding the Canal Zone. The agreements were abrogated on June 1, 1924, and supplanted by a commercial treaty signed July 28, 1926. Under this treaty, the United States agreed not to set up any business in the Canal Zone which would compete with the commerce of Panama. Further, Panama obligated herself to help the United States defend the Canal in time of war, and promised to consider herself in a state of war whenever the United States might be a belligerent. If necessary, too, the entire Republic of Panama would be turned over to the United States as a war measure. This treaty was rejected by the Panama National Assembly on Jan. 27, 1927, whereupon the United States Senate refused to negotiate any further.

Later in 1927, the president of the Panama Association of Commerce charged at the Pan-American Commercial Conference that the United States was operating stores in the Canal Zone, thus driving native merchants out of business. This charge was repeated by a group of American business men in a letter to President Coolidge on May 13, 1927. The State Department explained that there was nothing wrong about this since the treaty of 1926 had not yet been ratified by Panama. Throughout 1928 Panama continued to refuse ratification on the ground that the treaty was incompatible with the country's obligations as a member of the League of Nations.

PANAMA CANAL. This great engineering work was opened to traffic Aug. 15, 1914, and since that time has proved an ever-increasing factor in the commerce of the world. In the first 15 years of its operation, 54,021 commercial vessels had passed through the canal paying $223,751,682 in tolls and carrying a total of 249,777,467 long tons of cargo. It is used by ships of practically all nations having merchant shipping and has served to reduce materially the time and cost of transportation from one continent to another. The canal was opened in 1914 notwithstanding the fact that in the latter part of 1913 there had been serious earth slides in Culebra Cut, and on Oct. 13, 1914, navigation was seriously interfered with until the material could be dredged out. These slides have occurred from time to time and cut off traffic from September, 1915, until Mar. 27, 1916; but since that time, with constant dredging and a careful study of local conditions, it has been possible to keep the canal open to traffic.

As the canal found increased use, docks, warehouses, and repair facilities were provided at either end, and the harbors were dredged to give access for the largest vessels using the canal. Fortifications protecting the canal and its works were constructed, and every effort was made to secure its maintenance and operation on an economical and efficient basis. In fact, it was not many years before the canal more than paid all operating costs, and while this did not take into consideration the overhead and the interest on the original outlay, yet it prevented the canal from being a burden to the nation. The tolls for the first 15 years of the canal came to within $50,000,000 of paying the commercial cost of the canal, $275,000,000 representing this item, and $113,000,000 being charged to national defense. The cost of the Panama Canal up to the close of the fiscal year ending June 30, 1929, including the balance of appropriations still on hand and available for work in progress, was $388,000,000, from which should be deducted receipts from the sale of construction material and equipment and the value of buildings and plant turned over to the United States Army and the Alaska Railways. Additional expense was of course involved for government sanitation, payment to the Panama government, etc; but the sum mentioned covered the actual current cost of the project. See UNITED STATES.

The growing use of the Panama Canal is indicated by the accompanying table and particularly by the statement that during the calendar year 1928, 6334 commercial vessels passed through the canal, a greater number than in any previous year. These vessels had an aggregate net tonnage, Panama Canal measurement, of 28,943,437, carried 29,401,581 tons of cargo, and paid $26,375,962 in tolls. A total of 3317 commercial vessels made the transit of the Canal from the Atlantic to the Pacific, as compared with 3017 from the Pacific to the Atlantic.

Calendar year	No. of ships	Panama Canal net tonnage	Tolls	Tons of cargo
1914 [a]	350	1,284,293	$1,508,737.56	1,758,625
1915 [b]	1,154	3,902,512	4,297,467.11	4,893,422
1916 [b]	1,217	3,817,704	3,671,162.68	4,774,822
1917	1,960	6,217,054	6,107,696.63	7,443,610
1918	2,070	6,409,886	6,317,455.39	7,284,159
1919	2,130	6,932,984	6,973,095.30	7,463,151
1920	2,814	10,378,265	10,295,362.21	11,236,119
1921	2,783	11,435,811	11,261,098.80	10,707,005
1922	2,997	12,992,573	12,573,407.77	13,710,556
1923	5,037	24,737,437	22,966,838.18	25,160,545
1924	4,893	24,411,760	22,809,416.34	25,892,134
1925	4,774	22,958,158	21,380,759.70	23,701,277
1926	5,420	25,836,241	23,901,540.04	27,586,051
1927	6,085	28,610,984	26,231,022.94	29,102,538
1928	6,334	28,943,437	26,375,962.41	29,401,581
Total	50,018	218,869,099	206,671,023.06	230,115,595

[a] Canal opened to traffic Aug. 15, 1914.
[b] Canal closed about three months by slides.

An important development was the increasing use of the Panama Canal for the transportation of petroleum by tank vessels (see PETROLEUM), for the most part loaded on the coast of California. During the calendar year 1928, 981 of the tank ships with a tonnage of 5,306,030 net tons passed through the Panama Canal, paying $4,639,012.34 tolls, and carrying 4,954,422 tons of cargo. This was 15.5 per cent of the total number of transits during the year, 18.3 per cent of the total Panama net tonnage, 17.6 per cent of the tolls collected, and 16.9 per cent of the cargo carried through the canal. The traffic in 1928 showed a decline from 1927 of 2,129,058 tons of cargo. In the fiscal year 1924, the tanker tonnage passing through the Panama Canal reached the record figure of 1704 transits and 10,212,047 net tons or 39.1 per cent of the total net tonnage. In this year, tankers paid $9,071,835.65 in tolls or 37.3 per cent of the total.

In 1929 the Secretary of War approved the erection of a $12,000,000 dam at Alhajuela, Canal Zone, to provide additional storage of water and form a reservoir of 22 square miles which would afford a storage of 22,000,000,000 cubic feet of water. This new project would prevent the water shortage which threatens canal traffic during about four months of the year and also a check to the waters of the Chagres River in the rainy season. These floods always have proved a menace to navigation. It was estimated that five years would be required to complete the work.

There has been some agitation for the construction of a canal on the Nicaraguan route on the ground that the traffic through the Panama Canal is increasing so rapidly and great canal constructions take such a long time, that the capacity of the Panama Canal may be reached before other facilities are available. Thus, it is said, a proper provision for future needs demands the construction in Nicaragua, and in 1929 preliminary surveys were begun by U. S. Army engineers. As a matter of fact, those in the best position to know point out that the present traffic at Panama is less than 40 per cent of capacity and shows a steady but small growth. Furthermore, sites are available for increasing the water supply of the canal through reservoir construction and the present double flights of locks can be increased to three, thus greatly increasing the capacity in Panama, should the need for such increase become evident.

PANAMA CANAL TOLLS ACT. See UNITED STATES, *History*.

PAN AMERICAN CONFERENCES. These conferences during the years 1914–29, held at the Pan American Union in Washington, D. C., and elsewhere in the Western Hemisphere, rank among the most important of the international gatherings which distinguished this period, both for the number of sovereign states represented and the importance of the questions discussed. The Fourth Pan-American Conference, held in Buenos Aires, July 1 to Aug. 30, 1910, closed its sessions without deciding on the seat of the Conference to be held in 1914, and the Pan American Union in 1913 decided upon Santiago, Chile, as the meeting place of the Fifth Pan American Conference, but due to the outbreak of the War, the Conference was postponed indefinitely, and it was not until Mar. 26, 1923, that it finally convened in Santiago, lasting until May 11. In the interval, however, there were numerous manifestations of Pan Americanism as evidenced by the sessions of the Second Pan American Scientific Congress in Washington, D. C., during the three weeks following Dec. 25, 1915, and the International High Commission which met in 1916; two Financial Conferences were held in 1915 and 1920 to deal primarily with questions of public finance and with the monetary and banking situation in Pan America, with the result that a financial high commission, presided over by the Minister of Finance, was created in each country. Two Pan American Child Welfare Congresses were held in Montevideo in December, 1918, and in May, 1919, at the second of which provisions were made for the establishment of an international Bureau of Child Welfare. The Second Pan American Commercial Conference was in session in Washington during June, 1919.

At the Fifth Pan American Conference which opened in Santiago in 1923, all American countries were represented except Canada, which lacked "sovereignty," Mexico, which at that time was not "recognized" by the United States, and Peru and Bolivia, which refused to attend because of their differences with Chile. Of the 18 subjects on the agenda, by far the most vital question was the disarmament problem, which concerned chiefly Argentina, Brazil, and Chile, since the United States was covered by the Washington Arms Pact, and the other Latin-American countries had only insignificant armament. No satisfactory agreement was reached, however, due to differences between Argentina and Brazil, and the Conference ended in ill feeling between the A B C states, although important results were effected in the case of other subjects than armament. Under the heading "political coöperation," the most important topic under discussion was the plan for the formation of an American League of Nations for which there seemed to be strong sentiment among the Latin-American delegates. Two methods were projected to accomplish this, namely, the creation of a new association of the American states and the enlargement of the Pan American Union. A concession gained by the Latin-Americans related to the composition of the governing board of the Pan American Union which hitherto had been composed of diplomatic representatives of the American states in Washington and of the United States Secretary of State as permanent president. This representation was considered disadvantageous to the Latin-Americans since thereby membership was restricted to countries enjoying American approval and since the representatives, due to their political status in Washington, were prevented from commenting on important problems with the necessary freedom. Hence, at Santiago, an agreement was effected whereby the composition of the governing board retained the existing representation with the additional provisions that any country not having accredited representatives in Washington or whose representative was temporarily absent, should be free to appoint a special representative on the board, and that the presidency was made elective. Uruguay's proposal to bind the American nations closer together by the formation of a compact American League of Nations was shelved until the next Pan American Conference. The subject of the Monroe Doctrine was brought up in connection with the discussion of the American League of Nations, and despite the attempts of the United States delegation to ignore the topic, the Latin-American delegations forced the statement from the former that the Monroe Doctrine was a unilateral doctrine for which the United States had been and must continue to be solely responsible. A forward step was the revival of the commission of jurists to codify American international law, and this commission which met in Rio de Janeiro from Apr. 17 to May 21, 1927, as the Pan American Conference of Jurists, is generally regarded as from some points of view the most significant of Pan American, or rather international, gatherings ever held. The results of this meeting were later submitted to the Sixth International Conference of American States, which met in Havana in January, 1928. Three additional Pan American Conferences were held in 1927, in the Pan American Union, Washington, D. C., the work of the Inter-American Commercial Aviation Commission, and that of the Third Pan American Commercial Conference, being particularly deserving of mention because of their achievements in a pioneer undertaking.

Because of the growing intensity of feeling over some of the policies of the United States, and the desirability of promoting friendly political and commercial relations in Latin-America, the Sixth International Conference of American States, at Havana, Cuba, from Jan. 16 to Feb. 20, 1928, was an event of prime interest. The American delegates included Charles E. Hughes, chairman; Noble B. Judah, Ambassador to Cuba; Dwight W. Morrow, Ambassador to Mexico; Dr. R. L. Wilbur, President of Leland Stanford University; former Senator Oscar L. Underwood; Henry P. Fletcher, Ambassador to Italy; and Dr. L. S. Rowe, Director of the Pan American Union; while the outstanding delegate from Argentina was Dr. Honorio Pueyrredon, her Ambassador to Washington; from Brazil came Dr. Raul Fernendez, an international jurist; and the Cuban delegation was headed by Dr. Bustamente, president of the Conference. President Coolidge, accompanied by Secretary of State Kellogg and Secretary of the Navy Wilbur, went to the Conference on the battleship *Texas*, and delivered the opening address on January 16, in which he stressed the desire of the United States for friendship with Latin America and the equal rights of the 21 states present in matters of deliberation. The business before the conference was of six kinds: Organization problems of the union; questions of an inter-American judicial nature; problems of communication; intellectual coöperation; economic problems; and social problems. Mr. Hughes did much to conciliate the various delegations and bring about accord with Latin America in his address, in which he disclaimed any selfish designs in the intervention of his government in the Western republics, and pointed out the policy which his government had pursued in withdrawing from Santo Domingo upon the establishment of stable conditions and its desire to pursue the same course as soon as possible in other Pan American countries.

The Conference accomplished most important pieces of practical work in unanimously adopting a treaty for the regulation of commercial aviation, and in the unanimous adoption by the plenary session of the codification of private international law prepared by Dr. Bustamente and recommended to the Conference by the International Commission of Jurists after the deliberations of that body in 1927. An important consideration to keep in mind in connection with the Pan American Congress is that it "is a consulting body which is not authorized by any nation to take action that will bind that nation before the legislation, or ratification, of the votes of the Congress by the various participating states, each acting for itself." See PAN AMERICAN UNION.

PAN AMERICAN UNION. An official organization founded in 1890 as the International Bureau of American Republics and composed in 1929 of 21 Republics of the Western Hemisphere. It was founded and is maintained for the purpose of exchanging mutually useful information and fostering commerce, intercourse, friendship, and peace, and is supported by the joint contributions of the republics. It is controlled by a governing board comprising the diplomatic representatives in Washington of all the republics of Latin America which subscribe to the union and it has as its honorary president the Secretary of State of the United States and is administered by a director general and an assistant director, elected by the board. It is strictly international in its scope, purpose, and control, and each nation has equal authority in its administration. Its activities include the following: Publication in English, Spanish, and Portuguese of an illustrated monthly bulletin which records the progress of all the republics; publication of various kinds of descriptive material relating to each country; and the distribution of information helpful in the promotion of Pan American commerce and interests. Another important function of the union is the work of the staff in organizing and arranging the preliminary details and programmes of the numerous Pan American Conferences which it sponsors. The director general in 1929 was Dr. L. S. Rowe, and the assistant director, E. Gil Borges. The headquarters were in the Pan American Building at Washington, D. C. See Pan American Conferences.

PANGALOS, Theodor (1878–). A Greek soldier and dictator, born near Athens. He distinguished himself in the Balkan Wars (1912–13) and in 1919 was made chief of the general staff.. After serving as commander-in-chief of the army in Thrace in 1922, he became Minister of War in the Gonatas Cabinet formed toward the end of that year. In the Papanastassiou cabinet, he was Minister of Justice and later Minister of War (1924). He overthrew the Michalakopoulos régime in 1925 and was proclaimed Dictator and, in 1926, President of the Republic. Overthrown by a conspiracy in August, 1926, he was imprisoned until July, 1928.

PAN-GERMANISM. The term Pan-Germanism in a loose sense is popularly employed in many countries to stigmatize what was regarded as the German policy of imperialism and aggression before and during the World War. This popular application of the term to German political and economic imperialism, or Germany's policy as a world power, was strictly an outgrowth of war-psychology, stimulated by effective propaganda, and was valid only to the very limited degree to which German world policy was affected by the aims and the doctrines of the Pan-German movement. It was only this latter movement, an expression of extreme German nationalism, which with justice could be called Pan-German. This movement, which had its inception in the eighties and nineties of the last century and the nucleus of which was the Pan-German League, a numerically weak but very aggressive and vocal group, aimed at the creation of a Greater Germany—to be composed of the German Empire, Austria-Hungary, Denmark, Holland, Belgium, and Switzerland—and at the absolute hegemony of this superstate on the European continent. At the same time, the Pan-Germans strove for world expansion, naval supremacy, and an extensive colonial empire. See Germany, History; Austria; War in Europe.

PAN-ISLAMISM. See Caliphate; Arabia; Turkey.

PAN-SERBIANISM. See World War.

PAN-TURANIANISM. The term Pan-Turanianism is usually applied to the rather loose and vague movement which aims at the awakening of a sense of racial unity among all the various peoples of supposedly Turanian stock, and, through this means, the establishment of political cohesion among these peoples. Within this wider movement, Pan-Turanianism is also used to describe in a more definite sense Turkish aspirations toward the creation of a large Turanian state to be constituted of certain closely related Turanian peoples and to operate under the hegemony of the Osmanli Turks in opposition to other races alien to the Turanian stock and particularly to the expansion of the Western Powers in Asia. See Turkey; Afghanistan; Turkestan, Russia; Caliphate; Arabia.

PAPER AND WOOD PULP. The growth in the paper and wood-pulp industries in the twentieth century has been extraordinary, and the increased production of printed matter of various kinds is remarkable in most of the civilized countries. The United States ranks first among

TABLE I—UNITED STATES PAPER AND PRINTING INDUSTRIES

United States Census of Manufactures

Note.—Data for establishments reporting products valued at less than $5000 are included in the figures for 1914 and 1919 but not for subsequent years. For individual printing and related industries, see Tables XI and XV.

Industry and census year	Establishments	Wage earners (average number)	Primary horsepower	Wages	Cost of materials	Value of products	Value added by manufacture
				In thousands of dollars			
The group as a whole:							
1914	37,209	453,006	2,039,073	296,565	......	....	875,547
1919	36,424	510,049	2,346,682	564,722	......	....	1,706,630
1921	25,377	467,256	([a])	637,430	......	....	1,818,194
1923	25,799	527,019	2,743,529	743,050	......	....	2,227,870
1925	26,553	536,766	3,060,794	805,516	......	....	2,529,450
1927	28,405	553,040	3,383,222	858,337	......	....	2,808,457
Paper and wood pulp:							
1914	718	88,457	1,611,954	53,246	213,181	332,147	118,966
1919	729	113,759	1,849,699	135,691	467,483	788,059	320,577
1921	738	105,294	([a])	127,029	445,992	667,436	221,443
1923	746	120,677	2,178,623	151,477	573,727	907,347	333,620
1925	763	123,842	2,427,010	160,146	605,860	971,882	366,022
1927	929	123,360	2,642,806	162,002	724,111	1,138,090	413,979
Manufactures of paper not made in paper mills:							
1914	1,759	79,368	85,670	36,176	102,278	190,569	88,291
1919	1,967	94,759	117,815	77,408	253,742	463,914	210,172
1921	1,880	80,278	([a])	76,518	224,416	414,895	190,480
1923	1,958	99,278	135,910	99,765	306,210	558,882	252,672
1925	1,980	98,903	148,510	104,546	315,798	588,597	272,799
1927	2,060	102,146	171,989	111,569	360,821	661,690	300,869
Printing and publishing and related industries:							
1914	34,732	285,181	341,449	207,144	265,809	934,099	668,291
1919	33,728	301,531	379,168	351,623	586,977	1,762,859	1,175,882
1921	22,759	281,684	([a])	433,883	661,963	2,068,233	1,406,271
1923	23,095	307,064	428,996	491,808	664,481	2,306,059	1,641,579
1925	23,810	314,021	485,274	540,824	692,576	2,583,205	1,890,629
1927	25,416	327,534	568,427	584,766	752,469	2,846,078	2,093,609

[a] Not called for in schedule for 1921.

the paper-producing countries of the world, and is followed by Great Britain, Canada, and Germany, in the order mentioned, although other countries contribute wood pulp, which is the basis of the industry. In 1927 the estimated world production of wood pulp was 15,075,000 tons, of which 8,720,000 tons were chemical pulp and 6,355,000 tons, mechanical or ground-wood pulp. The 1927 world production of paper was estimated at some 19,458,000 tons, of which the United States contributed over 10,000,000 tons, or more than half. In fact, the paper and printing industries combined ranked seventh as regards total output and fourth as regards value added to materials by manufacture in the general census of United States manufactures taken in 1927. Among the 16 industry groups, when considered from the standpoint of product, they were worth $4,638,571,773, while the value added to materials by manufacture was $2,808,000,000, distributed as indicated in Table I, on page 1172, which gives statistics for the years 1914 and 1927 with certain intervening years when censuses of manufactures were taken.

In preparing wood pulp, which is now the base of paper manufacture, four methods are employed, one of which is mechanical and three are chemical. In the first, which uses preferably green coniferous wood, a revolving grindstone is used against which barked and clean wood is held by hyrdaulic pressure. This mechanical pulp or ground-wood pulp is used only for the cheapest grades of paper and board, but may be mixed with chemicals for news, wall, and other cheap papers and boards. The object of the chemical processes is to dissolve out the nonfibrous components of the wood substance leaving cellulose which forms about 50 per cent of the wood substance and is the ideal paper-making material. The sulphite method is the most important of the chemical methods, as the sulphite fibre is used in the manufacture of newsprint where 20 per cent of the sulphite pulp is added to 80 per cent of ground-wood pulp, while for the better class of white paper and boards, it is used either pure or in mixture with other papers. The sulphite or kraft process is a modification of the older soda process and substitutes sodium sulphate or salt cake, for sodium carbonate or soda ash, which is more expensive. This process was first used in America in Canada in 1907. The soda process is the oldest chemical process and depends upon the action of caustic soda upon the nonfibrous components.

The production of pulp in 1928 in the United States, amounted to 4,510,800 tons, as compared with 4,313,000 tons in 1927, 4,395,000 in 1926, 3,962,000 in 1925, 3,789,000 in 1923, 2,876,000 in 1921, and 2,893,000 in 1914. There are four major grades of pulp, and the proportionate production in the United States from 1914 to 1928 is indicated in Table II.

The United States does not produce all the wood pulp used in its paper industry, and considerable amounts of sulphite chemical wood pulp, both bleached and unbleached, and sulphate pulp, principally unbleached, are imported from Canada, Sweden, Norway, Finland, and Germany. The amount of sulphite imported in 1928 was 948,431 tons, valued at $55,955,555. This material entered the United States free of duty, and so did the sulphate wood pulp, of which in unbleached form 381,256 tons, imported in 1928, were valued at $21,170,948. The principal quantity came from Sweden, which supplied 193,145 tons, as compared with 139,945 tons for Canada. Of the sulphite in 1928, Canada furnished 356,558 tons, followed by Sweden with 333,367 tons, Finland with 94,278 tons, and Norway with 63,668 tons.

The accompanying Table III gives the quantities of pulp exported by the principal pulp-producing countries of the world in 1927. Figures for 1913, the year immediately preceding the War, and for 1926 are shown for comparison. In the calendar year 1928, the exports of wood pulp from Canada were 17,276,019 cwt. (1,934,914,128 pounds).

TABLE II—PRODUCTION OF PULP IN THE UNITED STATES

(Tons of 2000 pounds)

Grades	1914	1919	1920	1922	1928
Total	2,893,150	3,384,768	3,807,656	3,464,258	4,510,800
Ground wood	1,305,430	1,449,799	1,578,300	1,481,935	1,610,988
Sulphite	1,187,151	1,385,706	1,576,676	1,331,691	1,558,858
Sulphate	52,641	161,887	212,888	256,107	774,225
Soda	347,928	377,473	431,971	383,055	488,641
Other than wood pulp	......	9,903	7,821	11,470	78,088 [a]

[a] Semi-chemical and screenings.

Sources: Figures for 1914 from the report of the U. S. Bureau of the Census, Paper and Wood Pulp; 1919–22 figures from Federal Trade Commission Summary for 1922. 1928 U. S. Bureau of the Census.

TABLE III—EXPORTS OF WOOD PULP FROM PRINCIPAL WOOD-PULP-PRODUCING COUNTRIES OF THE WORLD

Years ended Dec. 31

Countries	1913 Total Wood Pulp lb.	1926 Total Wood Pulp lb.	1927 Total Wood Pulp lb.	1927 Proportion 1927 of— Chemical lb.	1927 Proportion 1927 of— Mechanical lb.
Sweden	2,224,626,000	3,311,848,000	3,723,770,000	2,709,237,000	1,014,533,000
Canada	596,339,000	2,011,558,000	1,758,308,000	1,224,082,000	534,226,000
Norway	1,558,049,000	1,596,478,000	1,615,402,000	520,080,000	1,095,322,000
Finland	....	1,007,711,000	1,171,052,000	841,134,000	329,918,000
Germany	412,083,000	533,591,000	427,266,000	417,994,000	9,272,000
Austria	225,428,000	256,363,000	245,945,000	189,417,000	56,528,000
Czechoslovakia	....	171,275,000	203,711,000	203,568,000	143,000
United States	39,552,000	68,450,000	65,008,000	59,865,000	5,143,000
Switzerland	14,655,000	23,375,000	26,285,000	23,376,000	2,909,000
Poland	....	32,354,000	19,386,000	19,345,000	41,000
Newfoundland	115,595,000	24,969,000	8,263,000	....	8,263,000
Total principal countries		9,037,972,000	9,264,396,000	6,208,098,000	3,056,298,000

The total exports of the 11 principal pulp-exporting countries of the world in 1927 were 9,264,396,000 lb. or 4,632,198 short tons, of which Canada contributed about 19 per cent. While the exports of Sweden, the leading exporter, increased over those of 1913 by only about two-thirds and were decreasing, Canada's exports during the same period had almost tripled and were increasing, in spite of the increasing proportion of pulp production which was being further manufactured into paper in Canadian mills.

The total output of wood pulp in the United States in 1927, as stated in the Census Table, was 4,313,403 tons, valued at $207,332,666, the principal items comprised in this total being as follows: Ground wood—steamed, 181,031 tons, valued at $6,857,710; not steamed, 1,429,378 tons, $39,101,493. Soda fibre, 487,478 tons, $32,842,265. Sulphite fibre—bleached, 680,228 tons, $53,847,246; unbleached, 881,709, tons, $45,337,303. Sulphate fibre, 593,955 tons, $28,133,175. Of the 219 establishments reporting the manufacture of wood pulp in 1927, 61 were situated in New York, 33 in Wisconsin, 26 in Maine, 13 in Washington, 12 in Michigan, 12 in Pennsylvania, and the remaining 62 in 18 other States. In the table showing the 1928 pulp production by States, some interesting developments are indicated. The following Eastern States, representing 46 per cent of the total pulp, showed the following percentage change from 1927: Maine, +3 per cent; New York, —10.8 per cent; Pennsylvania, +0.9 per cent; New Hampshire, —10.9 per cent; Massachusetts, +1.7 per cent; and Vermont, —39.1 per cent. The total production of these States in 1928 was 2,073,258, as against 2,103,684 in 1927, a decrease of 60,426 tons, or 3 per cent. The Middle Western States, Wisconsin, Michigan, and Minnesota, representing 25 per cent of the pulp production, showed an increase of 35,000 tons, or 3.3 per cent in 1928, compared with 1927. Wisconsin pulp production increased 4.3 per cent; Michigan, 1.3 per cent; and Minnesota, 1.6 per cent.

In 1921 the United States Census of Manufactures showed that out of 726 mills in the entire country, New York had 155 and was followed by Massachusetts and Wisconsin with 69 and 62 mills, respectively. These three States indicated the geographical distribution of the industry, as the Middle Atlantic States were first in the number of mills, while New England and the Lake States were second and third, respectively. At the beginning of 1923, there were 1691 paper-making machines with an estimated capacity of 9,560,000 tons per annum, and the normal running time of each machine was stated to be 270 days, about 75 per cent of the actual capacity. Of the 709 establishments reporting the manufacture of paper in 1927, 136 were situated in New York, 80 in Massachusetts, 55 in Pennsylvania, 53 in Ohio, 51 in Wisconsin, 42 in Michigan, 37 in New Jersey, 32 in Connecticut, 30 in Illinois, 26

TABLE VI—PAPER AND PAPER BOARDS

PRODUCTION, BY CLASS, KIND, AND QUANTITY, FOR THE UNITED STATES, 1928 AND 1927, AS COMPILED BY U. S. BUREAU OF CENSUS

(The schedule used for 1928 did not call for data in as much detail as did that used for 1927 and consequently some of the figures in this table may not be strictly comparable as between the two years.)

Kind	Quantity (Tons: 2000 lb.) 1928	Quantity (Tons: 2000 lb.) 1927
Total	10,403,338	10,002,070
Newsprint, standard	1,415,450	1,516,929
Hanging paper	96,390	112,658
Catalogue [a]	138,660	183,338
Book paper, uncoated	1,334,326	1,269,321
Cover paper	27,043	26,333
Writing paper	550,472	508,808
Wrapping paper, sulphite [b]	351,786	290,724
Wrapping paper, kraft	873,578	637,295
Boards	4,065,378	3,773,608
Container boards	1,984,697	2,100,150
Folding boxboards	947,613	796,216
Set-up boxboards	620,809	444,228
Building boards	84,456	71,235
Binders' board	78,839	51,610
Cardboard	102,602	49,244
Leather board	18,911	24,195
Press board	7,775	6,938
Other	219,676	229,792
Tissue paper	348,174	316,070
Absorbent paper	74,768	63,766
Building paper	562,865	625,589
Other papers, including wrapping paper other than sulphite and kraft	564,448	677,631

[a] Includes data for poster, novel, news-tablet, lining, etc. This figure is not, therefore, comparable with the corresponding item for 1928.

[b] Other grades of wrapping included in "Other Papers."

TABLE IV—WOOD PULP

PRODUCTION, BY QUANTITY AND PROCESS, FOR THE UNITED STATES: 1928 AND 1927, AS COMPILED BY U. S. BUREAU OF CENSUS

Process and Condition	Quantity (Tons: 2000 lb.) 1928	Quantity (Tons: 2000 lb.) 1927
Total	4,510,800	4,313,403
Mechanical, total	1,610,988	1,610,409
Not steamed	1,546,240	1,435,321
Steamed	64,748	175,088
Sulphite, total	1,558,858	1,552,699
Unbleached	836,751	872,411
Bleached	722,107	680,288
Sulphite, total	774,225	603,253
Unbleached	733,674	([a])
Bleached	40,551	([a])
Soda, unbleached and bleached [a]	488,641	487,478
Semi-chemical	29,967	11,983
Screenings, total	48,121	47,581
Mechanical	4,701	8,229
Chemical	43,420	39,352

[a] Not shown separately in order to avoid disclosing the production of individual establishments.

TABLE V—WOOD PULP PRODUCED, BY STATES 1928 AND 1927

U. S. BUREAU OF CENSUS

(This table gives statistics for all States for which separate figures can be shown without disclosing operations of individual establishments. Certain of the "Other States," however, reported larger amounts of pulpwood consumed and of wood pulp produced than some of the States shown separately.)

	Wood pulp produced (Tons: 2000 lb.) 1928	Wood pulp produced (Tons: 2000 lb.) 1927
United States	4,510,800	4,313,403
Maine	970,690	942,162
Wisconsin	720,781	690,921
New York	633,182	710,227
Washington	349,107	268,349
Louisiana	226,708	179,878
Pennsylvania	218,598	216,587
New Hampshire	198,587	200,324
Virginia	189,925	170,630
Michigan	196,203	193,539
Oregon and California [a]	213,407	200,869
Minnesota	194,399	191,220
Massachusetts	32,370	31,822
Vermont	19,831	32,562
Other States [b]	347,012	284,313

[a] Combined in order to avoid disclosing quantities reported by individual establishments.

[b] 1928—Arkansas, Delaware, District of Columbia, Maryland, Mississippi, New Jersey, North Carolina, Ohio, South Carolina, Tennessee, Texas, and West Virginia; 1927—Delaware, District of Columbia, Maryland, Mississippi, North Carolina, Ohio, South Carolina, Tennessee, Texas, and West Virginia.

in Indiana, 25 in Maine, 24 in New Hampshire, 14 in Vermont, 12 in Washington, 11 in California, 10 in Maryland, and the remaining 71 in 19 other States.

It will appear from the accompanying table (VII) that the production of paper increased in the United States up to 1920, when the peak was attained with a total output of 7,334,614 short tons. There was a considerable falling off in 1921 due to the carrying over into that year of surplus stock from 1920, and in the years 1922 and 1923, the quantities produced were less, although in 1923 there was an increase in value. The table indicates the distribution of the production for 1914 and subsequent years and also shows the development and production which occurred in the various lines.

The total production of paper and paper board in 1927, as reported by the Census of Manufactures, amounted to 10,002,070 tons (of 2000 pounds), valued at $872,206,847. This total was made up as follows: Standard newsprint, in rolls and sheets, 1,519,737 tons, valued at $99,068,924; hanging paper, 109,850 tons, $8,748,152; poster, novel, news-tablet, lining, catalogue, etc., 183,338 tons, $15,573,062; book paper, 1,328,782 tons, $160,868,747; cover paper, 26,333 tons, 5,937,919; writing paper (fine), 508,808 tons, $105,148,140; wrapping paper, 1,525,305 tons, $162,579,549; paper boards (container boards, folding boxboards, building boards, etc.), 3,773,608, tons, $211,263,855; tissue paper, 316,070 tons, $46,616,919; absorbent paper, 63,766 tons, $13,331,497; building paper, 625,589 tons, $40,062,024; other paper, 20,884 tons, $3,008,059.

The 1928 data on paper production which the Bureau of Census collected made the most recent data on the paper industry available unusually early, and the figures are summarized in the accompanying table (VIII).

In 1928 paper production totaled 10,403,338 tons and pulp production totaled 4,510,800 tons. The paper production represents a 4 per cent increase over 1927 and the pulp, a 4.5 per cent increase. There were several substantial gains in the 1928 production, as against that of 1927, in several of the individual grades such as cardboard, with a 108 per cent increase; binders' board, a 52 per cent increase; kraft wrapping paper, a 37 per cent increase; tissue paper, a 10 per cent increase; and absorbent paper, a 17 per cent increase. The following grades showed substantial percentage decreases in production in 1928, as compared with 1927: Newsprint, 6.7 per cent; hanging, 14.5 per cent; catalogue, 24.4 per cent; leather board, 21.9 per cent; and building papers, 10.1 per cent.

The United States also imports considerable paper, principally newsprint, which enters from Canada free of duty. In 1923 newsprint imported amounted to 2,617,685,620 pounds, valued at $98,021,045, an amount that by 1928 had increased to 4,313,732,865 pounds, valued at $139,410,918. Out of total imports of paper of $156,-

TABLE VII—U. S. PRODUCTION OF PAPER AND WOOD PULP—CENSUS RETURNS

Product	Quantity					Value				
	1000 short tons					1000 of dollars				
	1914	1921	1923	1925	1927	1914	1921	1923	1925	1927
Total paper	5,270	5,431	8,029	9,182	10,002	$291,588	$585,735	$812,509	$862,589	$872,207
Standard newsprint, in rolls and sheets	1,313	1,237	1,521	1,563	1,520	52,943	114,315	110,865	106,083	99,069
Hanging	97	57	111	105	110	4,489	5,949	10,285	9,506	8,748
Poster, novel, tablet, lining, etc.	8 [a]	35	55	84	183	491 [a]	4,174	4,960	7,096	15,573
Book [b]	904	792	1,208	1,328	1,329	70,102	122,930	169,286	175,525	160,869
Cover	22	16	21	24	26	2,809	4,112	4,973	5,806	5,938
Fine	248	231	377	474	509	34,055	61,314	89,098	105,474	105,148
Wrapping (or coarse)	911 [c]	827	1,184	1,292	1,525	51,308 [c]	103,259	141,532	143,587	162,580
Boards	1,292	1,740	2,793	3,287	3,774	44,870	104,346	182,867	192,942	211,264
Tissue	115	186	251	281	316	11,536	33,647	44,144	45,735	46,617
Absorbent	14	12	16	51	64	1,458	2,667	3,777	10,000	13,331
Building	244	217	345	555 [d]	626	9,476	12,842	23,529	44,031 [d]	40,062
All other	103	81	148	138	21	8,053	16,179	27,195	16,803	3,008
Wood pulp:										
Total [e]	2,893	2,876	3,789	3,962	4,313	(f)	(f)	(f)	(f)	207,333
For sale or transfer	912	868	1,063	913	561	31,678	63,374	65,497	55,200	38,272

[a] Reported as poster only.

[b] Excludes plate, map, woodcut, etc., paper and also lithograph paper in all years except 1927.

[c] Figures are not strictly comparable with later years owing to the exclusion of bag paper which was included in "All other paper."

[d] Not strictly comparable with earlier years owing to a change in classification.

[e] Figures include wood pulp consumed in mills in which manufactured.

[f] Not available.

TABLE VIII—NEWSPRINT PRODUCTION IN THE UNITED STATES AND CANADA
(Thousands of tons)

	1913	1914	1915	1916	1917	1918	1919	1920
United States	1,305	1,283	1,239	1,315	1,359	1,260	1,375	1,512
Canada	350	415	489	608	686	735	803	876
Total	1,655	1,698	1,728	1,923	2,045	1,995	2,178	2,388
	1921	1922	1923	1924	1925	1926	1927	1928
United States	1,225	1,448	1,485	1,481	1,530	1,678	1,486	1,415
Canada	808	1,082	1,266	1,353	1,522	1,882	2,087	2,381
Total	2,033	2,530	2,751	2,834	3,052	3,560	3,573	3,796

TABLE IX—ESTIMATED PRODUCTION OF NEWSPRINT PAPER IN 21 LEADING COUNTRIES, 1927

Country	Production Tons	Country	Production Tons	Country	Production Tons
Canada[a]	2,083,000	United States	1,486,000	Great Britain	720,000
Germany	565,000	Sweden	239,000	Japan	246,000
Newfoundland	203,000	Finland	200,000	Norway	192,000
France	121,000	Netherlands	77,000	Italy	42,000
Belgium	50,000	Austria	55,000	Czechoslovakia	45,000
Spain	25,000	Estonia	21,000	Denmark	16,000
Poland	17,000	Mexico	14,000	Latvia	3,000
				Total	6,420,000

[a] Production of newsprint paper in Canada in 1928 is provisionally given as 2,382,011 tons.

384,548 in 1928, the foreign paper entering the United States did not compete seriously with the domestic product as American mills could not supply the great demand for newsprint. In regard to exports, however, American manufacturers do not compete actively on the basis of price but rather on that of quality. The total exports of paper except printed matter in the year 1923 aggregated $25,677,685 in value, of which newsprint accounted for $1,636,937; book paper, $3,001,149. In 1928 exports were valued at $30,932,651. Book paper, wrapping paper, paper board and straw board, writing paper, sheathing and building paper, and photographic paper were among the other leading exports. The production of newsprint in the United States and Canada is indicated in the accompanying table, which shows the steady character of the industry in the United States, as well as the marked increase in Canada. In the period under review, there was an increase in prices which reached a maximum of about $0.0608 in January, 1921, from which it declined to $0.0325 in January, 1925, a price that has prevailed since that time. The increased demand for newsprint was due largely to the great extension of advertising, especially in the daily and Sunday papers, and it was estimated that $700,000,000 was expended for newspaper advertising alone in 1927.

Canadian Pulp and Paper Industry. The pulpwood and paper industry in Canada since 1914 has developed extraordinarily due to existence of abundant water powers adjacent to extensive forest resources of pulpwood species. In 1928 there was a capital invested in the industry of $685,687,459, an increase of 18.3 per cent in a year. The industry engaged the services of 33,614 persons at a total remuneration of $47,322,648, both of these figures showing substantial increases and representing greater amounts than for any other industrial group.

The pulp and paper industry is the most important in the Dominion, heading the list for 1928 for gross and net values of manufactured products, as well as for distribution of wages and salaries. In total capital invested, the industry was second only to electric power and light plants, and in total number of employees second only to sawmills. There were 110 establishments in operation in 1928, as compared to 114 in 1927, and 33 of them made pulp only.

The gross value of pulp and paper produced in Canada during 1928 reached the figure of $233,535,326, representing an increase of $14,000,000 over the preceding year and setting a new high mark. In 1924 the pulp and paper figure on the same basis of comparison was $179,000,000 and there has been an annual increase since 1922. These figures represent the sum of the values of pulp for sale in Canada and for export, and of paper manufactured in Canada. They do not include pulpwood nor the pulp made in combined pulp and paper mills for their own use.

In 1913 Canada produced 2,144,064 cords of pulpwood valued at $14,313,939, or an average value of $6.67 per cord. Of this amount, 1,109,034 cords, or 51.7 per cent of the total production, were used in Canadian pulp mills; while the exports of pulpwood amounted to 1,035,030 cords, or 48.3 per cent of the total production. By 1927 the production of pulpwood had increased to 5,929,456 cords, valued at $70,284,895, or $11.85 per cord. Of the production, 4,387,687 cords, or 74 per cent of the total production, were used in Canadian pulp mills, and 1,541,769 cords, or 26 per cent of the total production, was exported in the form of raw pulpwood. In 1928 the apparent total production of pulpwood was 6,323,610 cords, of which three-quarters were manufactured into pulp in Canadian mills, while the remainder was exported to the United States.

Exports of pulpwood have shown but little increase, as most of the Canadian pulpwood is used in Canadian pulp mills of which at the end of 1927 there were in operation 42 pulp mills, 42 combined pulp and paper mills, and 30 mills making paper only. In some cases, the more important pulp companies operate sawmills to utilize the large timber to the best advantage, while many lumber manufacturers divert a proportion of their spruce and balsam logs to pulp mills. Pulpwood cut on Crown lands must in every province be manufactured into pulp in Canadian pulp mills; while the pulpwood exported to the United States is cut from private lands.

The production of pulp in 1913 was 854,624 tons, of which 600,216 tons was mechanical or ground pulp, and 254,408 tons was chemical fibre. By 1927 the total pulp production in Canada had increased to 3,278,478 tons, valued at $114,442,550, of which 1,922,124 tons were mechanical pulp, valued at $44,174,811, and 1,278,572 tons were chemical fibre, valued at $69,169,002. The 1927 production was the output of 42 mills manufacturing pulp only and 42 combined pulp and paper mills. Of the 1927 production, 2,262,542 tons, valued at $63,558,345, were made in the combined pulp and paper mills for their own use in manufacturing. In 1928 the 79 mills manufacturing pulp produced 3,610,724 tons, valued at $121,458,078, as compared to 3,278,978 tons in 1927, valued at $114,442,541, representing an increase of 10.1 per cent in quantity and 6.1 per cent in value.

The total paper production in Canada had increased in the period since 1917 from 853,689 tons, valued at $58,750,341, of which 689,847 tons were newsprint, to 2,468,69. tons, valued at $168,445,548 in 1927, of which newsprint made up over 84 per cent of the total paper production, 6 per cent of paper boards, 4 per cent of wrapping paper, 3 per cent of book and writing papers, and about 2 per cent of other miscellaneous papers. Quebec produced over half the total amount and Ontario about one-third, with the remainder coming from British Columbia, New

Brunswick, and Manitoba. The distribution of paper by quantities and values in 1927 was as follows: Newsprint, 2,082,830 tons, $132,286,729; book and writing papers, 75,072 tons, $12,916,469; wrapping paper, 102,707 tons, $9,607,828; boards, 161,497 tons, $8,985,588; other paper products, 46,585 tons, $4,433,926. In 1928 the mills making paper produced 2,849,687 tons of paper, as compared to 2,468,691 in 1927, showing an increase in value from $168,445,548 to $184,462,356.

In 1928 newsprint made up 84.7 per cent of the total paper manufactured. It amounted to 2,414,393 tons, valued at $144,146,632, as compared to 2,082,830 tons, valued at $132,268,729, in the preceding year, an increase of 15.9 per cent in tonnage and 9 per cent in total value.

See FORESTRY.

PAPINI, pȧ-pē′nė, GIOVANNI (1881–). An Italian writer (see VOL. XVIII). He was the editor of *Lacerba* from 1913 to 1915 and *La Vraie Italie* in 1919. Converted to Catholicism in 1920, in the following year, he published a *Life of Christ* which was translated into several languages. His autobiography, *The Failure*, was translated in 1924. Other works include *Cento pagine di poesia* (1915); *Stroncature* (1916); *Testimonianze* (1919); *Giorni di festa* (1920); with P. Pancrazi, *Poeti d'oggi, 1900–1920*, an anthology with biographical and bibliographical notes (1920); *Four and Twenty Minds* (trans. 1922); *The Memoirs of God* (1926); and *Pane e vino*, poetry (1926). Consult *Giovanni Papini*, by Guiseppe Prezzolini (1924), and *Italian Silhouettes*, by Ruth Shepard Phelps (1924).

PAPUA. See NEW GUINEA.

PAPYRI. See PHILOLOGY, CLASSICAL.

PAQUET, ALFONS (1881–). A German writer and traveler, born at Wiesbaden and educated there and at the School of Commerce in London, as well as the universities of Heidelberg, Jena, and Munich. He traveled over the greater part of the world. His many works include some fiction, *Prophezeihungen* (1922), *Lusika's Stimme*, and *Ausblick am Meer* (1925); books of travel, *In Palästina* (1915), *Nach Osten* (1915), *Im Kommunistischen Russland* (1919), *Delphische Wanderung* (1922), and *Der Rhein, eine Reise* (1923); the plays, *Fahnen* (1922), *Markolph* (1924), *Sturmflut* (1926), and *William Penn* (1927); the essays, *Die neuen Ringe* (1924) and *Städte, Landschaften und ewige Bewegung* (1927); and a volume of verse, *Drei Balladen* (1923). He has edited works by Hu-Kung-Ming and Kirijewski and *John Woolman's Journal*.

PARAGUAY. A republic of South America with an estimated area of 196,000 square miles. The population was estimated at 828,969 in 1927. The capital, Asuncion, had a population of 142,519 at the end of 1928, an increase of nearly 50,000 since 1920. Other large towns are Villarica, 26,000; Concepcion, 11,000; Encarnacion, 7500. Immigration increases little, in 1920 only 330 immigrants receiving state aid, and in 1926, only 317. In August, 1921, in the 27 National Colonies, there was a population of 13,808 of whom 7755 were males. Education is still backward and in 1927 the total school registration was only 100,023 pupils.

Industry and Trade. Agriculture and grazing are the leading activities, though more than half the total acreage is unexploited. The following products figured in Paraguay's foreign trade in 1927: extract of quebracho (used in tanning), 103,562,000 pounds; mate (Paraguayan tea), 16,291,000 pounds; oranges, 139,837,000; tobacco, 10,267,000 pounds. According to the live-stock census of 1926, there were 3,270,000 cattle, 209,901 horses, 195,192 sheep, and 45,483 hogs. In the same year, there were three meat-packing plants which slaughtered 115,767 cattle. In 1927, 392,000 hides were exported and 2,786,000 pounds of jerked beef. Sugar and cotton are receiving greater attention. The sugar production in 1920 was 5230 tons; in 1921, 2579 tons; in 1925, 2250 tons. In 1922, 844,219 kilos of ginned and unginned cotton were exported. The 1927 production of cotton was 5,640,000 pounds. The country enjoyed great prosperity during the War because of the world demand for meats. The fluctuations are reflected in the following figures (gold peso = $0.965): imports for 1914, 5,149,000 gold pesos; for 1919, 15,835,970; for 1921, 8,358,922; for 1927, 11,978,000; exports for 1914, 4,584,000 gold pesos; for 1919, 14,816,117; for 1921, 9,316,721; 1927, 14,282,000. The following were the proportions in value by countries of origin of Paraguay's imports: For 1913, Great Britain, 29 per cent; Germany, 28 per cent; Argentina, 13 per cent; United States, 6 per cent. For 1927, Argentina, 33.5 per cent; United States, 18.6 per cent; Great Britain, 10.9 per cent; and Germany, 9.6 per cent. Many of the imports from Argentina are merely reshipped. The greater bulk of the exports go to Argentina for reshipment abroad.

Finance. The 1913 estimated revenue was 3,248,000 gold pesos and 21,688,000 paper pesos (paper peso is worth 7 cents); estimated expenditure was 1,863,000 gold pesos and 48,307,000 paper pesos. The 1926–27 estimated expenditure was 5,146,461 gold pesos; estimated revenue was 5,186,244 gold pesos. The total national debt on July 31, 1928, was 6,503,898 gold pesos and 27,267,179 paper pesos. In 1928–29 revenues were estimated at 5,445,685 gold pesos and expenditures at 5,412,255. In 1914 the figures were: external debt, $3,757,573; internal debt, $5,091,218.

History. Eduardo Schaerer (1911–15), the first President of Paraguay in 40 years to complete his term, was succeeded by Manuel Franco (1916–19), under whose peaceful administration the country greatly developed its packing industry. By 1919 packing products constituted Paraguay's leading export. Manuel Gondra, elected for the term 1920–24, was forced to resign in 1921 by a revolution, and was succeeded by Dr. Eusebio Ayala. Dr. Eligio Ayala, who became provisional President in 1923, was regularly elected in 1924 and served until 1928. His administration was without unusual incident, despite the recurrent irritations of the 100-year-old Chaco Boreal boundary dispute with Bolivia. He was succeeded on Aug. 15, 1928, by Dr. José P. Guggiari, the Liberal candidate, who had campaigned on a platform calling for the peaceful settlement of the boundary dispute. On Dec. 5, 1928, a clash between Paraguayan and Bolivian frontier patrols at Vanguardia precipitated a serious crisis. Bolivia severed diplomatic relations with Paraguay on December 8 and war fever aroused in both countries threatened to embroil them and other leading South American countries.

The crisis was averted through the intervention of a Pan-American conference in session at Washington at the time. Paraguay and Bolivia finally agreed to accept the protocol of conciliation submitted by the conference, which then appointed a commission composed of two delegates each from Bolivia and Paraguay and one each from the United States, Mexico, Colombia, Uraguay, and Cuba, to investigate and conciliate the dispute. On Sept. 5, 1929, neutral members of the commission reported that under a formula agreed upon as a basis for arbitration of the differences between the two countries, Paraguay would receive title to that portion of the Chaco Boreal lying south of the Rio Verde, originally awarded to her by President Hayes, and Bolivia would obtain an outlet to the Atlantic Ocean by way of the Paraguay River. On Sept. 12, 1929, the commission adopted a resolution which attributed the crisis to "the employment of coercive measures on the part of Paraguay in the Vanguardia incident." It was also announced that both governments had agreed to a renewal of diplomatic relations and to the reëstablishment of the status of the frontier as it existed prior to Dec. 5, 1928, under the supervision of two Uruguayan officers. In October, 1929, the United States and Uruguay suggested that Bolivia and Paraguay agree to the creation of a new commission of neutrals to assist in settling permanently the Chaco boundary question. In 1929 a boundary treaty with Brazil was promulgated.

The period 1914–29 was marked by the appointment of an American financial adviser to the Government in 1921, following the announcement that Paraguay could not meet her external obligations, and by a severe hurricane which partially destroyed the city of Encarnacion on Sept. 20, 1926, with the loss of 200 inhabitants and $1,000,000 property damage.

In 1926 it was estimated that there was invested in the principal industries of the Republic a total of about 74,219,000 gold pesos and about 103,794,000 paper pesos nominal, of which 39,864,145 gold pesos and 60,988,400 paper pesos were paid in. Great Britain's investments in the country at that time were placed at about 20,000,000 gold pesos, those of French interests, at 5,000,000 gold pesos, and those of Argentine capital, at more than 30,000,000 gold pesos. The combined capitalization of American meat-packing and quebracho companies in Paraguay was about $5,000,000.

PARALYSIS, INFANTILE. See INFANTILE PARALYSIS.

PARASITOLOGY. See VETERINARY MEDICINE.

PARAVANE. A naval device developed by Commander C. D. Burney of the British Navy. Its earlier form, the explosive paravane, was designed mainly for use against submerged submarines and had many resemblances to the old Harvey towing torpedo. It consisted of two cigar-shaped submerged mines, each carrying an explosive charge and a depth mechanism to insure its sustained immersion at the desired depth. The mines were towed by cables, one on each side of the ship, and were deflected outward by fixed vanes on the shell until the towing cables made an angle of 20 to 60 degrees with the ship's course, depending on the speed. The explosion of the charge took place if the hull of a submarine or the shell of a mine were struck or if a firing key on the bridge were pressed. In the latter type, the torpedo-shaped floats, or "otters," as they were called, carried no explosive charge but were fitted with saw-like jaws for cutting mine-anchor cables. The towing rope was attached to the stem of the ship a dozen feet or more below water. Any mine which lay close to the course of the ship was caught by one of the towing ropes pressing against the anchor line. The latter slid along the towing rope until it reached the "otter's" jaws, where it was instantly cut. The mine then rose to the surface clear of the ship and could be easily destroyed by gunfire. This type of paravane was eventually fitted to all large warships and merchant steamers during the World War. Paravanes saved many vessels from being sunk by mines and revealed the location of several new and unknown mine fields. They were also used for mine sweeping and in searching for mine fields. Since the War, some improvements have been made in the "otter" machinery, inhaul gear, etc. See MINE, SUBMARINE.

PARIS. The capital of France and, after London, New York, and Berlin, the fourth city in size in the world. The population at the census of 1926 was 2,871,429, a decrease of 35,043, as compared with the census of 1921. The population of the rest of the Department of the Seine was approximately 1,750,000, a gain of 249,361 since the census of 1921, making the population of Greater Paris 4,628,637 in 1926. The expansion of Paris has been facilitated by the demolition of part of its fortifications, consisting of the continuous rampart around the city with its theoretically free zone of 250 meters (273.4 yards) and a ring of forts and redoubts situated about a mile outside the ramparts. This project was originated in 1919, but the second ring of forts, about five miles from the city, was retained. In addition to the 100,000,000 francs which the city paid for the fortifications, the cost of leveling the works has amounted to 158,000,000 francs. On the sites which first became available, several blocks of workmen's dwellings were erected. The removal of the fortifications added 988 acres to the available area of Paris and 1729 habitable acres to the suburbs just beyond the city limits.

With the demolition of the old city walls, the subway system of Paris is being extended to the hitherto isolated suburbs. This has been made possible by the merger of the two companies, the Nord-Sud and the Metropolitan. In all, 15 extensions are planned which will represent 20 miles of new lines at a cost of 245,000,000 francs. A loan for this extension was floated by the City of Paris in December, 1928. At the same time, another loan amounting to 105,000,000 francs was issued to meet the need of housing construction. In 1929 a five-year building programme which included the construction of 80,000 apartments, or 50,000 cheap dwelling houses, and 30,000 apartments of medium rental values was entered upon. The building activity of Paris has also included the completion of the Boulevard Haussmann, one of the finest streets in Paris. For more than 50 years, it had remained uncompleted at its eastern end, leaving a gap of a few hundred yards between the Rue Taitbout and the junction of the Boulevards des Italiens and Montmartre. Its completion in 1927 was a great relief to the traffic congestion of the Place de l'Opéra.

The port of Paris is the largest port of France in amount of tonnage handled. In 1927 its freight traffic amounted to 12,250,000 tons, as compared with 8,200,000 tons at Marseilles, and 6,510,000 tons at Rouen. Determined efforts are being made to develop Paris as a seaport and to increase the navigable depth of the Seine so as to admit of the passage of larger vessels than have hitherto been able to proceed above Rouen. The Seine is to be deepened to a depth of 4.5 meters (14.8 feet); the Canal de l'Ourcq widened to facilitate traffic with the east and with the Rhine; and the ports of Gennevilliers, Bonneuil, and Pantin created. To facilitate river traffic, the old Pont de la Tournelle, which joined the Ile Saint-Louis to the south bank of the river, has been demolished and a new concrete structure, with a single span of 75 yards, erected in its place. The Department of the Seine also has projected the building of a series of basins on the sites of the old fortifications, construction of reservoirs on the upper reaches of the Seine and Marne to regulate the flow during flood periods, extension and improvement of present methods of handling sewage and waste water, straightening channels, and increasing the height of certain bridges. The Basilica of the Sacred Heart, which was built as a propitiation for the War of 1870, was consecrated on Oct. 16, 1919. The grave of the Unknown Soldier of France is beneath the Arc de Triomphe in the Place de l'Étoile.

PARIS CONFERENCE. See PEACE CONFERENCE AND TREATIES.

PARK, JULIAN (1887–). An American educator, born at Buffalo, N. Y., and educated at Williams College and the universities of Paris, Columbia, and Minnesota. He was assistant director of the Buffalo Fine Arts Academy from 1911 to 1913 and in the latter year was appointed instructor in French at the University of Buffalo where he was successively instructor in history, professor of history, and department head, secretary of the College of Arts and Science, and dean. During 1925–27 he lectured at the Geneva (Switzerland) School of International Studies. He was a member of many historical and learned societies and was the author of *Philatelic Rambles* (1912); *History of the University of Buffalo* (1917); *Subject Peoples under the Teutons* (1918); *Napoleon in Captivity* (1927); and editor of *Cuba in the Seven Years' War* (1920). He was a frequent contributor to *The University of Buffalo Studies.*

PARK, WILLIAM HALLOCK (1863–). An American bacteriologist, pathologist, and sanitarian, born in New York City and educated at the College of the City of New York and Columbia University. In 1897 he was made professor of bacteriology and hygiene in the Bellevue-University Medical College. In 1894 he had been appointed director of the bureau of laboratories of the New York Board of Health. In 1900 appeared his textbook, *Bacteriology in Medicine and Surgery,* while in 1910, in collaboration with Williams, he published *Pathogenic Microöganisms,* which passed through eight editions in 14 years. He edited the reference work, *Public Health and Hygiene* (1920), and was a voluminous contributor, alone or in collaboration, to the periodical press, with special reference to diphtheria and typhoid fever. In 1923 he was president of the American Public Health Association.

PARK COLLEGE. A nonsectarian institution at Parkville, Mo., founded in 1875. The enrollment increased from 412 students in 1914 to 501 in 1928–29; the faculty from 24 to 36 members; and the library from 25,000 to 36,000 volumes. A number of buildings were constructed during the period under review, including: the president's residence, a men's dormitory, a lighting and heating plant, a Carnegie Library, and Wakefield Science Hall, in 1924. The endowment fund was greatly increased, amounting to $1,660,000 in 1928, in which year the income was as follows: From endowment, $84,000; tuitions and fees, $91,000; donations, $47,500; and other sources, $9500, making a total of $232,000. In 1926 gifts received included: $13,500 in land; $100,000 for a new dormitory; and $25,000 by legacy. It was decided in 1924 to discontinue the work of a preparatory school which was conducted in connection with the college, and an orientation course for freshmen was established; in the spring of 1927, a plan of honors work was adopted by the college for which about 10 per cent of the senior class is recommended annually. President, Frederick W. Hawley, D.D., LL.D.

PARKER, THE RT. HON. SIR GILBERT (1862–). An English novelist (see VOL. XVIII). From 1900 to 1918, he was a Conservative member of Parliament for Gravesend. He was created a baronet in 1915 and made a member of the Privy Council in 1916. During the first two years of the World War, he had general charge of British publicity in the United States and did excellent service in creating favorable sentiment in behalf of the Allies. His later books include: *You Never Know Your Luck* (1915); *The World For Sale* (1916); *Wild Youth* (1919); *No Defense* (1920); *Carnac's Folly* (1922); *The Power and the Glory* (1925); *There is the Man* (1927); and *The Promised Land* (1928). He also wrote *The World in the Crucible* (1915), a book on the World War.

PARKHURST, HELEN. See EDUCATION IN THE UNITED STATES, under *Dalton Laboratory Plan.*

PARKS, NATIONAL. Created in August, 1916, by an Act of Congress. The National Park Service of the United States, which placed the national parks and monuments in the Department of the Interior, was under the general charge of a director. The act provided also that the Secretary might make rules and regulations for the use and managment of the reservations and prescribe punishment for the infraction of such rules and regulations. Up to 1916, 16 parks had been created; the latest up to that time were the Hawaiian National Park in the Territory of Hawaii and the Lassen Volcanic National Park in northern California.

Since the establishment of the National Park Service in 1916, the number of national parks has been increased to 21, and in addition there are 33 national monuments under the jurisdiction of the National Park Service. The new parks are: Mount McKinley, Alaska (1917); Grand Cañon, Arizona (1919), formerly a national monument; Acadia, Maine (first reserved, upon donation of lands, as the Sieur de Monts National Monument in 1916; then changed to Lafayette National Park by act of Congress in 1919; later, in 1929, enlarged and the name changed to Acadia National Park); Zion, Utah (1919), formerly known as the Mukuntuweap and later as the Zion National Monument, Bryce Cañon, Utah (1928), formerly the Bryce Cañon National Monument; Grand Teton, Wyoming (1929). The Bryce Cañon National Park was formally dedicated in September, 1928, and the Grand Teton, on July 29, 1929.

During the travel-year ended September 30, 1928, a total of 3,024,844 people visited the national parks and monuments, as against 356,097 in 1916 and 755,325 in 1919. These latter two figures cover travel to the national parks only, as no figures were available concerning the few visitors to the national monuments in these years.

Plans were being developed for a national park in the South, to be known as the Great Smoky Mountains National Park. Authority to establish this and the proposed Shenandoah National Park was granted by Congress in 1926, contingent upon the land within the specified areas being donated to the Government in fee simple. The total funds necessary to acquire the lands for the Great Smoky Mountains Park, amounting to $10,000,000, have been secured by donations from the Laura Spelman Rockefeller Memorial and from private citizens, and by appropriation of State funds by the Legislatures of Tennessee and North Carolina. In 1929 title to more than half the total specified minimum area of the proposed park had been secured and plans were being made by the two States to turn this area over to the Government for administration and protection, as the enabling act provides that 150,000 acres may be accepted by the Secretary of the Interior for administration and protection, but not for development, as a national park. It was hoped that the entire minimum area of 427,000 acres set by Congress would be acquired within a short time.

PARMOOR, Charles Alfred Cripps, First Baron (1852–). An English lawyer, educated at Oxford. He was one of the most prominent laymen of the Church of England, was Vicar General of Canterbury (1902–24) and Attorney General to the Prince of Wales (1895, 1901, 1912). Elected to Parliament in 1895, he was a Conservative in politics but later broke away from his party because of his free-trade ideas. He supported Labor, became a strong believer in the League of Nations, and was appointed by Prime Minister Ramsay MacDonald as Lord President of the Council in the first Labor cabinet of 1924 and in the second formed in June, 1929. He was a strong advocate of disarmament. In 1914 he was made a judicial member of the Privy Council by special appointment, and was created a baronet. He published *Principles of Compensation* and *Laws of Church and Clergy.*

PARODI, Dominique (1870–). A French philosophical writer, disciple of Renouvier and Hamelin. He published in 1919 a comprehensive survey of contemporary French philosophy, *La Philosophie contemporaine en France, Essai de Classification des Doctrines.* His other works include *Le Problème moral et la pensée contemporaine* (1910) and *Traditionalisme et démocratie* (1908).

PARSONS, Frank Alvah (1868–). An artist and critic born at Chesterfield, Mass., who studied art in Italy, France, England, and Austria. He has published many books on art, including *Principles of Advertising Arrangement*; *Interior Decoration, Its Principles and Practice*; *The Psychology of Dress*; *The Art Appeal in Advertising Display.* He was coauthor of *Advertising, Its Principles and Practice,* and *Art, Its Principles and Practice Applied to Modern Life.* Besides writing books on art, he has delivered lectures in many parts of the United States and written articles and pamphlets on art subjects. He has been president and director of the New York School of Fine and Applied Art, since 1905, and professor of advertising display in New York University, since 1915.

PASHITCH, pä'shich, Nikola (1846–1926). A Jugoslav statesman (see Vol. XVIII). He was premier at the time of the Sarajevo assassination and throughout the World War, and attended the Peace Conference in Paris, where largely through his efforts the Kingdom of Jugoslavia was established. In 1923 an attempt was made on his life. With the exception of short periods, he remained Premier from 1921 until his death. He stood strongly for centralization of the government, weakening the Croation Separatist movement by taking its leader, Raditch, into his cabinet. He died the day after he was called by the King to form a new cabinet to handle the dispute with Italy over the Italian-Albanian Treaty. See Jugoslavia.

PAŠIĆ, Nikola. See Pashitch, above.

PASSY, pȧ'sē', Paul Édouard (1859–). A French philologist who made a special study of phonetics (see Vol. XVIII). His later publications include: *Phonetic Reader* (1915); *Premier livre de lecture* (1917); *Lectures françaises phonétiques* (1918); and *Conversations françaises en transcription phonétique* (1919).

PASTOR, päs'tôr, Ludwig (1854–). A German historian and professor at the University of Innsbruck (see Vol. XVIII). His later publications included *Conrad von Hötzendorf* (1916); *Generaloberst von Danke* (1916); *Der Staat Rom zu Ende der Renaissance* (1916); *Charakterbilder katholischer Reformatoren* (1924); and *Die Fresken der sixtinischen Kapelle* (1925). He edited *Johannes Janssens Briefe* (1922) and *Janssens Geschichte des deutschen Volkes.*

PATERSON. A manufacturing city of New Jersey. The population increased from 125,600 in 1910 to 135,875 in 1920 and to 144,900 in 1928, according to the estimate of the U. S. Bureau of the Census. The city has a comprehensive zoning ordinance adopted in 1921, providing for four residence, two business, and two industrial, zones. Four modern school buildings were completed in the period from 1914 to 1924, and in the latter year a $1,250,000 high-school building was erected. The number of manufacturing establishments increased from 702 in 1909 to 1120 in 1927 and the value of their output from $67,000,000 in 1909 to $207,469,696 in 1927. Approximately 33,800 workers were employed in these establishments and received $45,003,000 in wages. Paterson is the leading silk-manufacturing centre of the United States, approximately 75 per cent of the silk goods produced being dyed and finished in the Paterson district. It is also the home of the leading aëronautical motor works of the United States. Bank resources rose from $43,000,000 in 1914 to $156,065,731 in 1927. Building construction within recent years includes the Valley View Tuberculosis Sanitorium erected by Passaic County, a modern hotel, and a new theatre and office building. The Erie and the Lackawanna railroads have spent approximately $10,000,000 in the elimination of grade crossings, new freight-handling facilities, and new stations. The assessed valuation of property in 1927 was $200,464,000; the net debt was $17,076,000.

PATRICK, Mason Mathews (1863–). An American military engineer and former chief of Air Service. He was born at Lewisburg, W. Va., and was graduated from West Point in 1886, and from the Engineering School of Application in 1889. From second lieutenant of engineers, he was promoted through the grades to colonel (1916). Besides serving at different periods on Mississippi River and Great Lakes improvement projects, in river and harbor work at Norfolk, Va., and on duty at the office of the Chief of Engineers in Washington, he acted as instructor in engineering and was in command of the engineers' detachment at West Point. He was also chief engineer of the Army of Cuban Pacification (1907–09) and was a member of the board detailed for raising the U.S.S. *Maine* (1910–12). In 1916–17 he was commandant of the Engineer School at Washington Barracks, D. C. In the World War, he was made a brigadier general (1917) of the National Army (major general, 1918) and served as chief engineer of lines of communication and director of construction and forestry with the A. E. F. in France until May, 1918. He then became chief of Air Service. Returning to the United States after the Armistice, he was assigned to engineer duty at New Orleans (1919–20) and as assistant chief of engineers (1920–21). He was appointed chief of the Army Air Service in October, 1921, with the rank of major general, U. S. Army, and reappointed four years later. He was retired in 1927. He received the D. S. M. and various European orders for his war services.

PATROL SHIP. See Vessels, Naval.

PAUL, Bruno (1874–). A distinguished German architect who studied in Dresden and Munich and was professor and member of the Berlin Academy and director of the State Schools of Free and Applied Arts. He was also a clever draughtsman and illustrator and was for many years a contributor to *Simplizissimus.* He received the Grand Prix in Paris (1900) and in St. Louis (1904).

PAUL TEST. See Smallpox.

PAVEMENTS. See Roads and Pavements.

PAVLOV, päv′lôf, Ivan Petrovitch (1849–). A Russian physiologist (see Vol. XVIII). Having become eminent through his work on the physiology of the digestive glands, which was carried out in part on dogs with artificial stomach pouches and which was interrupted by the Russian Revolution, he distinguished himself in a new field, that of the so-called conditioned reflexes as studied in the dog. His first book on this subject appeared in Russian in 1923 and has since been translated into English, French, German and Spanish. Pavlov's experiments on these reflexes originated many years ago and are said to be the foundation of the behavioristic school of psychology. In his eightieth year, his activity was undiminished and he planned to visit the United States in 1929. In 1928 he delivered the Croonian Lectures before the Royal Society of England. He resigned his professorship of physiology at the Military Medical School, Leningrad, in 1924. The results of twenty-five years of study were published in *Lectures on Conditioned Reflexes,* translated into English in 1929. See Psychology and also Behaviorism.

PAYNE, John Barton (1855–). An American public official, born at Pruntytown, Va. (now W. Va.), and educated at Orleans, Va. He began to practice law in West Virginia in 1877, moved to Chicago in 1883, and was appointed judge of the Superior Court of Cook County, Ill., holding the office for five years. He was appointed general counsel of the United States Shipping Board Emergency Fleet Corporation in 1917 and director general of railroads in 1918. He held the post of Secretary of the Interior in President Wilson's cabinet from February, 1920, to Mar. 4, 1921. He was made chairman of the American Red Cross by President Harding on Oct. 1, 1921. In April, 1923, he was one of two commissioners appointed by President Harding to confer with representatives of Mexico with a view to American recognition of Mexico. He was president of the Board of South Park Commissioners, Chicago, 1911–24.

PEACE CONFERENCE AND TREATIES. A task of world-wide reconstruction and readjustment confronted the statesmen and diplomatists of the victorious Allied and Associated Powers at the end of the World War. To arrange a settlement of the problems of peace, a whole series of conferences was held and the results of their deliberations were registered in numerous agreements, treaties, protocols, and conventions. During the War, the Allied cause in general had represented "a most curious combination of lofty idealism with an undercurrent of selfish ambition." The openly avowed ideals were usually at utter variance with the more sordid ulterior aims. "Practical" men—nationalists, imperialists, and militarists—insisted that the immediate problem was to punish Germany and her allies for their atrocious crimes against civilization, to exact the greatest possible indemnity, to reduce the Central Empires to military impotence and so to cripple German industry and commerce as to make impossible any effective or dangerous competition by her in the future economic development of the world. The German colonies and the Turkish Empire were to be divided among the victors and the litigious estates of the Hapsburgs liquidated to satisfy the nationalistic aspirations of Italy and the smaller Allies. Most of these aims had been embodied in the secret engagements and commitments negotiated by the various European Allies and Japan at intervals during the years 1915, 1916, and 1917, before the United States entered the War. In regard to Turkey, secret discussions continued unabated throughout the conflict and at the time of the Peace Conference in 1919 Lloyd George and Clémenceau were still haggling silently but strenuously over the division of the spoils. These secret treaties constituted a comprehensive programme for dividing the world, a hard and fast basis for the final peace settlement. They "were destined to bear a crop of suspicion, controversy, balked ambition, which twice, at least, nearly wrecked the Peace Conference, poisoned its discussions, and warped and disfigured its final decisions."

Entirely opposed to the plans of settlement represented in the secret treaties were the openly voiced aspirations of numerous liberal and labor groups in the various belligerent countries. Some of the statesmen who professed idealistic motives were sincere in their convictions; others utilized idealism as a cloak for their activities while engaged in forging the chain of secret treaties. Yet their utterances outwardly imparted to the Allied cause during the last few years of the War all the moral elevation of a crusade for human righteousness. In particular, the various addresses of Woodrow Wilson, President of the United States, served to clarify the fundamental issues of the War and to provide a set of legitimate aims and guiding principles for the inauguration of a more enlightened era of international peace and coöperation. From 1917 on, Mr. Wilson enjoyed an unparalleled prestige and influence in the public opinion and counsel of the world. The principles of his war-aims addresses of 1918 were the official basis of the pre-Armistice terms agreed upon with Germany and her associates. These terms were binding on all parties and constituted in a technical sense the legal basis of the peace settlement. With two qualifications, the Allied Powers bound themselves to impose no conditions of peace inconsistent with Mr. Wilson's "Fourteen Points" of January 8, his "Four Principles" of February 11, his "Four Ends" of July 4, and his "Five Particulars" of September 27. Judgment was reserved by the Supreme War Council on the second of the Fourteen Points relating to the "freedom of the seas"; this was declared to be open to various interpretations some of which they were unable to accept. In addition, it was expressly stipulated that the demands for the restoration of territories invaded by Germany should include compensation for all damages done to the civilian populations of the Allied countries by land, by sea, and from the air. The Armistice signed with Austria and Hungary was unconditional as finally agreed upon, yet the preceding diplomatic exchanges between the Austro-Hungarian and American governments had created, if not a legal, at least a strong moral, obligation to arrange peace upon the basis of the President's addresses except in regard to Point Ten, which was modified by Wilson himself to assure complete and unconditional self-determination to the Czechoslovaks and Jugoslavs hitherto incorporated in the Dual Monarchy. With Bulgaria and with Turkey, Mr. Wilson entered into no negotiations at all, but the Fourteen Points touched upon their cases.

The two months which elapsed between the signing of the Armistice with Germany (Nov. 11, 1918) and the first meeting of the major Allied plenipotentiaries in Paris (Jan. 12, 1919) were marked by extremely significant developments throughout the world. The contemporaneous revolutions in Central Europe which resulted in the establishment of democratic republics in Germany, Austria, and Hungary failed to effect any considerable change in the attitude or plans of the Allies. In Italy, a tremendous wave of nationalistic feeling overwhelmed all efforts of liberal and socialist leaders to pledge the support of that country to a peace of conciliation. In France, Premier Clémenceau, unmoved by Socialist attacks, announced his intention of securing the utmost possible security and indemnification for France together with the maintenance of the old system of alliances. His government received an overwhelming vote of confidence as he thus threw down the gage. In Great Britain, Parliament was dissolved in November and a general election held on December 14. Premier Lloyd George, discarding the liberalism of his war-aims speech of Jan. 5, 1918, made the issue of his campaign a hard and bitter peace. His platform included recovery of the entire costs of the War—"shilling for shilling and ton for ton"—and punishment of war criminals. The result was a stupendous triumph for his Coalition which secured a majority of over 260 seats. The Labor Party advocating a Wilsonian peace secured 61 seats and became the official Opposition.

President Wilson could point to no such popular mandate or parliamentary vote of confidence. Indeed, despite his appeal to the American people for support in the shape of a Democratic Congress, the elections of November 5 had returned small Republican majorities in both the House and the Senate. Republican leaders in office and out were bitterly attacking the President's policies. Ex-President Roosevelt was particularly vehement. He openly asserted that Mr. Wilson had no authority whatsoever to speak for the American people as his leadership had just been emphatically repudiated by them. It was the duty of the Allies to impose their common will upon the nations responsible for the hideous disaster which had almost wrecked mankind. Mr. Roosevelt's manifesto harmonized perfectly with the purposes and plans of Clémenceau and Sonnino.

Notwithstanding the fact that recent electoral reverses had thus seriously discredited his leadership at home, Mr. Wilson, against the advice of Secretary of State Lansing, made the momentous decision to go abroad as head of the American commission to negotiate peace. He was animated by a sincere determination to work for the incorporation of his ideals into the substance of the peace treaty, to see to it that no false or mistaken interpretation was put upon them and no possible effort omitted to realize them. He claimed to be under no illusions as to the difficulty of realizing his programme. Arriving in France on December 13, Wilson found that although the date for the Peace Conference had been set for the 17th, a month more was to elapse before real work began. He spent the interval visiting the various Allied countries, conferring with statesmen and making speeches, being warmly received by liberal and radical elements which gave whole-hearted support to his reiterated proposals for a peace of justice.

THE PARIS PEACE CONFERENCE

The five Principal Allied and Associated Powers which had contributed most to the winning of the War assumed supreme charge of arranging the Peace. It was early decided to exclude the enemy powers from the impending Congress until preliminary terms had been agreed upon among the Allies. Paris—the shell-shocked nerve-centre of Allied resistance to Germany—was selected as the scene of the Preliminary Conference. Here on Jan. 12, 1919, there finally convened a meeting of the Supreme Council, its membership now comprising the chief executives of Great Britain, France, Italy, and the United States, together with their respective foreign ministers. Two Japanese representatives were admitted on the following day and this "Council of Ten," as it came to be known, definitely inaugurated the work of the Peace Conference and continued to dominate the course of events until the middle of March when it was transformed into the "Council of Four" and a subordinate "Council of Five."

Organization. Quickly, the Council of Ten proceeded to the organization of Peace Conference machinery. Thirty-two states which had been at war with Germany or had severed diplomatic relations with her were admitted to membership in the plenary conference, though with varying degrees of representation. Adopting a middle course between the proposals of the extreme militarists who advocated a body made up of delegates from the Great Powers alone which should frame a treaty to be imposed on smaller Allied States and enemy powers alike, and the proposals of the extreme legalists who championed the theoretical equality of nations with uniform representation for all, the Supreme Council apportioned plenipotentiaries to each on the basis of size, military power and prestige, and service or suffering in the recent War. Of the 70 officially authorized plenipotentiaries, five were assigned to each of the Great Powers—France, Italy, Japan, Great Britain, and the United States; three each to Belgium, Brazil, and Serbia (later officially recognized as Jugoslavia); two each to Australia, Canada, China, Czechoslovakia, Greece, Hedjaz, India, Poland, Portugal, Rumania, and Siam; and one apiece to Bolivia, Cuba, Ecuador, Guatemala, Haiti, Honduras, Liberia, New Zealand, Nicaragua, Panama, Peru, and Uruguay. While thus allocating the formal representation for plenary sessions, the Council of Ten reserved to itself the power of determining the course of procedure, conducting preliminary deliberations, and making the really important decisions. The plenary sessions were to prove almost entirely devoid of any significance save the ceremonial function of ratifying and registering decisions already made. On January 18, at the first plenary session, Premier Clémenceau of France, who presided at meetings of the Supreme Council, was elected as President of the Conference.

In addition to formally authorized participants in the Conference, streams of uninvited and sometimes unwelcome guests from all parts of the world converged upon Paris, in the hope of securing a hearing or at any rate of arousing interest in the aims and ambitions of their respective nationalities. Armenians, Syrians, Georgians, Ruthenians, Estonians, Lithuanians, Letts, Finns, Albanians, Persians, Egyptians, Koreans, Zionists, Schleswigers, Åland Islanders, Irish-Americans, Negroes, and others came to present ex-parte evidence and plead for justice. "Never before had Europe witnessed such a gathering of rulers and rivals, or realists bent on material gains and idealists striving for a happier world." Realists and idealists alike usually met with disappointment. Small nations were to be allowed to present their cases; even neutrals were to be heard in matters specifically affecting their interests; but the real power was to rest with the chief representatives of the five largest states.

To assume, however, that the treaties emanating from Paris were drafted by a small group of men— the "Ten," the "Four," or the "Three"—and that the terms were fixed by them would be highly erroneous. Each delegation at the Conference had a numerous staff of territorial, ethnographic, and historical specialists, economic advisers, and other experts, and these together with the plenipotentiaries supplied the personnel for some 58 technical commissions constituted during the first six months of 1919 to make preliminary investigations and reports on various problems of the settlement. These commissions held over 1600 meetings and their conclusions and recommendations were discussed by the Council of Ten, which held 72 meetings, the later Council of Four, which held 145 sessions, and the subordinate Council of Five, which met 39 times. Most of the articles in the treaty were taken bodily, without change, from the reports of commissions.

Wilson's First Point declaring for "open covenants openly arrived at" was seriously vitiated at Paris. Despite a keen struggle waged by the Americans for a wider measure of publicity, only the plenary sessions of the Conference were opened to the press. Lloyd George, Clémenceau, and Orlando uniting to demand that the executive councils deliberate in secret, it was decided and announced that publicity with regard to their proceedings "must be subject to the limitations necessarily imposed by the difficult and delicate nature of their object." The army of newspaper correspondents was obliged to be content with brief and noncommittal communiqués issued each day, the scanty substance of which had to be supplemented with the gleanings of gossip, semi-official conferences with directors of publicity appointed by each delegation, and occasional interviews with important plenipotentiaries. But in devious ways and for ulterior purposes, reports of secret proceedings frequently reached the printed page, garbled, perhaps, to advance the interests of those who instigated publication.

"The Big Four." In addition to running the conference machinery and determining final terms of peace, the members of the Supreme Council were burdened with complicated and urgent tasks of administration. Each leader had to consider public opinion and political developments at home, problems of demobilization and economic readjustment. The armistice terms with Germany had to be renewed, measures taken to combat the spread of Bolshevism, and to feed, clothe, and house refugees in a dozen regions of Europe. Eastern Europe was in chaos, central Europe was in revolution, and western Europe trembled on the verge of exhaustion and collapse. Everywhere the various nationalist groups were attempting to anticipate the decisions of the Conference by seizing as wide an area of debatable territory as possible. At one time, American observers counted as many as 14 small wars raging in various parts of Europe. The maintenance of political stability and the restoration of economic processes to more normal functioning had to be accomplished in the face of nationalistic quarrels and social unrest that threatened to plunge all Europe into renewed anarchy and to spread the tenets and tentacles of Communism westward to the Rhine and the Adriatic.

The position of Woodrow Wilson and his American colleagues was at once highly advantageous and supremely difficult. Mr. Wilson enjoyed great prestige as the head of a wealthy, powerful, and influential nation. The moving eloquence of his lofty declarations on the issues of the World War and the principles of a lasting settlement, together with his vigorous advocacy of a league of free nations coöperating in the fruitful processes of peace, had earned him a numerous following among liberal and labor elements the world over. His programme for world settlement had been officially endorsed as the basis of peace at the time of the armistice negotiations, and he came to Paris determined to secure the application of the twin principles of national self-determination and international coöperation.

Speaking broadly, however, one may say that the representatives of the other Allied Powers did not view with entire favor the policies of Mr. Wilson. They might with diplomatic tact, with reassuring cordiality, agree with Mr. Wilson "in principle," yet their manifest purpose was to negative his projects in detail. Throughout the long negotiations during the first six months of 1919, with the endless proposals and counter-proposals, discussions, and decisions, the central ideas of the leaders of the different delegations, except possibly the British, remained fairly consistent.

In addition to the aims and interests of the Great Powers, there was another grave obstacle to the realization of a Wilsonian peace, namely, the inordinate ambitions and conflicting claims of the smaller nations now newly vindicated, emancipated, or unified. The representatives of Belgium, Paderewski (the pianist Premier of Poland), Bratiano of Rumania, Pashitch of Serbia, and the gifted Venizelos of Greece, all asked for territory which could only be assigned to them on the inveterate, but, to Wilson's mind, iniquitous principle of the division of the spoils among the victors. It was partly because of these overweening pretensions on the part of the smaller states that Wilson agreed to their exclusion from the Supreme Council of the Allies which directed the Conference.

The Russian Problem. The vexatious and long-unsolved problem of Russia rose to confront the Supreme Council during the early weeks of the Conference. The danger of Bolshevism loomed large on the Eastern horizon, for despite the ring of domestic and foreign enemies which surrounded them, the Communists had managed to maintain their position. Though they were generally regarded as traitors and outlaws, the inherent difficulties of the problem of dealing with them were rendered still more complicated by the divergent aims and sympathies of the Allies. Early in January, 1919, the French, mindful of the billions of francs which they had invested in Russia, urged the utilization of the combined resources of the several countries to overthrow the Bolshevist régime; but the United States and Great Britain refused to furnish any troops for this enterprise. President Wilson strongly opposed Foch's plan for sending troops to Poland, saying he had great doubts whether the spread of Bolshevism could be checked by the use of armed force. He and Lloyd George suggested a plan for holding a conference with the various Russian factions including the *de facto* Bolshevist government. Clémenceau refusing to have his capital contaminated, the place and date of meeting were set for the island of Prinkipo in the Sea of Marmora in February, but to the ill-concealed joy of the French, the project fell through owing to the contemptuous refusal of the counter-revolutionary leaders, Denikin and Kolchak, to consider any proposal for a truce and a conference.

During the several subsequent months, the British and the Americans, recognizing the danger of a policy of drift, persisted in their endeavor to make some sort of settlement regarding Russia, but due to diplomatic tactlessness on the part of the Bolshevists, hostile comment in the Allied press, the vacillation of Lloyd George in the face of this comment, and the unbending rigor of official France, nothing was accomplished, and the Allies finally reverted to the policy of supporting the Royalist counter-revolutionists. Much valuable time had been wasted and meanwhile the tide of Bolshevism seemed to be sweeping irresistibly westward, into Hungary, into Austria, into Bavaria. The Conference lived throughout under the menacing shadow of impending revolution.

The League of Nations. One of the earliest and perhaps the most vital of the many struggles at the Peace Conference was the effort to bring into being a league of nations and relate it definitely to the Treaty of Peace. See LEAGUE OF NATIONS. The French were desirous of postponing consideration of a league until the material problems of peace had been settled—new states, boundaries, colonies, disarmament of the enemy, and indemnity; but Wilson placed the league project first on his list of subjects, and in compliance with his demand, the Council of Ten passed a resolution on January 22, sanctioning the creation of a league which should be incorporated "in the general treaty of peace." This resolution was approved by the second plenary session on January 25, and a commission constituted to draft a covenant for the proposed league.

On January 23, Lloyd George, supported by Clémenceau and Sonnino, precipitated an acrimonious discussion of the disposition of the German colonies and the dismemberment of Turkey, which consumed the greater part of a week and generated much heat and bitterness. German sea power and economic rivalry having been crushed, the British moved quickly to their next objective—the division of the spoils of war. Wilson vigorously opposed the move, but had to compromise. It was agreed (January 24) that the colonies should not be restored to Germany, though, on the question of future control, grave differences of opinion developed. The British Premier and the Dominion Prime Ministers demanded outright annexation of the territories which the secret treaties assigned to the British Empire. On January 27, the Japanese announced their unconditional claim to Shantung and the North Pacific islands as per secret-treaty engagements. On January 28, the French demanded annexation "pure and simple" of Togoland and the Cameroons, basing their claims in part upon the existence of secret arrangements with Great Britain and requesting that France "be allowed to continue her work of civilization in tropical Africa." Belgium presently intimated a desire for territorial increases in Africa, and Italy put forward provisional claims based upon the secret Treaty of London.

Wilson, adhering to his programme of "self-determination" with "no annexations," proposed that the areas in question should be held in "trusteeship by the League of Nations through the appointment of mandatories." Smuts of South Africa had originally proposed the application of the mandatory principle to the Turkish and Hapsburg empires, but Wilson in adopting his suggestion widened its application, thereby incurring bitter attacks in the French press which denounced him and his "impracticable ideals."

The British shifted their attack, accepted the mandatory scheme in principle, and attempted to have a preliminary allocation of colonies made before the League came into existence. Hughes of Australia and Massey of New Zealand now uttered a virtual ultimatum, but Wilson stood adamant, and consideration of the problem was postponed pending the drafting of the League Covenant, work upon which was expedited during the first two weeks of February. Simultaneously, other commissions which had been appointed, such as those on various territorial problems, responsibility for the War, reparations, etc., immediately commenced their arduous task of preparing the formulas of settlement.

Following the plenary session of February 14, there was a month's interregnum due to the absence of the "Big Four." Lloyd George was absent from the Conference from February 7 to March 5. His place was temporarily taken by Winston Churchill, perhaps the most militaristic and ultra-imperialistic member of the British cabinet. Mr. Wilson, who left for America on February 14, to attend to administrative duties, did not return to Paris until March 14. Premier Clémenceau, wounded by a French anarchist on February 19, was confined to his home until March 10. Premier Orlando went to Italy for some time leaving his more reactionary colleague, Sonnino, in control.

During the week before his departure, especially on February 7 and February 12, Wilson advocated the immediate imposition upon Germany of military and naval terms providing for her disarmament as a preliminary preparation for Allied demobilization. This would separate military terms from general considerations of peace and tend to remove the Conference from the militarist atmosphere created by the maintenance of large standing armies. Clémenceau bitterly denounced this plan. He desired expansion of the old conditions for Germany, but not demobilization for the Allied Armies. Balfour of Great Britain supported the President in resolutions renewing the old armistice terms for an indefinite period and providing for a preliminary treaty containing the military, naval, and air terms to be drafted immediately by a committee of military experts during Wilson's absence in America; but those delegates who favored imposing general territorial and reparation terms on Germany before considering a League of Nations took advantage of the situation to sidetrack the league project and work for the expansion of the preliminary military, naval, and air treaty, authorized by the resolution of February 12, into a general settlement.

On February 22, Mr. Balfour, responding to pressure by Churchill, introduced a new resolution providing for a preliminary peace treaty with Germany which should include, besides disarmament clauses, the approximate future frontiers of Germany, financial arrangements, post-war economic relations, and responsibility for breaches of the Laws of War. The various commissions which had been constituted to investigate these matters were directed to report not later than March 8 (one week before Wilson's expected return). This resolution received the cordial endorsement of the French and the Japanese. Baron Sonnino of Italy favored the principle, though he was averse to having the German settlements made before Italian claims to Austrian territory were satisfied. Mr. Lansing and Colonel House of the American delegation, desirous of securing a speedy peace, acted against their absent chief's wishes and assented to the project. Lord Milner of the British delegation alone opposed the move, but in vain. The foes of the League secretly rejoiced at this victory, and it was openly declared that the League was shelved. On March 1, Marshal Foch presented a report on the military terms of the Treaty. No sooner, however, had the Council of Ten resolved to frame a general preliminary treaty of peace omitting the League than difficulties were encountered. All sorts of controversies began to crop out. The British and the French differed about the disposition of the German war vessels, the British and Japanese about former German cables. Lloyd George no sooner returned to Paris than he had a falling-out with Clémenceau. To make matters worse, the Italians objected very vociferously to a quick peace with Germany which left Austrian problems in abeyance.

Such was the situation upon the return of President Wilson to Paris on March 14. In many respects, his visit home had been discouraging, for he had learned that he could not count with certainty upon the American people's support of his peace programme. Circumstances demanding decisive action on his part, the very next day he issued a strong proclamation repudiating American support of the scheme for a preliminary comprehensive peace settlement without the League and announcing that the resolution adopted at the second plenary session on January 25 to the effect that the League should be made an integral part of the general treaty of peace, was of final force.

The French Demands. The somewhat cool reception which Wilson had encountered at home did not pass unnoticed in Europe. Clémenceau and Lloyd George undoubtedly felt that Wilson's domestic support was so unstable that they who could point to the tangible popular mandates of victorious elections and votes of confidence were justified in adopting a stronger tone. These three chief conferees now faced in all its acuteness the problem of finding some basis of unity among themselves upon which the terms of the peace settlement might rest. In January, Wilson had insisted upon immediate steps toward the creation of the League of Nations. The French now resolved to carry through in its entirety their formidable programme of security, reparation, and expansion. It embraced the following points: (1) French military control of the Rhine; (2) a permanent alliance of the Great Powers to help France hold it; (3) erection of a group of smaller allies to menace Germany from the East; (4) territorial reduction of the German Empire; (5) crippling of the German political organization through the encouragement of separatist movements; (6) disarmament of Germany but not of the Allies; (7) a crushing indemnity to cover not merely restoration of northern France but as much of the French war debt as possible; (8) appropriation of German economic resources; (9) a set of commercial agreements preferential to France, prejudicial to Germany. In addition, the French were determined to acquire a large share of the economic opportunities of developing parts of Turkey and the former German colonies.

Wilson recognized that his programme of permanent world peace based upon sound moral principles backed by mutual guarantees was seriously jeopardized by the French demands. He had upset many plans on March 15, by declaring that the League must be an integral part of the treaty. He consistently opposed Marshal Foch's projects of sending military expeditions to coerce Soviet Russia, and on March 17, during the final consideration of the military, naval, and air terms of the treaty, caused the rejection of an elaborate scheme advanced by the French for perpetual control over the military and naval affairs of Germany. Shortly afterward, he was instrumental in again defeating, in the League of Nations Commission, the plan sponsored by M. Bourgeois to make the League practically a military alliance for the defense of France. In addition, while on his way back to France, he had refused, by wireless, to consent to the French proposal to include the entire costs of the War in Germany's reparations bill. Such actions, though maintaining his position, served to irritate and consolidate the opposition.

The French determined not to yield on any more points. Though unanimously assured of the return of Alsace-Lorraine, political, military, and economic motives impelled them to demand a more complete "rectification" of their eastern frontier. The secret agreement of February, 1917, with Russia had assigned them, first, outright annexation of the entire iron district of Lorraine and the entire coal district of the Saar Valley, and, second, the separation from Germany of the remaining territories on the left bank of the Rhine and their erection into an autonomous neutral state to be occupied by French troops pending final fulfillment of all conditions of peace to be imposed upon the enemy. With minor modifications, the execution of this agreement, together with a proposal for an indefinitely extended inter-Allied control of the Rhine bridges, was vigorously advocated by the French delegation at the Conference, and the debate on this subject of fundamental importance was keen and protracted, lasting off and on for the first six months of 1919.

On March 14, Wilson and Lloyd George offered to pledge their respective countries to aid the French in case of an unprovoked attack by Germany. Clémenceau accepted this extraordinary guarantee with much gratitude, but insisted that it supplement rather than supersede the French plan for indefinite occupation of the left bank and military control of the Rhine. On March 27, the French finally presented their definitive claim to the Saar, pared down to an irreducible minimum providing first for political annexation of that part of the Saar Basin which had belonged to France under the frontier of 1814 but had been relinquished to Prussia as an additional penalty after Napoleon's débâcle at Waterloo, and, second, for full French ownership of the mines in the adjoining regions. The whole controversy on this issue, together with disputes about reparation, amendments to the Covenant of the League of Nations, and other points, came to a head late in March. From March 25 to April 7, the Conference seemed to have reached a standstill as the major plenipotentiaries battled for supremacy. Affairs had reached an impasse.

The opening days of April have truly merited the caption, "the Peace Conference's blackest hour." In the Council of Four, Clémenceau was at loggerheads with Wilson and Lloyd George and threatened to resign unless his demands were granted. His fall would probably have resulted in an even more obstinate French resistance. In the sessions of the League of Nations Commission, the French were insisting on the adoption of amendments favoring militarization of the League and the maintenance of French security. There were grave premonitory rumblings of future disputes with the Italians and Japanese over their respective territorial claims. The inspired French press and certain sections of the English and Italian press uniting in a vituperative attack upon Wilson and to some extent upon Lloyd George, anathematized the former as a pro-German and the sole obstacle to a speedy and satisfactory peace. On April 3, the President succumbed to physical exhaustion and for four days was confined to his bed. On April 4, came news of renewed disorders and aggressive Bolshevist projects in Hungary; on the same day, King Albert of Belgium arrived to insist upon Belgian priority in reparations payments. On April 5, it was learned that Bavaria had embraced Bolshevism and on the sixth, there were socialist demonstrations in the streets of Paris.

Wilson determined to force a showdown. His first action upon leaving his sick-bed was to order the *George Washington* to sail for Brest immediately. This was his ultimatum: either the French had to recede from their extreme demands or he would leave the Conference. The result was an era of compromise. Working under the necessity of preserving Allied solidarity and preventing a disruption of the Conference, Wilson and Clémenceau gradually fought out the problems of French security and reparation. On April 10, a solution of the Saar Basin question was attained. (See SAAR BASIN.) On April 16, Wilson and Lloyd George agreed to a 15-year occupation of the left bank of the Rhine, together with Allied control of the three principal bridge-heads, the demilitarization of all this territory and also of a zone stretching 50 kilometers east of the river. Simultaneously, it was definitely decided to sign the three-power defensive alliance as an additional guarantee of French security, though in so doing, Wilson laid himself open to serious charges of inconsistency, as he had hitherto opposed special alliances within the general family of the League of Nations. Meanwhile, in the final sessions of the League Commission, April 10 and 11, Wilson carried through certain American amendments that he considered necessary to meet domestic opposition, but with Clémenceau's consent, the proposed French amendments were rejected. On April 12, a compromise was reached on the reparations issue. See REPARATIONS. These decisions in regard to reparations, the Saar Valley, and the left bank of the Rhine completed the main outlines of the settlement with France. Though the worst period of the crisis was thereby weathered, the compromises on these vital issues satisfied no nation and extraordinary attempts were subsequently made to evade or modify them, for the French never stopped fighting for their full programme, and the British and the Americans, regretting their concessions, endeavored to secure a reconsideration. However, by April 14, sufficiently comprehensive agreements had been reached by Wilson, Clémenceau, and Lloyd George to justify summoning the German delegation to Versailles; but three weeks were yet to elapse before the tentative draft treaty was completed and submitted to the enemy plenipotentiaries, for barely had the worst period of the French crisis been safely weathered when another storm—the Italian crisis—burst upon the Conference.

The Italian Demands. The Italians had been growing restive under the apprehension that the German terms would be settled before they had a chance to bargain for concessions in the Adriatic, Asia Minor, and elsewhere as the price of their approval of the settlement. Italian claims for territory were based primarily upon the secret Treaty of London of April, 1915, by which Italy was promised the southern part of Austrian Tyrol, up to Brenner Pass and including the Bozen district with some 200,000 Austro-Germans, in addition to the ethnographically Italian region of Trentino; also Trieste; Gorizia, Gradisca, and Istria, a majority of whose inhabitants were Slavic; part of Dalmatia, with all the best harbors except Fiume on the eastern side of the Adriatic; the town and district of Valona in Albania; the Dodecanese Islands in the eastern Mediterranean, wholly inhabited by Greeks; imperialistic compensation in Africa and Asia Minor; and "a share of the war-indemnity." Subsequent secret arrangements, notably that of St. Jean de Maurienne in April, 1917, had elaborated prospective Italian gains in the Turkish Empire.

The Treaty of London, as its terms gradually became known, had a poisoning and disillusioning effect all through the Balkans, and proved to be one of the chief obstacles to a speedy and satisfactory settlement at Paris. "More actual time was devoted by the Council of Four and other councils and commissions to the controversies which raged around this treaty than to any other single subject discussed." In a session of the Supreme War Council on Nov. 4, 1918, at the time of the armistice negotiations, Premier Orlando had made a reservation on Point Nine of Wilson's Fourteen Points on the readjustment of Italian frontiers "along clearly recognizable lines of nationality," but this was not incorporated in the note to Germany on November 5, on the ground that it concerned the peace with Austria-Hungary, not with Germany. The Italians not only refused to abide by the Fourteen Points, but went a step beyond the Treaty of London and claimed, in addition, the port of Fiume, the annexation of which they had expressly, though it appears unwillingly, renounced in 1915. At that time, it was agreed to offer Fiume to Croatia, Serbia, and Montenegro as compensation for certain sacrifices of Serbian territory to be utilized in enticing Bulgaria into the War on the side of the Allies. The latter project falling through, Italy revived her claim to Fiume in order to secure undisputed economic domination of the Adriatic and to prevent any potential rivalry on the part of Jugoslavia. See FIUME-ADRIATIC CONTROVERSY.

The Japanese Demands. Contemporaneously with the Italian crisis over Fiume, there had taken place a sharp encounter with the Japanese over Shantung. The Mikado's representatives had hitherto confined themselves largely to silent observation of the wranglings of other nations and to a protracted though fruitless effort to secure insertion in the League of Nations Covenant of the principles of racial equality. Smarting under their defeat on this issue, the Japanese began strenuously to urge their claims to imperialistic aggrandizement in the Far East. Their diplomatic position was well-nigh impregnable. A secret agreement with Great Britain of February, 1917, subsequently approved by France, Russia, and Italy, assured Japan of the acquisition of Germany's rights in Shantung, and island possessions in the North Pacific, those south of the equator being assigned to the British. Several secret agreements negotiated with China at the point of the bayonet in 1915 and September, 1918, had secured reluctant Chinese assent to the Japanese plan for eventual restoration of Shantung to China only upon conditions favoring the enhancement of Japanese interests in Shantung and Manchuria. The Chinese having consented to these arrangements only under duress (see CHINA, *History*, and JAPAN, *History*), now asked the complete abrogation of all these old treaties and the direct restoration of Shantung without the intermediation or interference of the Japanese.

The Japanese, bitterly denouncing Chinese participation in the discussion of their claims, and grimly resolved to stand their ground, demanded the absolute surrender to themselves of the former German "rights, privileges, and concessions" in Shantung, after which they were to be left free to carry out the provisions of the treaty of 1915 and the arrangements of 1918. They summarily rejected a proposal made by Secretary Lansing in the Council of Foreign Ministers on April 15, and strongly supported by President Wilson in the Council of Four, providing for the blanket cession of all German rights in China to the Allied and Associated Powers for subsequent disposition. Lloyd George adduced the secret treaty of 1917 in justifying the Japanese claims, but his loosely made suggestion for a League of Nations mandate for Shantung was rebuffed by them. The Japanese peremptorily demanded an immediate and definite settlement of the problem in accordance with their stipulations since otherwise they had strict orders from home not to sign the treaty. The departure of the Italians redoubled the gravity and effectiveness of their threat to leave the Conference. The Belgians were simultaneously manifesting discontent over the reparations settlement and a complete break-up again seemed imminent.

Against the strong advice of his advisers and fellow-plenipotentiaries, including Secretary Lansing and General Bliss, Wilson finally decided to yield to the practical considerations of the moment and on April 30, it was agreed that Shantung should be ceded to Japan in the actual treaty, but that Japan in a supplementary verbal agreement was specifically to reaffirm her promise to return it to China under more explicitly defined conditions. This compromise solution saved the day, but was satisfactory to no one except the Japanese. It embittered the Chinese and led to their refusal to sign the treaty. It disheartened Wilson more than any other decision at the Conference. It stirred up great criticism in America and furnished a formidable weapon of opposition to the treaty there. Not until the time of the Washington Conference was an amelioration of the settlement made which molified the United States and China. See SHANTUNG AND WASHINGTON CONFERENCE.

The Polish Demands. On the contentious issues of Fiume and Shantung, Wilson received scant support from his colleagues in the Council of Four, but when it came to the extravagant Polish demands supported by the French, Lloyd George entered the diplomatic lists in the guise of an embattled advocate of justice and moderation. In 1917 France in her secret arrangements with Russia had agreed to allow the Czar's government a free hand in drawing Germany's western boundaries, i.e., in annexing Prussian and Austrian Poland; but the advent of revolution in Russia and the subsequent régime of the Bolshevists profoundly altered French policy. Having lost their powerful ally in the East and being interested in the creation of a ring of buffer states around Germany, the French argued for a great and strong Poland, which would not only hem in the Germans on the East but also form a link in the *cordon sanitaire* to be forged around Bolshevist Russia. The British, while committed to the restoration of Polish statehood, refused to countenance the projects of aggrandizement advanced by the Poles and the French, as they served no direct British interest and promised to cause unrest and possibly war in Eastern Europe. The Territorial Commission appointed to consider the problem of Poland recommended the cession to her of almost the whole of the provinces of Posen and West Prussia which had anciently constituted parts of the Kingdom of Poland, together with the district of Marienwerder controlling the railroad from Danzig to Warsaw. Poland was also to get the greater part of Upper Silesia, which had not been Polish for centuries. Lloyd George strongly opposed the transfer of 2,000,000 Germans to Polish rule and, supported by President Wilson, he secured a decision allowing a plebiscite in Marienwerder, and making Danzig a free city under the League of Nations, though subject to Poland in customs regulations and conduct of foreign relations.

The essential terms of the treaty were now complete. On April 28, at the fifth plenary session, the League of Nations Covenant and the International Labor Charter were adopted by the Conference, and on May 6, despite a strong undercurrent of dissatisfaction among the smaller powers "with special interests" who felt that their views had not been sufficiently considered, a summary digest of the whole treaty was read and approved.

German Reception of the Treaty. Headed by Count Brockdorff-Rantzau, foreign secretary of the republican government at Berlin, the German plenipotentiaries arrived at Versailles on April 29. Here, on May 7, the Preliminary Conference was transformed into a definitive Peace Congress and at a ceremonial meeting the proposed treaty was formally transmitted to the German delegation by Clémenceau whose tart speech, declaring that the War had cost the victors too much to allow the remission of any precautions or guarantees necessary to ensure a lasting peace, elicited from Brockdorff-Rantzau an extremely defiant and tactless reply marked by bitter denunciation of the Allies and a vigorous denial that Germany was solely responsible for the War.

Seven weeks of uncertainty ensued, taken up with the analysis of German protests, the formulation of the Austrian peace treaty (see below), and the last great crisis that preceded the signature. Oral discussion being barred, the Germans, commencing May 10, submitted an extended series of notes criticizing various parts of the treaty, and on May 29 advanced an elaborate set of counter-proposals. Complaining that the principles of the Armistice under which Germany had laid down her arms had been violated in letter and spirit, they asserted that the terms imposed upon their now thoroughly democratic government were intolerably severe. They demanded a plebiscite to determine the future status of Alsace-Lorraine, and suggested that, instead of ceding West Prussia, Danzig, and Memel, they should be allowed to make Danzig, Königsberg, and Memel free ports under German sovereignty. They afforded fixed annual supplies of coal to France in lieu of the Saar mines and argued that the retention of Upper Silesia was absolutely necessary if Germany were to fulfill her obligations. They requested that Germany be admitted to the League of Nations immediately without conditions, and proposed that she retain her colonies under a League mandate. They advocated general instead of unilateral disarmament and asked the Allies to abolish compulsory military service in two years.

These and numerous other suggested changes and interpretations were considered by the Allied Councils and 13 special committees. Of great significance was an eleventh-hour attempt on the part of Lloyd George to secure modification of the terms of peace. Publication of a digest of the treaty had elicited vociferous denunciation of its provisions in liberal and labor circles in Great Britain and to some extent in the United States. Certain plentipotentiaries and experts in the British and American delegations at Paris were emphatic in their criticisms. In Germany, all parties denounced the treaty and huge demonstrations of protest led to increasing anxiety about its possible rejection. Alarmed by the spread of dissatisfaction and fearful lest the Germans would refuse to sign, the consummate politician, Lloyd George, who on May 9 had been stronger than any of the others for coercion, swung suddenly toward the other extreme and began to demand somewhat radical revisions of the treaty. He particularly attacked the provisions regarding the army of occupation and the Silesian settlement. Clémenceau, criticized in France for having already yielded too much, convinced as always that the Germans understood nothing but force, and believing that once a few concessions were made they would insolently demand more, bristled with opposition and refused to agree to a reconsideration.

Lloyd George turned to the Americans for support. Wilson, having struggled all through the Conference to abate excessive British, French, Italian, Japanese, and Polish demands, was not impressed by the British Premier's periodic changes of position. On June 1, Lloyd George consulted his cabinet at a special meeting convened in Paris, and the very next day he threatened to go home and lay the whole matter before Parliament if Clémenceau did not consent to changes. The French Premier, himself facing a ministerial crisis, declined to budge. Wilson, at a special meeting of the American delegation on June 3, announced that he was strongly in favor of making any changes that would ensure more complete justice, but he opposed granting any last-minute concessions merely to placate the enemy. He feared that the resumption of conversation about French security and other points would imperil the whole delicate structure of the settlement. With the President's consent, the American experts did urge that a definite and moderate sum of reparation be fixed; but Lloyd George, remembering his election pledge about recovering the costs of the war—some $120,000,000,000—frankly opposed the move. On June 16, however, he secured a convention providing for supreme civil, rather than military, control of the occupied territory and a declaration limiting the cost of the Army of Occupation to be assessed upon the enemy. The Allied reply to the German observations on the conditions of the Peace which was dispatched on the same day, registered certain additional modifications including the requirement of a plebiscite for Upper Silesia, a slight readjustment of Poland's western frontier, a retardation of the required reduction of the German Army, and a provision for the collaboration of a German commission in discussing methods of reparation payments.

Despite these concessions, the Allied reply was in effect an ultimatum which called for Germany's acceptance or refusal on or before June 23.

The return of the German delegates from Versailles with the modified treaty conditions precipitated a ministerial crisis at Berlin. The Scheidemann government, which had fomented resistance to the treaty and threatened not to accept it, resigned on June 21, and was replaced by a transitional ministry under Adolph Bauer pledged to acceptance of the treaty. An effort to secure the omission of the articles requiring the confession of war guilt and the surrender of war criminals met with an absolute refusal by the Supreme Council to consider any further modifications and a demand for immediate compliance. Marshal Foch was ordered to advance on Berlin with the Allied armies should the German government not submit within the time limit, and preparations were made for tightening the blockade. The Germans reluctantly gave way. On June 23, the National Assembly at Weimar voted 237 to 138 to accept the treaty unconditionally and the next day the Allied Supreme Council was informed of the fact. Dr. Hermann Muller, the new foreign secretary, and Dr. Johannes Bell, a colonial secretary, were prevailed upon to act as plenipotentiaries in place of Brockdorff-Rantzau and his colleagues. On June 28, 1919, five years to a day after the assassination of the Austrian Archduke Francis Ferdinand, the two representatives of the new German Republic attached their signatures to the Treaty of Versailles which, being signed by delegates of all the Allied nations except China, officially terminated the World War.

THE TREATY OF VERSAILLES

The Treaty of Versailles, as signed on June 28, 1919, revolutionized the international status of Germany, territorially, politically, militarily and economically. By its terms, Germany lost her navy, her merchant marine, her colonial empire, invaluable natural resources; and her army was reduced to impotence. The first 26 articles of the Treaty constituted the Covenant of the League of Nations, but from this Germany was to be temporarily excluded. (See League of Nations.) The rest of the large-sized volume of 440 articles and annexes set forth more specific conditions of peace.

Political Terms. Germany recognized the complete independence and unconditional sovereignty of Belgium, Poland, Czechoslovakia, and German Austria, denounced the treaties of Brest-Litovsk and Bucharest, and agreed to allow the Allies carte blanche in dealing with Russia, Turkey, Bulgaria, Hungary, and Austria.

Territorial Terms. Germany lost all of her overseas possessions and some 27,500 square miles, or a trifle over 13 per cent, of her European domain. Alsace-Lorraine was returned to France, and the Saar Basin placed under a League of Nations Commission for 15 years as described above. Belgium received the small districts of Eupen, Malmédy, and Moresnet. Under plebiscites held in February and March, 1920, to determine the status of Northern and Central Schleswig, the former, comprising some 1537 square miles, was reunited with Denmark, but the latter remained with Germany. To Poland were ceded large parts of the provinces of Posen and West Prussia. In July, 1920, plebiscites in southern East Prussia and the Marienwerder district of West Prussia produced very substantial majorities for Germany. The plebiscite in Upper Silesia in March, 1921, gave a majority for Germany, but to the disappointment of the Germans, in October, 1921, the Council of the League of Nations, having been invited to settle the controversy, awarded the richest part of the region, some 12.55 square miles, to Poland. A small portion, 110 square miles, of Upper Silesia was ceded to Czechoslovakia on July 28, 1920. The port of Memel with adjacent territory was ceded to the Allies for ultimate transfer to Lithuania. The port of Danzig was likewise ceded to the Principal Allied and Associated Powers, who in accordance with the agreement described above recognized Danzig as a free city administered under the League of Nations but subject to Polish jurisdiction as regards customs and foreign relations. Germany renounced all special rights and privileges in China, Egypt, Siam, Siberia, Morocco, and Turkey. Her rights and privileges in Shantung were ceded to Japan. (See Washington Conference for eventual Japanese settlement with China.) Germany ceded to the Principal Powers all of her remaining overseas possessions which in accordance with Article 22 of the League of Nations Covenant were to be administered by the mandatories of the League. Already on May 6, 1919, the Supreme Council had made a provisional distribution of mandates. Great Britain was to receive German East Africa. On May 30, however, the British government resigned to Belgium the districts of Urundi and Ruanda contiguous to Belgian Congo to be administered under separate mandate. German Southwest Africa went to the British dominion of South Africa. France and Great Britain were to receive a joint mandate over Cameroon and Togoland with permission to partition them by mutual agreement. German New Guinea was assigned to Australia, German Samoa to New Zealand, the island of Nauru to Great Britain, and the German islands north of the equator to Japan. On Feb. 21, 1921, President Wilson announced that the United States could not agree to have the cable centre on the island of Yap (q.v.) assigned to Japanese control and a new arrangement in regard to it was made at the time of the Washington Conference. For an account of the mandatory system, see Mandates and also League of Nations.

Military Terms. Germany was required to abolish compulsory universal service; to reduce her army to 96,000 men and 4000 officers recruited by voluntary enlistment; to demilitarize all the territory on the left bank of the Rhine and also that on the right bank to a depth of 150 kilometers; to stop all importation, exportation, and nearly all production of war material; to limit her navy to six battleships, six light cruisers, and 12 torpedo boats, with no submarines, the naval personnel not to exceed 15,000 officers and men; and to abandon all military and naval aviation by Oct. 1, 1919. The execution of most of these provisions was to be supervised by an inter-Allied Commission of Control endowed with full powers of inspection and investigation. (See below, *Continuation Conferences.*) In addition, she agreed to demilitarize the island of Helgoland, to open the Kiel Canal to all nations, to surrender her 14 submarine cables, and, last but not least, to permit the trial of her ex-Emperor by an international high court on the charge of "a supreme offense against international morality," and of other officials for violation of the laws and customs of war.

Economic Terms. The economic and reparation provisions of the treaty were exceedingly drastic and constituted a perplexing problem which more than any other aspect of the Treaty of Versailles has subsequently disturbed the peace of the world. (See REPARATIONS.) In addition to paying heavy indemnities, the Germans were required to grant nonreciprocal most-favored-nation treatment to the commerce of Allied nations for a period of years. As guarantees for the payment of reparations, the Allies were to maintain military occupation of the left bank of the Rhine and of the bridgeheads at Cologne, Coblenz, and Mainz, with provisions for the evacuation of the latter three districts at five-year intervals should Germany be duly fulfilling her obligations. Including the Saar Basin (742 square miles), a total area of 12,338 square miles was to be occupied by the Allies and the subsequent seizure of the Ruhr by the French in 1923 added nearly a thousand more.

THE AUSTRIAN TREATY OF ST. GERMAIN

With the signing of the Treaty of Versailles with Germany on June 28, the major task of the Peace Conference was concluded and the most important plenipotentiaries, except Premier Clémenceau, departed from Paris leaving subordinate statesmen and diplomatists in charge. Mr. Lansing, succeeding Mr. Wilson as head of the American delegation, stayed until July, when he withdrew, leaving Mr. Polk, Under-Secretary of State, to act for him. Mr. Balfour became the chief of the British delegation, but in September he, too, departed, surrendering the headship to Sir Eyre Crowe. Premier Orlando's cabinet had fallen from power on June 19 as a result of Italian dissatisfaction over the Adriatic negotiations and his successor, Signor Nitti, refrained from visiting Paris.

Claims of the Succession States. Although giving priority to the settlement with Germany during the first six months of 1919, the Peace Conference had simultaneously taken under consideration the problem of arranging terms of peace with Austria, Hungary, Bulgaria, and Turkey. It was planned to have the five treaties form part of the same general settlement, each beginning with the League of Nations Covenant, and employing as far as possible the same form and phraseology. The second treaty to be drafted and signed was that with Austria. Italy was the only Great Power with vital interests at stake, although France was insistent on preventing the union of Austria with Germany and carried her point during the era of compromise following the French crisis in April. She also favored a confederation of satellite states on the Danube to act as a bulwark against Germany in the southeast. To the numerous other "heirs of the Hapsburgs," however, Czechoslovakia, Poland, and the Balkan Allies, the disposition of Austrian territory was of supreme importance. As a result of the nationalistic revolution in the Dual Monarchy, the division had already taken place along broad lines by the time the Peace Conference met; but problems of frontiers still remained, some of which occasioned most violent conflicts. In Silesia, Poles and Czechs struggled for the control of the district of Teschen with its invaluable coal mines. For discussion of this problem, see TESCHEN. In the Adriatic, Italians and Jugoslavs came to swords' points over Dalmatia. In the Klagenfurt Basin, Italians, Jugoslavs, and German Austrians were ready to come to blows. The conflicting claims and charges of the various litigants, each of which viewed affairs through the colored prism of its own nationalistic ambition, rendered extremely difficult the task which confronted the Supreme Council regarding Austria in the spring of 1919.

Despairing of having the disputants arrive at amicable agreements among themselves, the Council of Ten constituted territorial commissions in February, 1919, to study the boundary problems of the various states except Italy. By the time the reports of these commissions were ready, the Council of Four had superseded the Ten and with few exceptions the unanimous recommendations of the commissions were approved without alteration. Over points in dispute, the Four worked earnestly, paying little attention to the small states. President Wilson finally acknowledged Italy's claim to the Brenner frontier, involving though it did the expatriation of over 200,000 Germans. The approximate boundaries of Czechoslovakia and Jugoslavia were settled in May, the former being assigned regions of Bohemia inhabited by 3,000,000 Germans, the transfer being dictated by economic and strategic considerations.

Work was rushed on the Austrian treaty so that it might be in the hands of the Austrians before the treaty with Germany was signed, for each contained the provision prohibiting union of Austria with Germany, each was to contribute to the territorial resurrection of Poland, and last but not least, Italians were insistent upon a simultaneous settlement with the two countries. An incomplete draft of the treaty was presented to the seventh plenary session with the intention of communicating it to the Austrians on the following day, but the plenipotentiaries of the Succession and Balkan States demanded time to study the document. Two days later at the eighth plenary session, Premier Bratiano of Rumania, supported by the Polish, Czechoslovak, and Jugoslav representatives, protested against having the Great Powers prescribe regulations for the protection of minorities within their separate states. Mr. Wilson answered that the Principal Powers could not be expected to guarantee the independence and integrity of the new states unless the latter would on their side guarantee equality of rights to racial or religious minorities transferred to their control under the peace settlement. Rumania and Jugoslavia, though greatly enlarged by the new readjustments, were old states and denied the right of the Conference to limit their sovereignty by special restrictions. Venizelos of Greece suggested that a joint meeting of the Council of Four with the smaller Allies ought to be held to consider the legitimate anxieties of the latter; but all objections were overruled by Clémenceau, Lloyd George, and Wilson.

The Austrian delegates had arrived at St. Germain near Paris on May 14, and on June 2, the preliminary draft of the treaty was transmitted to them. On July 20, the Supreme Council transmitted a more complete and revised draft of the treaty to the Austrians, informing them that Burgenland, or German West Hungary, for whose annexation they had asked would be ceded without a plebiscite. (See BURGENLAND.) The Austrians formulated and presented their observations on the revised terms on August 6, still protesting against the patent violations of the principle of self-determination. In their final reply of Sept. 2, 1919, the Allied and Associated Powers made few additional concessions—perhaps the most noteworthy being the return to Austria of the important railway junction of Radkersburg originally assigned to Jugoslavia. On September 8, the Austrian National Assembly authorized its delegates to sign the treaty, and this ceremony took place at St. Germain on September 10; but the opposition of Rumania and Jugoslavia to acceptance of Minorities Treaties to which they would have pledged themselves by underwriting the Austrian treaty led them to refuse to sign, until some time later. Though the Austrian National Assembly had already perforce ratified the Treaty of St. Germain on October 17, ratifications were not exchanged until July, 1920.

Political and Military Terms. The Treaty of St. Germain required Austria to recognize the complete independence of Jugoslavia, Czechoslovakia, Poland, and Hungary, to make liberal cessions of territory to various victorious neighbors including Italy, and to accept elaborate regulations for the protection of such racial, religious, or linguistic minorities as remained within her much-diminished territorial confines. As described above, the cession of lands to Italy included not only *Italia Irredenta* but also for strategic reasons the Brenner Pass frontier in the Tyrol with over 200,000 German inhabitants. One-fourth of the inhabitants of the new state of Czechoslovakia were Germans in Bohemia and Moravia, this violation of the principle of self-determination being motivated by economic and strategic considerations and justified on historical grounds. Eastern Galicia, inhabited by a Ruthenian majority with a strong Polish minority, had been bitterly contested between these two nationalities, and had been seized by the Poles during the Conference; it was renounced by Austria in favor of the Principal Allied and Associated Powers, who acquiesced in Poland's *de facto* possession of the region, without definitively settling the question of sovereignty. The Duchy of Bukovina, with 300,000 Ruthenian and 273,000 Rumanian inhabitants, was renounced by Austria in favor of Rumania.

As a result of the Klagenfurt plebiscite of October, 1920, the whole of that much-contested area remained Austrian. An additional solace was the award of German West Hungary (Burgenland). Thus, through revolution and dismemberment, the State of Austria shrank from its pre-war expanse of 116,000 square miles to the diminutive area of 32,000 square miles. The Austrian Army was reduced to 30,000 men recruited by long-term voluntary enlistments; military aëronautics were prohibited; all war vessels were surrendered and future maintenance of naval forces obviated through loss of maritime ports. Commercial clauses of general similarity to those in the Treaty of Versailles were imposed upon Austria. She was guaranteed free access to the Adriatic. A commission on which Great Britain, France, Italy, Rumania, and the riparian states were represented was established to regulate traffic on the Danube. All transferred territories were made responsible for their fair shares of the pre-war Austrian debt. Austria was obligated to pay such indemnities as might be prescribed by the International Reparations Commission, but so crippled was the new Republic politically, industrially, and commercially that in a few years intervention by the League of Nations proved necessary to straighten out her finances. See LEAGUE OF NATIONS; AUSTRIA; REPARATIONS.

THE BULGARIAN TREATY OF NEUILLY

Following the settlement with Austria, the Supreme Council devoted more attention to the task of arranging peace with Bulgaria—the first of the Central Powers to lay down her arms at the end of the World War. The protracted delay which intervened between the arrival of the Bulgarian delegation on July 26 and the formal presentation of a preliminary draft of their treaty on Sept. 19, 1919, led to considerable exasperation on the part of their truculent leader, M. Theodoroff. Learning the substance of the treaty conditions from the press, he lodged strenuous objections with the Supreme Council on September 2, denying that Bulgaria was the one "guilty, imperialistic, and aggressive nation" in the Balkans and protesting against the violations of the principle of self-determination prefigured in the proposed dismemberment of Bulgaria.

These objections to the territorial terms were reiterated in the formal observations submitted on October 24. The Bulgarians also complained about their exclusion from the League of Nations and demanded changes in the military provisions so as to permit the retention of conscription. The reply of the Supreme Council on November 3 promised speedy admission to the League, but otherwise made no substantial concessions. Further remonstrances from the Bulgarians had no effect other than the issuance of an ultimatum on November 5 demanding acceptance or rejection in 10 days. Meanwhile in Bulgaria, a general election held in August had resulted adversely to the Government and a new ministry recruited from the Agrarian Party under the leadership of M. Stambulisky came into power in the midst of the agitation about the treaty. On November 13, the Bulgarians still protesting yielded to superior force. Premier Stambulisky declared that he had "no illusions" and would sign "even a bad peace." He was the sole signatory for Bulgaria when the Treaty was signed at Neuilly on November 27. Jugoslavia and Rumania were not permitted to sign until they had accepted the Minorities Treaties supplementary to the Austrian Treaty. Ratifications of the Treaty of Neuilly were exchanged on Aug. 9, 1920.

Many clauses of the treaty were identical with those of the Treaties of Versailles and St. Germain, notably the League of Nations Covenant, the Labor Convention, aëronautical provisions, penalties, etc. Politically, Bulgaria was required to recognize the independence of Jugoslavia, to renounce the benefits of the Treaties of Bucharest and Brest-Litovsk and to accept regulations for the protection of racial, national, religious, and linguistic minorities. Territorially, Bulgaria was deprived of most of her gains resulting from the Balkan Wars and all of her conquests made during the World War. The Dobruja went to Rumania, as before 1914, leaving for future consideration the problem of inducing Rumania to relinquish such Bulgarian districts as it included. Thrace was ceded to the Principal Powers for ultimate assignment to Greece. Particularly embittering to Bulgaria was the loss of the small districts of Tsaribrod, Bosilegrad, Strumitsa, and Timok Valley—all predominantly Bulgarian but all transferred to Jugoslavia for strategic reasons. Jugoslavia had suffered grievously from Bulgarian attack and domination during the recent War, and in the bitterness of retaliation demanded other territorial annexations, but these were denied to her on ethnographic grounds. A small district of former Turkey was added to Bulgaria on the southeast. Bulgaria was obliged to abandon conscription, to reduce her army to 20,000 officers and men together with gendarmes and other police to a number not exceeding 13,000. All war vessels except four torpedo boats and six motor boats were to be surrendered or destroyed, military aëronautics prohibited, and the manufacture of munitions strictly limited. In addition, Bulgaria was to pay extensive reparations (two and a quarter billion gold francs in 37 years), supply live stock for devastated areas, and ship large allotments of coal to Jugoslavia annually for five years. Commercially, she agreed to give the Allied and Associated Powers most-favored-nation treatment and freedom of transit for goods and persons, receiving in return the guarantee of freedom of transit to the Ægean with which her territory was no longer contiguous.

THE HUNGARIAN TREATY OF TRIANON

The conclusion of peace with the Hungarian wing of the old Hapsburg Dual Monarchy was a protracted and difficult task, complicated alike by perplexing boundary disputes among the victors and by political instability and intransigence upon the part of the vanquished. The democratic republican régime established in Hungary by the revolution of November, 1918, was supplanted in March, 1919, by a Bolshevist dictatorship on the Russian Soviet model just at the most critical moment of the Paris Peace Conference. (See above.) The Communist leader, Béla Kun, defied the Supreme Council during the crucial months of April, May, and June. However, due to the exigencies of diplomacy and the nationalistic ambitions of the Balkan Powers, early decisions were arrived at regarding the territorial dismemberment of Hungary. Great difficulty was encountered in reconciling and adjusting the divergent interests and conflicting claims of both Jugoslavia and Rumania.

The secret treaty of August, 1916, which purchased Rumania's entrance into the World War, proved a source of much bickering and bitterness. Premier Bratiano of Rumania asked for the complete fulfillment of treaty stipulations, but the Big Four, arguing that all previous commitments were cancelled by Rumania's signature of the Treaty of Bucharest in May, 1918, refused to accede to his demands. The Banat of Temesvar (q.v.), all of which had been assigned to Rumania by the Treaty of 1916, was now partitioned between her and Jugoslavia. Despite reiterated Rumanian claims and objections, the terms of this settlement were definitely arranged in June, 1919. On June 13, the Supreme Council informed the Hungarians of the proposed cessions of territory to Rumania, Jugoslavia, and Czechoslovakia, and on July 20, as recounted above, the rich district of Burgenland (German West Hungary) was promised to Austria. For Hungarian political developments during this period, see HUNGARY. On January 7, the Hungarian delegates, after the establishment of a home government satisfactory to the Supreme Council, arrived at Trianon, France, and here January 15 they were formally presented with a preliminary draft of their treaty, the main terms of which had been ready as early as September, 1919.

Council of Ambassadors. One week later —on Jan. 21, 1920—the Supreme Council convened for the last time and the Peace Conference of Paris was thus formally dissolved approximately one year after its sessions had begun. To the Council of Allied Ambassadors in Paris was intrusted the task of completing the settlements with the remaining enemy powers of Hungary and Turkey though periodic conferences of the Allied premiers were shortly to be inaugurated for the purpose of dealing with other unliquidated problems of the peace. See below: *Continuation Conferences.*

On February 12, the Hungarians submitted a set of observations and counter-proposals which breathed a spirit of hostility and recalcitrance. They demanded the retention of the Czechlers (Magyars) of East Transylvania, and asked that no territories be transferred without plebiscites according the inhabitants the right of self-determination. All transferred territories were to be retained in the Hungarian customs régime for a period of years, and better safeguards provided for the protection of Hungarian minorities. The Allies were in no mood to make concessions. The strong reactionary nationalist and monarchist sentiment rampant in Hungary elicited a joint statement from Great Britain, France, and Italy on February 12 to the effect that a Hapsburg restoration would *ipso facto* violate one of the fundamental conditions of the peace settlement and call forth condign punishment. The new Parliament elected early in 1920 designated Admiral von Horthy as "Protector of the Magyar Republic," but despite the emphatic pronouncement of the Allies, the monarchial character of the constitution was reaffirmed on March 23. Hungary was a kingdom without a king. Such being the situation, the requests of her delegates for more moderate treatment met with scant consideration. The reply of the Council of Ambassadors on May 6 contained but slight alterations though it was asseverated that the League of Nations would be free to make such minor modifications of boundaries on ethnological or economic grounds as the future might reveal as feasible or desirable. The treaty was formally signed at Trianon on June 4. Hungary ratified the treaty on Nov. 13, 1920, and was admitted to the League of Nations in September, 1922.

The Treaty of Trianon duplicated the main features of the Austrian treaty except as regards territorial adjustments. By its terms, Hungary was transformed from a maritime, imperialistic country of 125,000 square miles into a landlocked fourth-rate power of some 35,000 square miles. On all sides, liberal cessions were to be made to neighboring states. The region of Slovakia on the southern slope of the Carpathian Mountains, though containing a large minority of Magyars, was incorporated in the new state of Czechoslovakia for economic and stragetic, as well as ethnic, reasons. To Rumania was assigned Transylvania with its compact Magyar minority in the East. A broad strip of Hungarian plain also was detached to secure Rumania's railroad communications with the Danube. Of the much contested Banat of Temesvar (q.v.), Jugoslavia received the county of Torontal in the west, the remainder going to Rumania. Jugoslavia also received Croatia-Slavonia, Bosnia, and Herzegovina. Fiume was renounced, to be disputed by Italy and Jugoslavia. Likewise to Czechoslovakia, almost purely for strategic reasons, was given the region called sub-Carpathian Ruthenia, autonomy being stipulated for the benefit of the 572,000 inhabitants. To Austria was renounced the region of Burgenland (see above).

Hungary was precluded from alienating her independence except with the consent of the League Council. Compulsory military service was abolished and her army was reduced to 35,000 men together with police to a number not exceeding 31,500. She was required to pay a reasonable sum of reparations before May 1, 1921, and such total sums in sixty semi-annual installments thereafter as might be decided upon by the Reparations Commission. All of her merchant shipping and up to 20 per cent of her river fleet were to be surrendered; an indefinite quantity of live stock was to be furnished for devastated countries; and Jugoslavia was to be supplied with annual allotments of coal for five years. Deprived of two-thirds of her territory and population, crippled economically and surrounded by more or less hostile states, Hungary yet constituted a potent menace to the future peace of the Balkans. Three million Magyars, now aliens in adjacent countries, created a new irredentist problem so dangerous that in 1920 the Succession States of Czechoslovakia, Jugoslavia, and Rumania formed the so-called "Little Entente" to meet it—an alliance calling for the indefinite maintenance of standing armies to guard against the restoration of the Hapsburgs or a Hungarian war of revenge. See LITTLE ENTENTE.

CONTINUATION CONFERENCES

The Paris Peace Conference, as we have seen, adjourned on Jan. 21, 1920, before the Hungarians had decided to accept their treaty and before the Adriatic question including the problem of Fiume and the disposition of Dalmatia, Albania, and Thrace had been settled. Even more important, no agreements had been reached upon three outstanding and vital issues, viz., the terms of the treaty with Turkey, the question of future relations with Soviet Russia and the fringe of states on her western border, and the enforcement of the treaties already signed or projected, especially the Treaty of Versailles with Germany, the task of executing which embraced a whole range of subjects such as reparations, disarmament, punishment of war-criminals, plebiscites, etc. These three major problems to say nothing of a host of subsidiary and secondary issues engaged the attention of the world continuously after 1919 and necessitated a protracted series of difficult and delicate negotiations during which the appearance of Allied unity which had been so precariously maintained hitherto was even more seriously undermined.

On Jan. 16, 1920, pursuant to the call of President Wilson, the first session of the League of Nations Council convened in Paris, but though inextricably interwoven with the terms of the peace treaties and specially devised as a convenient and indispensable instrument of international coöperation and adjustment, the League was destined to play a relatively insignificant rôle in the controversies growing out of the territorial and economic settlement. (See LEAGUE OF NATIONS.) Rather, the work of carrying on diplomatic arrangements at the termination of the Peace Conference devolved upon the two agencies already mentioned: the Council of Ambassadors and the Council of Allied Premiers and Foreign Ministers. These councils held a rapid succession of formal and informal conferences during the ensuing years, now dealing with Russia, now with the execution of the German Treaty, then again with Turkey, Fiume, or Upper Silesia. It was impossible to confine attention to any one problem until it was solved. Others simultaneously pressed for adjustment and the divergence of national interests led inevitably to the use of the traditional and time-honored diplomatic methods of *quid pro quo*, compromise and compensation, interjected with accusations, threats, economic retaliation, ultimatums, and armed clashes. The liquidation of two of these problems, i.e., the Turkish peace and the enforcement of the treaties, is discussed below. Under RUSSIA will be found an account of the handling of the Russian problem.

THE SETTLEMENT WITH TURKEY

The Turkish Secret Treaties. Of all the spoils of the World War, the Ottoman Empire was among the richest. A long series of secret agreements were negotiated among the Allied Powers from 1915 to 1919 concerning the future political control and economic exploitation of Turkey. In March, 1915, Russia was assured of the annexation of the Straits and of Constantinople in return for assent to the assignment of the neutral zone of Persia to Great Britain and concessions to British interests in Mesopotamia and Egypt. On Apr. 26, 1915, by the Treaty of London, Italy was promised, among other things, a share in the Turkish Empire equal to that of Great Britain, France, and Russia, and including the port of Adalia and its hinterland. A more specific delimitation of interests took place in 1916. On April 26, one year after the Treaty of London, France and Russia signed the secret Sazonov-Paléologue Treaty dealing with their respective interests in northern Asiatic Turkey. Russia was awarded a vast domain of 60,000 square miles between the Persian frontier and the Black Sea, with immense deposits of silver, salt, and copper. The French were assigned a large slice of territory reaching south and west to the Mediterranean, the exact boundaries to be arranged with the British. Two weeks later on May 9, the famous Sykes-Picot Treaty prospectively partitioned the southern part of Asiatic Turkey, allotting Syria, Cilicia, and Southern Armenia to France in full sovereignty and establishing a French sphere of influence over the extensive and valuable provinces of Aleppo, Damascus, Deir, and Mosul. Great Britain was given complete control over the Mediterranean ports of Acre and Haifa and the region of lower Mesopotamia stretching from Bagdad to the Persian Gulf. Italy was excluded from these pacts, but learning of them in roundabout ways manifested such grave discontent that on Apr. 17, 1917, a new secret agreement, that of St. Jean de Maurienue, was signed. As subsequently modified in August, 1917, it provided that Italy was to get almost complete possession of the southern half of Anatolia, including the cities of Adalia, Konia, and Smyrna, together with an extensive sphere of influence in the region northeast of Smyrna inhabited chiefly by Greeks and Turks.

Curiously enough, it was at this same time that the United States entered the War and that Allied statesmen were issuing fresh declarations of unselfish war aims. To be sure, the Russian Revolution and subsequent socialistic renunciation of all imperialistic ambitions combined with growing labor unrest to complicate the situation. In his address of Jan. 5, 1918, Mr. Lloyd George, speaking for the British government, disclaimed any intention of depriving Turkey of its capital, "or of the rich and renowned lands of Asia Minor and Thrace . . . predominantly Turkish in race," but did advocate a recognition of the separate national conditions of Arabia, Armenia, Mesopotamia, Syria, and Palestine. Three days later, Mr. Wilson in his Fourteen Points speech stated that the Turkish portion of the Ottoman Empire "should be assured a secure sovereignty," but that submerged nationalities should be accorded "unmolested opportunity of autonomous development" and the Dardanelles should be permanently neutralized under international guarantees. This very definite pledge formed a part of the pre-armistice agreement which both Germany and the Principal Powers agreed to be morally binding for the Peace Settlement. Secret negotiations, however, continued to vitiate professed idealism. Lloyd George's speech in addition to reassuring British labor, mollifying Indian Moslems, and supporting Wilsonian internationalism served the ulterior but no less effective purpose of intimidating the French in secret dealings with regard to Turkey. In December, 1918, Clémenceau having visited London to secure confirmation of the Sykes-Picot arrangement of 1916, Lloyd George demanded the transfer of the valuable oil region of Mosul from the projected French sphere of influence to British control and also permission to determine the future of Palestine. Secret conversations continued unknown to "allied" Italians and "associated" Americans, and on February 15, a month after the Peace Conference began, the French were eventually obliged to accept the British proposal. On Mar. 20, 1919, just on the eve of the great French crisis described above, the finely spun network of secret treaties seriously entangled the Big Four in its meshes, when, in secret session of that supreme conclave, Lloyd George pressed for the dismemberment of Turkey. A heated controversy ensued between the British and the French. Wilson refused to acknowledge the validity of the secret engagements and proposed a settlement on the basis of his Twelfth Point. The matter was eventually compromised by the application of the mandate principle to transferred territories.

Other disputes arose continually. Early in February, 1919, the Italian claim to the Smyrna area having lapsed owing to the failure of Russia to sanction the St. Jean de Maurienne arrangement, the Greeks put in a claim to that region and also disputed Italian occupation of the Dodecanese. Italy sent expeditions to Smyrna and otherwise showed a disposition to anticipate decisions by the Conference; but when the Italians were absent from Paris in late April and early May, 1919, during the Fiume impasse, Venizelos pressed his claim and on May 6, unknown to the Italians, secured the secret authorization of the Big Three to occupy Smyrna. This move, being duly executed in the space of a fortnight, further embittered the Italians, and contributed to arousing Turkish nationalism with the dire consequences noted below. Lloyd George advanced numerous sordid schemes for solving the Fiume situation by granting Italy concessions in Asia Minor and Africa, but they all fell through.

The collapse of Russia caused a long and acrimonious discussion of the future disposition of Constantinople and the Straits. France, Great Britain, and Italy being seriously distrustful of one another, the United States was offered a mandate as early as February, 1919. Wilson favored the idea, but refused to pledge the American people. The subsequent course of events in America led to the abandonment of the project, caused great fluctuations in Allied policy and indefinitely delayed the signing of the Turkish Treaty. In November and December, 1919, while the Supreme Council was yet functioning, the Turkish settlement was discussed by representatives of Italy, France, and Great Britain in special conferences, and on Feb. 16, 1920, at a conference held in London, it was finally announced that Constantinople would be left under Turkish suzerainty. The work of drafting the treaty was then pushed.

The San Remo Conference. On April 24, at the Conference of San Remo, the main outlines of the settlement were completed. Mandates for Syria, Cilicia, and Lebanon were promised to France; for Adalia and Rhodes to Italy; for Palestine and Mesopotamia (including Mosul) to Great Britain; and for Armenia offered first to the League of Nations and later to the United States, both refusing to accept. Simultaneously, the French and British delegates at San Remo signed a secret agreement providing for an equal division of interests and exploitation in Rumania for the transfer of the formerly German-owned quarter-interest in Mesopotamian oil, together with a quarter-interest in Anglo-Persian oil piped to the Mediterranean through territory under French mandate, in return for the provision by France of pipe lines and branch railways for the movement of their oil. The terms of this agreement gradually transpired despite denials by the signatories, and on November 20, Secretary of State Colby (successor of Mr. Lansing) lodged a vigorous protest refusing to recognize the establishment of these oil monopolies in Mesopotamia and elsewhere. This merely stimulated the British to negotiate a new secret convention with France on Dec. 23, 1920, confirming the previous agreement. On May 11, the preliminary draft was handed to the Turkish delegates at Sèvres, France. Its terms produced great excitement among the Nationalists in Turkey, who, under the leadership of Mustapha Kemal Pasha, evinced a determination to defy the Allies and work for the regeneration of their country's fallen prestige and power. See TURKEY.

Boulogne and Spa Conferences. During May and June, the Nationalists, in control of Asiatic Turkey, drove the French to the coast of Cilicia and then threatened the Straits zone. So menacing did the situation become that on June 21, the Conference of Boulogne at which were represented France, Great Britain, Italy, Japan, Belgium, and Greece, authorized the Greeks to undertake military operations against the Nationalists. At the Conference of Spa, Turkish requests for modifications in the peace conditions were rejected and an ultimatum was issued to coerce the Sultan's government, whose authority, due to the Nationalist revolt, now scarcely extended beyond the confines of Constantinople, where it was both bolstered up and seriously limited by Allied occupation. On Aug. 10, 1920, the Treaty was signed at Sèvres, simultaneously with the signature of a secret tripartite agreement among Great Britain, France, and Italy and also of a special convention between Italy and Greece. Representatives of the United States and of Hedjaz were not present, and the Jugoslav delegates refused to sign.

Treaty of Sèvres. By the terms of this Sèvres Settlement of Aug. 10, 1920, the century-long devolution and dismemberment of the Ottoman Empire was virtually consummated. Territorially, it was reduced from its 1914 area of 710,000 square miles to a small Turkish national state confined mainly to the interior of Asia Minor and embracing an area of less than 100,000 square miles. The Arab State of the Hedjaz was emancipated from Turkish sovereignty, though subjected to British control. Armenia became a free Christian Republic, her boundary with Turkey to be arbitrated by President Wilson. Palestine, including Transjordania, under a League of Nations mandate held by Great Britain, was to afford a national homeland for the Jews. Syria, with Cilicia, was likewise detached from Turkey and made a mandate of France. Southern Anatolia, including the port of Adalia, was constituted as an Italian "sphere of influence," being a sorry remnant of the princely domain marked out for Italy by the St. Jean de Maurienne agreement. Smyrna and its hinterland were transferred to Greece together with Thrace, Adrianople, the peninsula of Gallipoli, and the islands of Tenedos and Imbros.

By special arrangement with Italy, the Dodecanese Islands in the Ægean, which had been occupied by Italy since the end of the Tripolitan War in 1912, were to be yielded to Greece with the exception of Costellorizo and Rhodes, whose status was to be determined by plebiscites. In the case of the latter, the plebiscite was to be held only in case Great Britain, whose sovereignty over Cyprus was recognized by Turkey, ceded that Island to Greece. The French protectorates over Tunisia and Morocco were validated, as were also those exercised by Great Britain over Egypt and the Sudan. The coasts of the Dardenelles, the Sea of Marmora, and the Bosporus were erected into a neutralized "zone of the straits" controlled by a League of Nations commission consisting of British, French, Italian, Japanese, Rumanian, Greek, and Turkish members. The capitulations which the Sultan had abrogated in 1914 were revived and amplified; Turkey was made responsible for the costs of the Allied military occupation, and her own army was to be reduced to a maximum size of 50,000 men. A Financial Commission was instituted to supervise taxation, customs, loans, and currency, to control the Turkish budget, and ratify or reject proposed economic concessions, and all of this was to be done, in the language of the tripartite agreement, "to help Turkey, to develop her resources, and to avoid the international rivalries which have obstructed these objects in the past."

Rejection of the Sèvres Treaty. Despite the acceptance of the Treaty of Sèvres by the Sultan's government at Constantinople, the divergent interests of the Great Powers created a serious lack of unity on the Near Eastern question which proved fatal when the Turkish National Assembly at Angora refused to ratify such an unjust convention. By October, 1920, through a series of successful military campaigns (see TURKEY), Mustapha Kemal Pasha obliterated the Armenian Republic, rendered the French position in Cilicia untenable, forced the British Army of occupation back into the Ismid peninsula, and compelled the Italians to withdraw their troops to Adalia. Menaced by an Arab rebellion in Syria, unable to protect Cilicia against the Nationalists, unwilling to increase the size of their Syrian military establishment which already numbered 100,000 men, dissatisfied with the distribution of spoils in the Near East, fearful of the augmenting power and prestige of British imperialism, the French decided to scrap the Treaty of Sèvres and come to terms with the Angora government of Mustapha Kemal Pasha. Having broached the project to the noncommittal Lloyd George at the London Conference of February–March, 1921, they negotiated directly with the Angora delegation and on March 9, there was signed at London a Franco-Turkish agreement terminating hostilities in Cilicia. The Nationalists recognized the special social and cultural interests of France in Turkey, confirmed French interests in the Bagdad Railway and promised favorable concessions to French capitalists in Cilicia and southern Armenia. France on her part was to evacuate Cilicia, readjust the Turco-Syrian boundary, and adopt a more benevolent attitude toward the Grand National Assembly. See CILICIA.

The Italian situation in Turkey also was very menacing, for Italian troops had been driven out of Konia and maintained but an increasingly precarious position at Adalia. The Treaty of Sèvres was distinctly unpopular in Italy for it had registered a subversion of Italian prospects in Asia Minor to the advantage of the hated Greeks. Accordingly, on March 13, a Turco-Italian agreement was signed at London providing for the withdrawal of Italian troops from Ottoman soil and for economic collaboration between Italy and Turkey in the Adalian hinterland, together with the granting of certain valuable concessions to Italian capitalists. The Italian government also pledged itself to support effectively Turkish demands for untrammeled sovereignty and the restitution of Thrace and Smyrna. Their valiant resistance having elicited a sympathetic response from Bolshevist Russia, on Mar. 16., 1921, the Turkish Nationalists achieved another diplomatic triumph when a treaty was signed at Moscow with the Russian Socialist Federated Soviet Republic. Russia refused to recognize the validity of the Treaty of Sèvres, disavowed all imperialist ambitions in Turkey, ceded outright the Caucasian territories of Kars and Ardahan, and declared the capitulatory régime null and void as being incompatible with Turkey's autonomous national development.

Further negotiations conducted between France and Turkey during the summer of 1921, for the purpose of confirming and elaborating their March agreement, culminated in the signing of the Treaty of Angora, on October 20. The British were outraged at what they termed this breach of good faith and stimulated the Greeks to renewed efforts against Turkey. The Franco-British Entente Cordiale was strained to the breaking point, not alone by antithetical policies in the Near East, but by acute differences simultaneously manifested over relations with Russia, naval disarmament, and German reparations. During the protracted and sanguine war between Greece and the Turkish Nationalists in Asia Minor during 1921–1922, the British supported the Greeks as convenient tools for the advancement of their own interests, but the French and Italians aided and abetted the Turks even to the extent of withdrawing their troops from Constantinople. The decisive victories of Mustapha Kemal Pasha during the late summer and autumn of 1922 swept the Greeks out of Smyrna. An armistice between the Turks and the Allies was signed at Mudania, Oct. 10, 1922, permitting the former to retain Smyrna, take over the administration of Constantinople, and reoccupy Eastern Thrace, pending the formulation of a new peace treaty, to replace the thoroughly discarded Treaty of Sèvres.

Lausanne Conference. A conference of the Turks and the European Powers was convened at Lausanne, Switzerland, on Nov. 20, 1922, and was in session for eleven weeks, when it broke down, on Feb. 4, 1923, owing to the peremptory refusal of the Turkish delegation to accept a treaty drafted by the Allied leaders. All hopes of destroying Turkish power by fostering Greek imperialism in Asia Minor had been dissipated, but Great Britain was determined to maintain control of Mesopotamia (particularly Mosul) and to secure continued neutralization of the Straits. The French, supporting the Turks on these territorial questions, nevertheless aroused their suspicion and opposition by insisting on the maintenance of the Capitulations and the confirmation of all Allied concessions in Turkey. French prestige received a substantial setback with the granting (April 10) to American interests of the Chester concessions which authorized railroad construction and industrial developments throughout Eastern Asia Minor. The breach between France and Turkey grew wider with the lapse of time and when at Turkish suggestion and with Allied acquiescence the Conference of Lausanne was resumed on April 22, the French steadily lost ground, but, their power being almost wholly absorbed in the contemporaneous occupation of the Ruhr, they were unable to coerce the Turks into any measurable recognition of their claims. On May 15, it was disclosed that a syndicate of British interests had purchased a controlling interest in the Bagdad Railway.

The Lausanne Treaty. On July 24, 1923, the treaty was finally signed at Lausanne by representatives of Great Britain, France, Italy, Japan, Greece, Rumania, and Turkey which constituted a drastic revision of the whole Near Eastern Settlement as registered in the Treaty of Sèvres. Jugoslavia alone refused to sign because of dissatisfaction with the Ottoman debt settlement. Turkey definitely resigned all claims to Hedjaz, Palestine, Transjordania, Mesopotamia, and Syria, but she retained all of Anatolia, Turkish Armenia, Cilicia, Adalia, Smyrna, Constantinople, Gallipoli, Adrianople and Eastern Thrace to the Maritza River. Along the new European frontier, a neutral or demilitarized zone 60 kilometers wide was created, to prevent border conflicts. Likewise, but for a different purpose, the Gallipoli peninsula and the shores of the Straits were demilitarized and the Straits themselves were placed under an international commission supervised by the League of Nations. The "freedom of the Straits," for which the British Foreign Minister, Lord Curzon, had so valorously battled, was assured by a separate convention, bearing all the earmarks of compromise, by which merchant and war vessels, the latter in restricted number, were permitted liberty of passage in peace and war, except in case Turkey should be one of the belligerent powers. Disposition of the coveted oil fields of Mosul, in dispute between Britain and Turkey, was to be decided by diplomatic agreement, or, that failing, by reference to the League. Not only were the fettering restrictions which the Allies had attempted to place on Turkish finance, Army, and Navy, struck off, but reparation claims were canceled and the Allies recognized the abolition of the Capitulations, stipulating merely that Turkey should appoint for a transitional period of five years four legal councilors, from neutral states, to observe the working of the Turkish courts. The Nationalists, in short, won a remarkable diplomatic victory in their single-handed diplomatic combat with the powers of Europe. The erstwhile aggressive Greeks were thoroughly humiliated. Not only were they compelled to surrender Smyrna, Gallipoli, and Eastern Thrace to Turkey, but also to resign again to Italy the Greek-speaking Dodecanese islands in the Ægean. Some 600,000 Greek nationals were to be deported from Turkish territory in exchange for Turkish nationals.

ENFORCEMENT OF THE VERSAILLES TREATY

Some portions of the Treaty of Versailles, such as the guarantees of its execution prescribed in part 14, were merely recognitions of *faits accomplis,* and others were speedily put into operation. The League of Nations and the International Labor Organization authorized by parts 1 and 13, respectively, were early established—the first International Labor Conference being held in 1919 and the first session of the League of Nations being convened in 1920. Part 7, relating to penalties, proved practically impossible of execution. On the ground that no existing international court possessed legal jurisdiction, the Dutch government refused to comply with reiterated Allied demands for the extradition and trial of the former German Emperor, and in March, 1920, the "solemn farce" was terminated by an understanding that William II would be indefinitely interned in Holland and prevented from participating in any further international mischief. A similar demand made upon Germany in February, 1920, for the extradition of some 882 war criminals, including civilians and military and naval officers of high rank, was finally abandoned in favor of a German proposal that the accused be tried by a German Federal Court at Leipzig. The Inter-Allied Justice Commission promptly transmitted to Berlin the names of some 46 offenders against whom the evidence was most conclusive, the Allies reserving the right to hold retrials should they consider the verdicts palpably unjust. The Germans were very dilatory about proceeding to try these men and though the matter was discussed at the Spa

Conference (July 5–16, 1920), it was not until after the Allied ultimatum of Apr. 30, 1921, demanding action on this point among others, that trials began at Leipzig. A few convictions resulted, but the whole proceeding was rather farcical.

Territorial cessions and boundary readjustments prescribed under parts 2, 3, and 4 were effected, as far as Germany was concerned, without great difficulty except in the case of Upper Silesia. The economic sections of the treaty relating to ports, waterways, and railroads, etc., occasioned some difficulty, but the really great conflicts took place over German disarmament, involving the all-important issue of French security, and over reparations, involving a whole complex of issues, such as time and methods of payment, inter-Allied allocation of the proceeds, inter-Allied concellation of debts, the restoration of northern France, Belgium etc., the economic rehabilitation of Europe, French security, extension of Allied occupation of German territories (e.g., seizure of the Ruhr), and the maintenance or disruption of Allied solidarity. See REPARATIONS.

The treaties of 1919–1920, as we have seen, provided for the unilateral application of the principal of disarmament with the avowed purpose of attaining that long-sought objective—the destruction of German militarism. Throughout 1920, the Allies had to insist on reduction of the German Army to the 100,000 limit imposed by the treaty. At the Spa Conference (April 18–25), Premier Millerand, yielding to an Italian demand for trade negotiations with Russia, and to Lloyd George's Near Eastern importunities, secured as the price of his consent on these two points, a joint demand upon Germany for immediate disarmament, a refusal of a German request for a permanent army of 200,000 men, and a severe warning against future infractions of the treaty. At the Spa Conference (July 5–16), German disarmament was the first question considered. After a heated discussion, Germany, in return for her promise to disband immediately certain auxiliary forces such as the *Sicherheitspolizei* and *Einwohnerwehr*, was finally granted (July 9) permission to postpone until Jan. 1, 1921, the reduction of her army to the prescribed limit, though it was stipulated that it should not exceed 150,000 effectives after Oct. 1, 1920. As a guarantee of her faithful execution of these requirements, the Allies reserved the right to invade and occupy the Ruhr Valley or other regions.

After the Spa Conference, the question of German disarmament continued to be the subject of numerous notes exchanged between the Entente Powers and the German government. The Germans, however, failed to live up to their promises, and disarmament along with reparations again came to the fore at the Paris Conference Jan. 24–29, 1921, at which time they were given until July 1 to comply with the Spa agreement. Persistent dilatoriness on this point together with nonpayment of reparations and postponement of war-criminals' trials, led to the issuance of an ultimatum (May 7, 1921) by the London Conference threatening invasion of the Ruhr should not the Germans without reservations comply with treaty requirements by May 12. On May 10, the Reichstag voted to submit. Thereafter better progress was made. The work of disarmament continued under the supervision of the inter-Allied military control commission. French security constituted an important subject of discussion at the Cannes Conference, January, 1922. As the best method of adequately protecting France against attack and of fostering peace in Europe, Lloyd George, voicing English opinion, advocated a tripartite agreement embracing England, France, and Germany. Premier Briand vehemently opposed this plan and demanded an Anglo-French military alliance. After considerable parley, a 10-year treaty was signed (but never ratified) by which both powers reaffirmed their common interest in those provisions of the Versailles Treaty relative to German fortifications and military activities along the Rhine; both powers undertook also to act in concert should Germany take any measures incompatible with the treaty, and Great Britain specifically promised to place her naval, military, and aërial forces at the disposal of France in the event of direct and unprovoked aggression by Germany. Bitter opposition in the French Chamber of Deputies to Premier Briand's promises to moderate his attitude toward Germany led to his supersession by the nationalistic Poincaré. This change in the French government put an end temporarily to the chance of recementing Entente solidarity and foreshadowed the military occupation of the Ruhr. At the Genoa Conference Apr. 10–May 15, 1922, Lloyd George proposed a 10-year European nonaggression compact, but the French refused to accept this plan unless every other European nation agreed to sign, unless Russia recognized all her existing boundaries during the 10-year period, and unless France forfeited none of her rights for enforcement of the Versailles Treaty. During 1920–1921, France and Great Britain had drifted apart due to divergence of interests and policies, as regards German reparations, Poland and relations with Russia, and Turkey and the Near Eastern settlement. In January, 1923, the Franco-Belgian seizure of the Ruhr further undermined their relations, and the *entente cordiale* of 1904 had been definitely transformed into suspicion and dislike, exacerbated not only by the above-mentioned differences on questions of policy but also by a keen rivalry in aëronautical expansion. France, meanwhile, in an endeavor to stabilize the treaties of which she had been the most active and powerful defender, had forged a network of alliances with other European states. In July, 1920, a defensive alliance was concluded with Belgium; in February, 1921, with Poland; and in 1924, with Czechoslovakia and Rumania. France, therefore, became the leading spirit in a system of European alliances maintaining standing armies aggregating nearly 2,000,000 men, and consecrated to the preservation of the newly made peace treaties by force if necessary.

Bibliography. In addition to the works mentioned in the articles, the following works will be found of service in this field: Morvat, *History of European Diplomacy 1914–1924;* Winston Churchill, *The World Crisis 1916–1918*; Baker, *Woodrow Wilson and World Settlement* (3 vols., 1922); Baker, and Dodd, editors, *The Public Papers of Woodrow Wilson* (6 vols., 1925–26); Seymour, editor, *The Intimate Papers of Colonel House* (4 vols., 1927–28).

Other phases of international post-war problems are discussed under the following heads: LEAGUE OF NATIONS; REPARATIONS; LABOR

Organization, International; Mandates; Washington Conference; Racial Minorities Treaties. For national points of view, see the history sections under the articles United States; Great Britain; France; Germany; Russia; Turkey; Austria; Hungary; etc. Detailed treatment of the territorial and political disputes that arose out of the making of the Peace and its application will be found under the following: Tyrol, German South; Burgenland; Fiume-Adriatic Controversy; Klagenfurt; Thrace; Banat; Transylvania; Bessarabia; Bukovina; Silesia, Upper; Teschen, Zips, and Orava; Danzig; Allenstein-Marienwerder; Galicia; Vilna; Memel; Little Entente; Saar Basin; Eupen, Malmédy, and Moresnet; Limburg, Southern; Luxemburg; Schleswig; Rhineland; Dodecanese; Smyrna; Cilicia; Dardenelles and Bosporus Straits; Kurdistan; Shantung. See the articles Europe and Africa for a general presentation of the territorial readjustments effected by the War in these two continents. For preliminary discussions of peace, see War, Diplomacy of the.

PEACH BORER. See Entomology, Economic.

PEARL, Raymond (1879–). An American biologist and statistician, born in Farmington, N. H., and educated at Dartmouth and the University of Michigan. He taught at the latter and the University of Pennsylvania until 1907, when he received the appointment of biologist and head of the department of the Maine Agricultural Experiment Station. He resigned this position in 1918 to become professor of biometry and vital statistics at the Johns Hopkins University School of Hygiene and Public Health. In 1923 he was appointed professor of biology in the Medical School and in 1925 director of the Johns Hopkins Institute for Biological Research. He also was made official statistician of the university and consultant in vital statistics and epidemiology to the United States Public Health Service. His published works comprise: *Modes of Research in Genetics* (1915); *The Nation's Food* (1920); *The Biology of Death* (1922); *Introduction to Medical Biometry and Statistics* (1923); *Studies in Human Biology* (1924); *The Biology of Population Growth* (1925); *Alchohol and Longevity* (1926); *To Begin With* (1927); *The Rate of Living* (1928). In collaboration with Mitchell, he wrote the *Reference Handbook of Food Statistics*. He is editor of the *Quarterly Review of Biology*.

PEARSE, Arthur Sperry (1877–). An American zoölogist, born at Crete, Nebr., and educated at the University of Nebraska and at Harvard. He was Austin teaching fellow at Harvard (1907–08); instructor in zoölogy (1909–10) and assistant professor (1910–11) at the University of Michigan; assistant professor of zoölogy at the University of the Philippines for three months in 1911; and associate professor (1912–19) and professor of zoölogy (1919–26) at the University of Wisconsin. After 1927 he was a member of the faculty, graduate department, Duke University, Durham, N. C. Professor Pearse published articles on animal behavior, fishes, and crustacea, as well as *General Zoölogy* (1917); *Animal Ecology* (1926).

PEARSON, Alfred John (1869–). An American diplomat. He was born at Landskrona, Sweden, brought to America in infancy, and graduated at Bethany College, Lindsborg, Kan. (1893). Receiving the Ph.D. degree at Yale (1896), he taught at Upsala College, Brooklyn, N. Y., and was later appointed professor of German at Drake University, Des Moines, Iowa, in 1907. By appointment of the Governor of Iowa, he made a study of Germany's public schools in 1911. President Coolidge named him as Minister to Poland in 1924 and to Finland in the following year. He is the author of *Helps in the Study of English Classics* (1901); *The Rhine and Its Legends* (1919); and *The Moselle in History and Legend* (1919).

PEARSON, Karl (1857–). An English physicist and sociologist (see Vol. XVIII). His later works include *The Life and Letters of Francis Galton* (1915–1924) and *Tables for Statisticians* (1914–1924). He edited *Biometrika*, vols. i–xx (1902–28), and *Annals of Eugenics*, vols. i–iii (1925–28).

PEAR THRIPS. See Entomology, Economic.

PEEL, Rt. Hon. William Robert Wellesley, Second Viscount (1867–). An English government official, educated at Harrow and Balliol College, Oxford. At first a journalist, he served as a Unionist member of Parliament (1900–06 and 1909–12), entering the House of Lords on the death of his father in the latter year. He sat on the London County Council for many years (1900–04, 1907–10, 1913–19), being its chairman in 1914, and was leader of the Municipal Reform Party (1908–10). He was chairman of the Committee on the Detention of Neutral Vessels (1916), Joint Secretary to the National Service Department (1917), Under-Secretary of State for War (1919–21), Chancellor of the Duchy of Lancaster and Minister of Transport (1921–22). From 1922 until the fall of the Conservative government in January, 1924, and from October, 1928, to June, 1929, he was Secretary of State for India. Between his two tenures of this Secretaryship, he was First Commissioner of Works. He became a Privy Councilor in 1920.

PEGRAM, George Braxton (1876–). An American physicist, born at Trinity, N. C., and educated at Trinity College, Durham, N. C., at Columbia University, and at Berlin and Cambridge. In 1900 he became assistant in physics at Columbia, and in 1918 full professor and dean of the faculty of applied science. He was a magnetic observer with the United States Coast and Geodetic Survey (1902–06). Dr. Pegram made original studies on the electromagnetic theory and on radioactivity.

PEGRAM, Henry (1862–). A British sculptor, born in London and trained at the Royal Academy Schools. His principal works are "Death and the Prisoner"; "Ignis Fatuus," bought for the Chantrey Bequest (1889); sculpture on the entrance to the Imperial Institute (1891–92); "The Last Song," gold medal, Dresden (1897); the great candelabra in St. Paul's Cathedral (1897); "A Sea Idyll" (1902); "Sibylla Fatidica," bought for the Chantrey Bequest (1904); "Chance" (1913); the sculpture for Oriel College; statue of Cecil Rhodes at Cape Town; monument to Edith Cavell erected at Norwich; the Cunard War Memorial, Liverpool; "Hylas" (1922); "Lux Mundi" (1926); and busts of Earl Jellicoe and Dean Inge (1928). He was made a member of the Royal Academy in 1922.

PEIPING. New name of Peking, former Capital of China. See China, under *History*.

PEIXOTTO, Ernest Clifford (1869–). An American artist, born in San Francisco. He studied in Paris as a pupil of Benjamin Constant and Jules Lefèbvre at the Académie Julien. He spent much of his time in Europe writing and illustrating for American periodicals and during the World War directed the American Expeditionary Forces' art-training centre at Bellevue, France, and was the official artist of the A. E. F. He was elected an associate of the National Academy of Design (America) in 1919 and Chevalier of the Legion of Honor (France) in 1921. He exhibited many pictures at the Paris Salon and in leading American galleries. He executed mural friezes, was director of mural painting at the Beaux-Arts Institute of Design, New York, 1919–26, and painted the murals in the Seamen's Bank for Savings, New York (1927). His later books include: *By Italian Seas* (1906); *Through the French Provinces* (1910); *Pacific Shores from Panama* (1913); *Our Hispanic Southwest* (1916); *A Revolutionary Pilgrimage* (1917); *The American Front* (1919); *Through Spain and Portugal* (1922).

PELLAGRA. The theory of a deficient diet as responsible for this disease was partly exploded by the discovery that, in California and Louisiana, prosperous and well-nourished people were developing pellagra, but the opinion is general that the disease is due to absence from the diet of some unknown vitamin-like principle with other unknown contributory factors. Pellagra came into prominence in connection with the Mississippi Flood which called attention to the fact that in the inundated area it had long been prevalent. During the year 1924, the number of cases reported had reached 20,000 with a mortality of 1020 and the estimate for 1927, the year of the inundation, was up to 50,000 cases with 2500 deaths. This increase was anticipated because, under the economic pressure of the inundation, the people were forced more and more to subsist on a diet which experience has shown is well calculated to foster the development of new cases, to wit, meal, pork, and molasses. To offset this deficiency diet, and in the absence of proper dietetic articles, such as lean meat, poultry, fish, eggs, and milk, it has been believed that dried and killed yeast could readily be distributed among the candidates for the disease if these could be induced to make use of it; for this substance apparently contains an unknown vitamin which suffices to prevent the malady. The prevalence of pellagra in this area is held to be due to the fact that the people wish to raise only cotton and hence do not grow truck-farm products and also ignore dairy products and poultry, which forces them to depend on the few food staples sold in the stores. See Food and Nutrition.

PELLÈ, Maurice (César Joseph) (1863–1924). A French soldier and diplomat, born at Douai. In 1913–14 he was commander of the auxiliary Moroccan troops and chief of staff of the troops of occupation of Morocco. During the World War, he commanded the brigade of Moroccan sharpshooters, was major general of the French Armies, was commander of the 153d Division and the 5th Army Corps. In January, 1919, he was head of the French military mission to Czechoslovakia, then becoming chief of the French general staff, and later commander-in-chief of the Czechoslovakian Army (1919–20). In the latter year, he was appointed French High-Commissioner in the Near East, where he endeavored to mediate peace between the Turks and the Greeks and the Turks and the Allies. He was a signer of the Treaty of Lausanne (1923), and received decorations from many European nations.

PELLEY, John Jeremiah (1878–). An American railway official. He was born at Anna, Ill., and after a high-school course and some special work at the University of Illinois, entered the operating department of the Illinois Central Railroad, working up to a superintendency and becoming general manager (1923–24) and vice president in charge of operation (1924–26). He was then made president of the Central of Georgia, the Illinois Central's chief subsidiary (1926–28). In 1929 he was called to the presidency of the New York, New Haven & Hartford Railroad.

PELLIOT, pĕl'yō', Paul (1878–). A French archæologist and Orientalist, born in Paris. In 1899 he was made a member of the Archæological Mission to French Indo-China. He was in Peking during the Boxer uprising and in 1905 was named by the Minister of Education to head an archæological expedition (1906–09) to Central Asia and China, to investigate traces of pre-Islamic Buddhism in China. At Tunchuk, in the Chinese Turkestan, Pelliot discovered the ruins of a Buddhist temple built in the Greco-Buddhist style, and from there he was directed to a monastery at Tuen Huang, where he made an amazing find of some 15,000 manuscripts and silk paintings. He returned with most of the manuscripts, as well as other objects of historical value, to Paris. The collection of Chinese manuscripts which he organized at the Bibliothèque Nationale was larger than any to be found in China proper. The manuscripts, all of which date before the eleventh century, are in Chinese, Tibetan, and Sanskrit. The French government rewarded Pelliot for his expedition by creating for him at the Collège de France a chair on the languages, history, and archæology of Central Asia (1911). In 1921 he was elected to the Academy of Inscriptions of the Institute. A catalogue and description of the findings of his expedition was published under the title, *La Mission Pelliot en Asie Centrale*, 5 vols. (1914–21). He also wrote *Un traité manichéen retrouvé en Chine*, translated and annotated with E. Chavannes (1912); *À propos du Keng Tche T'ou* (1913); *Les grottes de Touen-Houang* (6 vols., 1914–24); *Le Sûtra des causes et des effets du bien et du mal*, edited and translated with R. Gauthiot (1920); and *Jades archaiques de chine appartenant à M. C. T. Loo* (1925).

PENANG. See Straits Settlements.

PENNELL, Joseph (1860–1926). An American etcher, illustrator, and author (see Vol. XVIII). His later publications include *Pictures of War Work in America* (1918) and *Etchers and Etching* (1919). With his wife, he edited *The Whistler Journal* (1921). (*The Art of Whistler*, by Elizabeth Robins Pennell with Joseph Pennell, was published in 1928). He was chairman of the jury of the International Exhibition at Leipzig in 1914 and also at the Panama-Pacific Exposition in 1915, where he was awarded a commemorative medal. He won the Grand Prix in Florence in 1915 and was elected to the American Academy of Arts and Letters in 1922. In his later years, he conducted a wide and influential propaganda for better education in the graphic arts in the United States. See *Joseph Pennell: an Account by his Wife* (Metropolitan Museum of Art, 1926).

PENNINGTON, Mary Engle (1872–). An American chemist, born at Nashville, Tenn., and educated at the University of Pennsylvania and Yale. In 1898 she became director of the chemical laboratory of the Women's Medical College of Pennsylvania, meanwhile serving as chief of the Philadelphia Chemical Laboratory. These positions she resigned in order to accept the office of chief of the food research laboratory of the Bureau of Chemistry in Washington (1908), which she held until 1919, when she became manager of the research and development division of the American Balsa Company of New York (1919–23). Her original investigations pertained to the chemical, bacteriological, and histological study of flesh foods, as well as of milk, on which she published her results in the publications of the American Chemical Society, the Society of Biological Chemists, and other scientific organizations.

PENNSYLVANIA. The thirty-second State in size (45,126 square miles) and the second in population; capital, Harrisburg. The population increased from 7,665,111 in 1910 to 8,720,017 in 1920, a gain of 13.8 per cent; estimated population, 1928, 9,854,000. The white population increased from 7,467,713 (1910) to 8,432,726 (1920); Negro, from 193,919 to 284,568; native white, from 6,028,994 to 7,044,876. Foreign-born whites decreased in number from 1,438,719 to 1,387,850. Both urban and rural populations increased, the former from 4,630,669 to 5,607,815; the latter from 3,034,442 to 3,112,202. The growth of the principal cities was as follows: Philadelphia, from 1,549,008 in 1910 to 1,823,779 in 1920; Pittsburgh, 533,905 to 588,343; Scranton, 129,867 to 137,783; Reading, 96,071 to 107,784; Erie, 66,525 to 93,372. See articles on these cities.

Agriculture. Pennsylvania is one of the greatest of the Eastern States agriculturally, but in common with nearly all the group, it has experienced a general decline in agriculture. The total acreage in farms, 18,586,832 in 1910, fell to 17,657,513 in 1920, or by 5 per cent, and farther to 16,296,468 in 1925. The number of farms decreased from 219,295 (1910) to 202,250 (1920) and 200,443 (1925). The improved land in farms totaled 11,847,719 in 1920. The percentage of total land area used for agricultural purposes decreased from 64.8 in 1910 to 61.5 in 1920, and 56.8 in 1925. The total value of all farm property rose from $1,253,274,862 in 1910 to $1,729,353,034, in 1920, or by 38 per cent, but diminished to $1,460,702,270 in 1925; the average value per farm was $5715 in 1910, $8551 in 1920, and $7287 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 163,695 were operated by owners; 1791, by managers; and 34,957, by tenants. The comparative figures for 1910 were 164,229; 3961; and 51,105. White farmers in 1920 numbered 201,799, of whom 187,277 were native and 14,522, foreign born. The Negro farmers numbered 451. Farms reported as under mortgage numbered 48,498 in 1920; 38,787 in 1925. The total number of dairy cows was 1,049,763 in 1920; 859,711 in 1925. "Beef" cows numbered 57,440 in 1920; 43,561 in 1925; sheep, 508,711 in 1920; 415,085 in 1925. There were 1,190,951 swine in 1920; 734,465 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 50,037,000 bushels; wheat, 17,171,000; oats, 34,678,000; rye, 1,596,000; potatoes, 31,980,000; buckwheat, 3,802,000; tobacco, 49,580,000 pounds; and hay, 4,667,000 tons. Comparative figures for 1913 are corn, 57,057,000 bushels; wheat, 21,862,000; oats, 35,774,000; rye, 4,900,000; potatoes, 23,320,000; hay, 4,146,000 tons; and tobacco, 46,680,000 pounds. The apple crop in 1928 was 8,460,000, peach crop, 1,867,000, bushels.

Manufactures. Pennsylvania, ranking second among the States in agricultural importance, is surpassed only by New York. There were 77 cities having more than 10,000 inhabitants in 1920, which formed 50.8 per cent of the total population of the State and which reported 63.7 per cent of the State's manufactured products in 1919. There were 27,563 manufacturing establishments in the State in 1909; 27,973 in 1919; 17,298 in 1925; and 17,314 in 1927. Wage earners in manufactories numbered 1,135,837 in 1919; 999,460 in 1925; and 987,414 in 1927. Capital invested amounted to $2,749,005,975 in 1909 and $6,177,729,968 in 1919. The value of products was $2,626,742,034 in 1909; it rose to $7,315,702,867 in 1919, falling to $6,901,762,098 in 1925, and to $6,715,563,455 in 1927. The large increase in the value of products evidenced in 1919 was due partly to changes in economic conditions brought about by the War and cannot be properly used to measure the normal growth of manufactures during the war period. Steel works and rolling mills, chief in point of value of product, had an output valued at $500,344,000 in 1909; at $1,296,412,000 in 1919; at $1,362,462,079 in 1925; at $1,012,297,366 in 1927.

Foundry and machine-shop products, an extensive group of manufactures, amounted to $210,746,000 in 1909; to $233,616,000 in 1914; to $624,415,000 in 1919; and to $303,116,526 in 1927. Iron and steel blast-furnace production attained $168,578,000 in 1909; $135,806,000 in 1914; $311,080,000 in 1919; and $244,501,253 in 1927. The shipbuilding and boatbuilding output in 1919 was $237,325,000, but later declined greatly, amounting to $19,537,964 in 1927. The extraordinary increase in the output of the shipbuilding industry from 1914 to 1919 was due to the War. Silk manufactures totaled $329,121,498 in 1925 and $306,524,028 in 1927. The most important manufacturing cities of the State are Philadelphia, Pittsburgh, and Reading. In Philadelphia, there were 8375 manufacturing establishments with a product valued at $743,720,000 in 1909; 9064, with $1,996,481 in 1919; products in 1925 reached $1,937,415,000. In Pittsburgh, there were 1658 establishments with $243,392,000 in 1909; 1875, with $614,727,000 in 1919; the 1925 products attained $518,964,000. Similar figures for Reading are 482, with $51,135,000 in 1909; 527, with $141,561,000 in 1919; products reached $132,405,000 in 1925. Other manufacturing cities are Allentown, Altoona, Bethlehem, Erie, Scranton, and Wilkes-Barre.

Mining. Pennsylvania, in point of value of products, is the most important of the mineral-producing States. In the order of their importance, these products are coal, cement, clay products, and natural gas. Petroleum, of which the State was the original and for many years the chief producer, lost importance through the gradual exhaustion of the wells and the discovery of large areas of petroleum land in other States. Pennsylvania is the only State which produces the commercial domestic anthracite. At the same time, this State leads in soft-coal output. The progress of the coal-mining industry subsequent to 1914 is indicated by the following production figures: (1914) bituminous, 147,983,294 net tons valued at $159,006,296; anthracite, 90,821,507 net tons valued at $188,181,399; (1915) bituminous, 157,955,137, $167,419,705; anthracite, 88,995,061, $184,653,498; (1916) bituminous, 170,295,424, $221,685,175; anthracite, 87,578,493, $202,009,561; (1917) bituminous, 172,448,142, $421,268,808; anthracite, 99,611,811, $283,650,723; (1918) bituminous, 178,550,741 $463,159,736; anthracite, 98,826,084, $336,480,347; (1920) bituminous, 170,607,847, $642,630,000; anthracite, 89,598,249, $434,252,198; (1921) bituminous, 116,013,942, $322,538,300; anthracite, 90,473,451, $452,304,903; (1926) bituminous 153,041,638 net tons, $325,618,000; anthracite 84,437,452, $474,164,252. In 1928 the total production of anthracite was 75,348,069 tons, valued at $393,638,000, and of bituminous, 131,202,163 tons, valued at $249,895,000. The greatly increased value of bituminous coal about 1920 was due partly to conditions arising from the coal-miners' strikes and partly to the inflation of the currency. In shipments of Portland cement, Pennsylvania ranks first among the States, with 25,985,106 barrels valued at $20,944,787 in 1914; 28,748,546 barrels, $27,915,298 in 1916; 22,238,689 barrels, $33,600,956 in 1918; 27,662,116 barrels, $52,632,082 in 1920; 41,395,604 barrels, $70,437,218 in 1926. The production of petroleum during this period averaged about 8,000,000 barrels per year: In 1914 it was 8,170,335 barrels; 1918, 7,407,812; 1920, 7,438,000; 1922, 7,425,000; 1926, 8,961,000. In addition to the minerals noted above, the State produces large quantities of clay products, natural gas and natural-gas gasoline, sand and gravel, and stone. The total value of the mineral products in 1927 was $936,693,474, compared with $1,314,322,585 in 1920; $918,048,917 in 1919; $970,245,098 in 1918, and $452,824,034 in 1914.

Education. In many respects, the laws under which the school system was administered remained until recent years unsatisfactory. To remedy this condition, the Legislature of 1921 provided for the raising of the standard qualifications of teachers; established higher salaries; added to the support of the normal schools; increased the length of the school term, especially in fourth-class districts; reënforced compulsory school attendance; established State aid to local communities for the maintenance of new and higher standards; established a budget system in every school district; encouraged the consolidation of rural schools; and centralized and unified State school administration, creating the State Council of Education. One of the best evidences of the results was the remarkable response of the teachers to the new demands for improved qualifications. The number of pupils in the State in 1913–14 was 1,401,325. The enrollment in 1925–26 was 1,849,163; of this number, 1,581,767 were enrolled in the kindergarten and elementary schools, and 267,396 were enrolled in the high schools. The total expenditures for public day schools in 1925–26 were: current, $137,554,666; outlays for buildings, sites, or equipment, $32,088,623. The percentage of illiteracy in the State decreased from 7.3 in 1910 to 6 in 1920; among the native white population, from 1.8 to 1; among the foreign-born white, from 20.8 to 20.1; and among the Negro population, from 11 to 7.3.

Finance. State expenditures in the year ended May 31, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $82,222,896 (of which $23,658,223 was aid to local education); for conducting public-service enterprises, $78,079; for interest on debt, $4,103,911; for permanent improvements, $30,709,012; total, $117,113,898 (of which $37,967,816 was for highways, $11,850,441 being for maintenance and $26,117,375 for construction). Revenues were $130,938,414. Of this, special taxes formed 40.9 per cent; departmental earnings and charges for officers' services, 7.2 per cent; sales of licenses and taxation of gasoline, 39.8 per cent. No general property tax was levied by the State. Net State funded debt on May 31, 1927, was $92,400,007; all but a relatively small part of the total was in highway bonds.

Political and Other Events. Pennsylvania has remained strongly Republican throughout the political vicissitudes of recent years. In 1914 Martin G. Brumbaugh, Republican, was elected governor. The Republican candidate for reëlection to the Senate, Boies Penrose, likewise won. In 1916 Philander C. Knox, Republican, was elected to the United States Senate. In the presidential election that year, Hughes received 703,823 votes; Wilson, 521,784. The 1917 municipal primary elections in Philadelphia and Pittsburgh were marked by factional bitterness. In 1918 William Cameron Sproul, Republican, was elected governor, together with the entire State ticket of that party. In 1920 Boies Penrose was reëlected to the Senate, with 1,067,989 votes. In the presidential voting, Harding received 1,218,216 votes; Cox, 503,843. President Harding appointed two Pennsylvania Republicans to cabinet positions. They were Andrew W. Mellon, Secretary of the Treasury, and James J. Davis, Secretary of Labor. Senator Knox died suddenly in October, 1921, and William E. Crow of Uniontown was named to succeed him. Senator Penrose, the recognized leader of the State Republican organization, died at the end of the year. George Wharton Pepper was appointed to his place. In August, 1922, Senator Crow died. He was succeeded by David Aiken Reed of Pittsburgh. Gifford Pinchot was elected governor in 1922 over John A. McSparran, Democrat, head of the State Grange. Senators Pepper and Reed were elected at the same time. In 1923 Governor Pinchot was largely instrumental in averting a threatened anthracite-coal-miners' strike. In the spring election of 1924, the people approved a constitutional amendment providing an additional $50,000,000 bond issue for roads. In June, 1924, W. Harry Baker was reëlected chairman of the Republican State Committee without opposition, while Joseph F. Guffey, after a bitter fight, seized control of the Democratic organization in spite of opposition.

The popular vote of 1923 had approved a constitutional amendment setting at $100,000,000, in all, the amount that the State might issue in road bonds, excepted from the general debt restriction. When the whole amount had been issued and a part redeemed, the State sought to put out new road bonds up to the $100,000,000 limit; but the State Supreme Court held, July 2, 1928, that the amendment of 1923 provided only for an original issue to that limit, not for a perpetual borrowing capacity.

An effort was made in Philadelphia to reform the police and clean up the city by putting Brigadier General Smedley D. Butler, U.S.M.C., in charge of the Department of Public Safety, 1924–25. The presidential vote in 1924 was: Coolidge, 1,401,481; Davis, 409,192; La Follette 307,567. John S. Fisher, Republican, was elected governor in 1926. William S. Vare, Governor Pinchot, and Senator Pepper sought the Republican nomination for Senator in 1926, and all spent great sums in the primary campaign. Vare won the nomination and was elected, but W. B. Wilson, Democratic candidate, charged election frauds and contested the result. The United States Senate in 1927 failed to admit Vare and commenced an investigation of his case that continued in 1928. A strike in the anthracite mining industry in 1926 lasted for more than five months, caused wage losses of about $150,000,000, and involved some 158,000 workers in considerable hardship. It ended in an arbitration of wages. A bituminous miners' strike in 1927 was calamitous for the workers, many of whom were compelled not only to abandon the old wage scale but to revert to the open-shop system in 1928. The industry having been overmanned, many lost employment. In 1928 the presidential vote was: Hoover, 2,055,382; Smith, 1,067,586. At Philadelphia, the Sesquicentennial Exposition commemorating the Declaration of Independence was held in 1926, the City of Philadelphia meeting some $17,000,000 of costs involved.

Legislation. The Legislature of 1915 approved a resolution for a State constitutional amendment providing for woman suffrage, which was later rejected by popular vote. In 1917 a direct inheritance-tax law was passed. As a war measure, a State council of defense was created and $5,000,000 provided for it. In 1921 bitter opposition developed to a legislative programme proposed by Governor Sproul. On April 25, his supporters held a rump session, ousted the Speaker, elected another in his place, and passed all administration measures. These included taxes on anthracite and gasoline, a measure repealing nonpartisan election laws in Pittsburgh and Scranton, and a bill creating a State department of public welfare. The 1923 Legislature passed a modified old-age pension bill, approved a measure providing for a constitutionl convention in 1926, subject to the approval of the voters, and favored a constitutional amendment providing a $35,000,000 bond issue for a soldiers' bonus, which had been approved also by the 1921 Legislature. The gasoline tax was increased and a small tax placed on profits. An extensive reorganization of the State government, proposed by Governor Pinchot, was adopted. In 1924 the State Supreme Court ruled that owing to technical defects the proposed soldiers'-bonus amendment could not be submitted to the people. In July, 1924, the Dauphin County Court held the old-age pension bill unconstitutional. An enactment of 1924 made the alternative penalties of death and life imprisonment for first degree murder discretionary with court or jury. Governor Pinchot in 1926 called two special sessions to enact extensive changes in the election law and a programme of State-directed coal and water-power development, but disagreed with the Legislature in both matters, so that his programme fell. A commission to study election reform was created in 1927; a State mothers'-aid bill was enacted.

PENNSYLVANIA, UNIVERSITY OF. A nonsectarian institution of higher education located at Philadelphia, Pa., founded in 1740 and developed by Benjamin Franklin. During the period from 1914 to 1928, the student enrollment in regular courses increased from 2245 to 14,647, the faculty from 241 to 1350 members, including administrative officers and research workers, and the library from 75,000 to 675,000 volumes. The development of the university during this period is indicated by the establishment of the following separate schools, each with its own dean or director: (1) school of education, established in 1914; (2) graduate school of medicine, formed in 1919 by merger with the university of the Medico-Chirurgical College and Hospital and the Philadelphia Polyclinic Hospital and the College for Graduates in Medicine; (3) school of hygiene and public health, developed in 1920 from the former laboratory of hygiene; (4) the school of fine arts, formed in 1920 by merger of the former separate departments of music and architecture; (5) the Moore School of Electrical Engineering, established in 1923 by merger of courses in electrical engineering with the school of electrical engineering provided for in the will of the late Alfred Filler Moore. The endowment available for this school was $1,600,000. Other developments were the reconstruction of the athletic stadium on Franklin Field in 1926, which had a seating capacity of approximately 80,000, an indoor stadium, called the Palestra, seating 10,000; a new gymnasium with swimming pool; and an auditorium seating 2500.

Among the gifts received during the period were: $400,000 from the estate of Dr. J. William White to establish the White professorship of surgical research; $500.000 from Helen T. Massey to increase salaries of faculty members in the college; $549,736 from the estate of William B. Irvine to construct an auditorium; $113,518 from the estate of Abraham S. Wolf, through the generosity of Miriam H. Wolf, for a ward in the University Hospital; $250,000 from the Carnegie Foundation for research in medicine; $500,000 from Mr. and Mrs. Henry Phipps for the endowment of the Phipps Institute; $100,000 from Mrs. Mary A. Sharpe for the endowment of the Sharpe Memorial Gallery Fund in the University Museum Building, erected and endowed by means of another gift amounting to $100.000 from Eldridge R. Johnson; $150,000 from the estate of the late Miss Nina Lea for the establishment of the Henry Charles Lea Professorship of History; a bequest under the will of the late Craig D. Ritchie of $106,000, $21,000 of which is for endowment of the library; $100,000 from Col. Louis J. Kolb to establish the Kolb Foundation for the Treatment of Cancer; $125,000 for medical research; $1,000,000 to establish a foundation for the advancement of medical science and promotion of education in the liberal arts, from Edward B. Robinette. $700,000 from the estate of Charles Lenning in aid of instruction in theoretical and practical mechanics and to provide free scholarships. In addition to buildings mentioned in these gifts and bequests, other additions to the physical plant included the J. William White Surgical Pavilion; a maternity building for the University Hospital; a new Graduate

School Hospital; an anatomical wing for the medical laboratories; a new wing for the University Museum and the F. S. McIlhenny Dormitory. The productive funds of the university in 1928 were $13,916,495.91. In 1927 administrative changes were made in the university organization which included the addition of several vice provosts each in charge of a distinctive function, all assisting the head of the institution. Provost, Josiah H. Penniman, Ph.D., Litt.D., LL.D.

PENNSYLVANIA STATE COLLEGE. A nonsectarian, coeducational institution at State College, Centre County, Pa., founded in 1859. The student enrollment of the college increased from 2245 in 1914 to 4069 in the fall of 1928, not including 2786 students in the summer session of that year. In the same period, the faculty increased from 241 to 525 members, including the extension staff, and the library from 7500 to 108,569 volumes. A group of four large engineering buildings was completed in this period in addition to a mechanical engineering building finished in 1920. A residence hall for men and a beef-cattle barn were completed in 1923, and an 18-hole golf course was laid out. Farm land holdings were increased to 2000 acres and the campus proper to 200 acres. A graduate school was authorized in 1922 and a school of education was created in 1923. A large storage building was completed in 1927 and a further building programme was begun, including plans for an infirmary, a gymnasium, a sheep barn, a veterinary hospital, a poultry-brooder house, an addition to the dairy barn, and a winter-sports park. Other units under construction in 1928 included those for engineering, chemistry, biology, agricultural departments, and a students' union. Productive funds of the college amounted to $517,000 in 1928 and the annual income to $3,499,453.33. In 1927 Ralph D. Hetzel, LL.D., succeeded John Martin Thomas, D.D., LL.D., as president.

PENNSYLVANIA UNIVERSITY MUSEUM. See EXPLORATION.

PENOLOGY. An outstanding event in penology in the period following 1914, was the extension of the plan of inmate self-government to prisons for male adults. This plan was not of sentimental origin, as some critics have charged, but was based on the therapeutic principle that to reform law-breakers it is wise to hold them during confinement in a social *milieu* similar to that into which they will later be discharged, and further to give them an opportunity to use, under such limits as restraint imposes, those faculties or qualities of self-reliance, initiative, judgment, and responsibility which normal life requires. As such, it is opposed to the traditional system of autocratic discipline or rule in prisons, by which substantially every movement of the prisoner's day is fixed for him. Self-government had been a feature of the George Junior Republic, founded by William R. George at Freeville, N. Y., in 1895, and in 1912 Calvin Derrick had adapted the plan to the State Reformatory at Ione, Calif. The first extension of the idea to adult male prisoners was made at the New York State Prison at Auburn, N. Y., in 1914, under the unofficial inspiration and guidance of Thomas Mott Osborne, who later in the same year became warden of Sing Sing, another prison for confirmed male offenders in the same State, and incorporated the plan there. In both instances, the self-governing body was named the Mutual Welfare League. Each incoming prisoner became a participant in the self-governing activities and could be expelled by the members. Later, Osborne put the plan into effect at the United States Naval Prison at Portsmouth, N. H., where he was commandant for two years.

The period under review saw a serious preoccupation with the status of the prisoner as a problem in behavior. In general, actual treatment in penal and correctional institutions may be said to have responded slightly to the doctrine that, since all prisoners, except those who are executed or actually confined for life, are ultimately restored to society, they should be so treated as to make them better members of society. This has led, with other things, to an agitation for more vital education and a more educative vocational life. Farm prisons on wide acreage have been established in several States, and more careful assignment of prisoners to work has been made in some prisons. The principles of the indeterminate sentence, probation, suspended sentence (especially for first offenders), separate or juvenile courts for children, and parole or after-care attention for released prisoners were accepted to a somewhat greater extent by judges, lawmakers, and prison officials; probation was slightly extended to adult offenders. The county jail, in which both sentenced prisoners and persons merely awaiting trial were commonly kept, was increasingly seen in a bad light, although little actual attempt was made to improve it or to alter its function.

Problems of penology attracted increased attention in 1929 on account of outbreaks and violence on the part of prisoners at Dannemora and Auburn prisons in New York State and at the Federal Penitentiary at Leavenworth, Kan. Overcrowding was assigned as a leading cause, but it was apparent that there were deeper-seated problems.

Crime. In the post-war period and particularly in the years following 1924, the prevalence of crime in our large cities became one of the outstanding public questions and, with prohibition, occupied first place in the public attention. In the beginning, there was much talk of crime waves and alarmists who urged all sorts of horrendous proposals were given serious heed, but as the debate and study took more elaborate turns, it became apparent that strong-arm measures were no remedy. The activities of serious students disclosed the following state of affairs: the country was in no position to talk of the increase or decrease of crime because there existed no body of comparable statistics; criminals appeared to be younger; they no longer operated in gangs to nearly the same extent as formerly; police systems were in many instances inadequate; punishment appeared to be no deterrent; the death penalty was increasingly being attacked; not enough attention had been paid to the preventive aspects of crime or to the aid that might be obtained from medicine and psychiatry.

The whole discussion was of the utmost importance because it concentrated attention on the inadequate judicial procedure, on the whole theory of punishment, and on the inadequate study of the field of behavior. What were the causes of crime? There was a great variety of reasons suggested, some negligible, some showing a profound study of the question. Silas H. Strawn, president of the American Bar Association, in 1928 in his presidential address before that body, gave the following list as having helped in the increase of crime: 1. Prohibition and the inadequacy of the enforcement machinery, which encouraged bootlegging, "hi-jacking," etc. 2. The development of hard roads and automobiles, making get-aways easy. 3. Increased wealth, making the purchase of automobiles and firearms possible. 4. Organized crime, making possible the alliance between criminals and corrupt politicians. 5. Delay in apprehending criminals and meting out justice. 6. Indifference of citizens to their duties as jurymen. 7. Unrestricted sale of firearms. Other causes cited were the following: the wide powers of parole boards and the use of the indeterminate sentence; the coddling of prisoners; the failure of educational authorities to preoccupy themselves with pre-delinquents; the failure of public authority to avail itself of the contributions of medicine and psychiatry.

Real efforts were made by at least two organizations to get at the roots of crime. In 1925 there was created the National Crime Commission for the purpose of assembling statistics, preparing a preventive programme, and reporting the defects existent in the administration of justice. F. Trubee Davison was the first chairman of the commission and he was succeeded by Newton D. Baker in 1928. During 1926–28, various sub-committees of the commission published reports on a variety of subjects. The commission's inquiry into "Criminal Procedure and Judicial Administration" led to the issuance of 20 recommendations among which were the following: paroles should be tightened; public defenders should be established; the Federal government should restrict the sale of firearms. In 1928 reports were issued on the status of the insanity plea with particular regard to the susceptibilities of jurymen, on the inefficiency of police systems, and on the prominent rôle being played by the "fence" in crime.

At its 1927 conference, the commission showed that its attitude was largely conservative and traditional. It defended the severity of punishment, showed it believed that punishment was a deterrent, and warned the public against oversentimentalizing of the criminal. The New York State Crime Commission also sought to learn more about the reasons for the prevalence of crime. As a result of initial investigations under Senator Baumes, it brought in a series of measures that was adopted by the New York Legislature in 1926.

These laws were concerned for the most part with making punishment more drastic. For example, the so-called Baumes Laws raised the minimum term for burglary to 15 years, modified the systems of convict parole and commutation of sentence, and made it obligatory upon all judges to sentence to life imprisonment all offenders guilty of a fourth felony. In all, 25 such measures were passed. Other States, persuaded that severe punishments were deterrents, passed similar statutes. States to follow the example of New York were: North Dakota, Kansas, Oregon, California, New Jersey, Vermont, and South Dakota. During 1927–29, sub-committees of the New York State Crime Commission continued to sit and the commission issued a variety of useful reports on various aspects of crime including studies of penal institutions, vocational therapy among prisoners, the place of the county jail, truancy and juvenile delinquency, etc. It should be reported that, after 1926, the New York Legislature refused to render more severe the State criminal code.

Much attention was given during the period to the place of psychiatry in crime. Massachusetts passed the so-called Briggs Law which created a board of psychiatrists who were to act as friends of the court. These physicians were to examine individuals indicted for capital offenses or second offenders of felonies, and to advise the court on the question of sanity. Colorado enacted a somewhat similar statute. In 1927 Governor Alfred E. Smith of New York urged the passage of legislation which would permit scientific examination of criminals and even take the power of sentence out of the hands of the court, these functions to be administered by a board of psychiatrists.

Throughout the country generally, little thought had yet been given to the medical aspects of crime. Out of 1168 courts answering to an inquiry, only 110 reported some regular psychiatric service and out of 259 penal institutions reporting, only 29 declared that they had full-time psychiatrists on their staffs. This deplorable state of affairs existed despite the fact that psychiatry had definitely demonstrated its usefulness in classifying prisoners, i.e., singling out those for probation, indicating those who needed confinement in institutions for mental defectives, etc. Chief Justice Benjamin N. Cardozo, of the New York Court of Appeals, lent the prestige of his name to the demand for a psychiatric approach when, in 1928, he declared that the work of biochemists, behaviorists, psychiatrists, and penologists must transform the system of punishment and that the death penalty would seem to the next generation "an anachronism too discordant to be suffered."

It is apparent that the subject was largely a speculative one and this was due to the nonexistence of statistics on crime. Students pointed out: 1. There was no central agency for the collection of crime statistics. 2. There existed no classification of crime to permit of the comparison of such statistics as local agencies might compile. 3. There were no competent experts at work to collate important data (with perhaps one exception). To improve this situation, the National Crime Commission made the following concrete proposals in 1927: 1. The establishment by each State of a bureau of criminal statistics and a bureau of criminal identification. 2. The use, as Federal clearing houses, of the Bureau of Census and the Bureau of Identification of the Department of Justice. Dr. Frederick L. Hoffman, during the period under review, published the only intelligent statistics relating to crime and these were concerned only with homicides committed in a large number of cities with whose police authorities he was able to establish contacts. For the year 1927, for example, he found that a total of 12,000 murders had been committed, making a rate of 101 per million of the population. In 1928 the rate was the same. This rate was double that of the year 1900. In 1928, Detroit, among the larger cities, occupied the first place on the basis of homicidal deaths in relation to population. The Detroit rate per 100,000 of the population was 16.5; the Chicago rate was 15.8; Cleveland, 13.3; Philadelphia, 8.8; New York, 6.7; Los Angeles, 4.7. The Chicago rate had increased from 14.1 in 1927 to 15.8 in 1928. In other words, murders in Chicago were about 50 per cent greater than the average for the country as a whole. Interestingly enough, the murder rates of Southern cities were very much higher. In 10 Southern cities, the range of rates was from 60.5 per 100,000 of the population in Memphis to 25.9 in New Orleans. In the 10 cities of Memphis, Birmingham, Jacksonville, Atlanta, Little Rock, Macon, Savannah, Nashville, Houston, and New Orleans, 731 homicides had been committed during 1928, or a rate of 38.6 for their combined populations.

What Dr. Hoffman says about these Southern cities is interesting: "The ten cities are all located in States in which the death penalty is enforced with a fair degree of rigorous impartiality, but they are likewise located in States where the gun-carrying habit is common and the sale of firearms and ammunition is practically unrestricted. About three-fourths of all the deaths from homicide in Southern States are due to firearms." Dr. Hoffman suggests control in the traffic of firearms and elimination of the death penalty for murder. Of the death penalty, he says: "The death penalty, rather to the contrary, acts as a deterrent to swift and adequate justice, imposes heavy burdens upon the taxpayers as the result of long trials, fosters sensationalism of the worst possible type, and stains the civilization of those who enforce it."

The only other statistics available were those of the Federal census of prisoners in Federal and State prisons, but these were for 1923. They showed a decline in commitments of one-third for each 100,000 of the population, as compared with the year 1910, the ratio of commitments per 100,000 of the population in 1923 being 325.1 and in 1910, 521.7. In 1923 there were 357,493 commitments, as compared with 479,787 in 1910.

In the spring of 1919, President Hoover took official notice of the crime situation when he appointed the Law Enforcement Commission to study the matter comprehensively and to prepare suitable recommendations.

PENSIONS. See LABOR LEGISLATION; MOTHERS' PENSIONS; OLD-AGE PENSIONS; SOCIAL INSURANCE; UNITED STATES.

PEPPER, GEORGE WHARTON (1867–). An American legislator (see VOL. XVIII). In 1914 he participated in the movement for national preparedness. During the World war, he was chairman of the Pennsylvania Council of National Defense and in 1920–21 a member of the Commission on Constitutional Revision of Pennsylvania. Following the death of Senator Penrose, he was appointed by the Governor of Pennsylvania to succeed Penrose and held office until after the popular election in November, 1922, when he was elected for the term ending in 1927. In June, 1922, he was chosen a member of the Republican National Committee to succeed Senator Penrose. On taking his seat in the Senate, he assumed a prominent place in the debates and work of that body. In 1926 he entered a primary race for renomination which was hotly contested by Governor Pinchot and W. S. Vare. Each of the contestants spent large sums of money in the campaign and in the end Vare was successful. He wrote *Men and Issues* (1924).

PERAK. See MALAY STATES, FEDERATED.

PERCEPTION. The problem of perception has been the stumbling block of scientific psychology ever since its inception. The reason for this is quite simple. Positive science has always been committed to the atomistic analysis and to the mechanistic explanation in general. In the physical sciences, the perception of objects, i.e., the perception of unities over and above the conglomeration of atomic elements, was always taken for granted; but psychology, so far from avoiding this problem, attempted to deal with it by the orthodox method of atomic divisions. Metaphysically, the task was complicated by the relation of body and mind, or matter and consciousness. At the very outset of modern science, the paradoxes of Descartes's mechanistic dualism had become apparent to every reflective thinker, and not even Leibnitz's ingenious hypothesis of preëstablished harmony could bolster up the belief in a strict causal correspondence between physical and mental events. The psychological analysis of Locke, Berkeley, and Hume had later transformed the problem, and when nineteenth-century psychology took the field, it had the great advantage over the Cartesians of coupling an improved physiological technique with a more refined method of psychological introspection. Withal, it was committed to psychophysical parallelism and, although this doctrine was discredited philosophically, it seemed to impose itself scientifically by the very necessities of experimentation.

The orthodox method of explaining perception was to split up the problem into sensation, image, memory, association, and attention. The sensation was a unit element of psychological experience corresponding to a specific physical stimulus. As the sensation fades out of consciousness, it becomes a potential image, for the stimulus leaves a residue in the nervous system which is capable of arousing a faint copy of the original sensation. Since each sensation leaves behind it a separate residuum, there is a vast number of such residua in memory, each of which may be separately aroused, thus allowing for a certain independence of the original arrangement in which the sensations were experienced. At this point, the doctrine of association is invoked to provide an *ad hoc* explanation for the selection of certain memories on the occasion of a particular stimulus instead of any others. The doctrine of association dates back to Aristotle and the reason for its long life is its ambiguous meaning, expressing, as it does, both a dynamic process and a static law of memory. According to the doctrine, sensations or images tend to call up memory images which are similar to, or which have once been experienced in, spatial or temporal contiguity with the present sensations or images. All attempts on the part of modern psychologists to reduce similarity to spatio-temporal contiguity which could be measured quantitatively and statistically in the laboratory have failed. Now similarity of meaning in experience is not something that can be determined in advance, but *ex post facto* one may always say that a bond has become established between the old bit of experience and the new; in this case, we are speaking of association as a dynamic process. It is questionable whether by this explanation we are really adding knowledge or whether we are not merely picturing the act of mnemonic imagination itself.

Similarity of meaning is thus seen to be the very nature of the associative process, for contiguity in time and space is but one of the lowest forms of this similarity and, fortunately, a form whose properties can be studied in advance of objective content; but for modern psychologists, as Koffka points out, meaning is itself explained by the working of associations which in themselves are meaningless. There is perhaps no better commentary on this attitude than the vast amount of experimental work which has been done on the memorization of nonsense syllables. This work was performed on the theory that one was getting at the fundamental conditions of memory, but actually all that was accomplished was the formulation of statistical and contingent laws for the memorization of specific nonsense syllables. One may contrast with this type of experimentation the direct clinical methods invoked by the new psychology. So far from attempting to determine the conditions of memory and association along merely spatial and temporal lines, which must necessarily be limited at best to nonsense syllables, a psychiatrist like Jung attempts to determine concretely for a given person in a given situation the method behind the person's imagination. See ASSOCIATION TESTS. He does this by noting down the random associations, together with any expressions of emotion, which certain words call forth from a patient. The task here falls entirely on the psychiatrist, for there is no mechanical rule by which to measure the minds of all men; some general notions and a practical sympathy and skill on the part of the observer simply enable him to picture in his own mind the process of his patient. It is, moreover, significant to point out the failure of the attempts made by Freud's disciples and by Freud himself to take the master's solution of specific dreams on the basis of certain symbolisms as scientific and as valid for all cases, instead of as suggestive examples to incite the use of one's creative imagination.

Turning now to attention, we find here the great scapegoat of experimental psychology. While every direct study of attention has sought to define it in terms of the stimulus and the physiological process, yet, in experiments on perception, it was treated as a mental element, as an unpredictable determining tendency which prevented the expected reaction from taking place. In short, so far from using a strict parallelistic procedure, experimental psychologists explained conscious phenomena in a physiological fashion whenever they could and then invoked mental concepts to explain discrepancies. Behind these mental concepts, such as attention, association, and memory, they indeed postulated corresponding physiological entities; but these were in no wise observable and amenable to scientific measurement. In Germany, the school of the *Gestaltqualität*, or form quality, following up Wundt's conception of creative synthesis, had given up the attempt to maintain psychophysical parallelism in the higher mental processes. They emphasized the fact, well known in music and duplicated in other phases of psychological experience, of the form of perception existing over and above the so-called objective content. Thus, a melody has a real quality over and above the physical notes of which it is composed, since it may be transposed to totally different notes, provided the order and rhythm are maintained. On this theory, all higher-perceptual acts are instances of forms which have reality of their own, although they are ultimately "founded" on sensations with their psychophysical relationship of stimulus and consciousness.

Between the *Gestaltqualität* psychologists, such as Meinong, Ehrenfels, and Witasek, and their radical descendants, the school of *Gestalttheorie*, there may be traced an evolution almost identical with that which occurred in philosophy in the descent from Locke to Berkeley and Hume. Locke began with sensation produced by external substances and with reflection which the mind contributed to the ordering of its external impressions. Berkeley and Hume found the Lockian conception of external substances completely useless, inasmuch as these substances could not be known except through the "higher" faculties of reflection, which in the nature of the case are subjective. So the final result of the current of criticism which Locke started was the development of empirical or phenomenal idealism. In point of fact, what the *Gestalt* psychologists did was to apply experimentally the idealistic criticism to structural and physiological psychology. Only recently, Dr. J. S. Haldane, the eminent Oxford biologist, had publicly declared that, although he was a physiologist, he "could not for a moment agree with the assumptions on which what is called physiological psychology is ordinarily based. These assumptions appear to me as a mixture of very rudimentary physiology with a psychology which has been obsolete since Hume and Kant. It is doubtless the case that a very wide public is still ready to accept the assumption in question, but a still wider public would accept the assumption that the sun goes around the earth." (*Proc. Aris. Soc.*, Sup. vol. iii, p. 65).

Among the assumptions that Dr. Haldane had in mind is the constancy hypothesis, according to which a definite conscious sensation corresponds to every single stimulus. This assumption having been riddled experimentally by the proponents of form-quality, it remained for the more radical psychologists to show that the whole notion of an objective physical or physiological stimulus is quite misleading. They did this by reinterpreting in a new fashion the standard experiments with changing figures and perceptions of movement. In his laboratory studies of visual movement, Wertheimer showed how both the illusion and direction of movement could be obtained by preparing a pattern in the mind of the observer. Thus, if in the tachistoscope the experimenter exposes in succession two lines, first an oblique line making an acute angle with the horizontal, and then the horizontal itself, the observer will see the oblique line rotate in the direction of the horizontal, passing through the acute angle. Now, if the experiment is repeated and the size of the angle is increased gradually until it passes a right angle and becomes an obtuse angle, the observer will still see the oblique line rotate in the original direction. If the experiment had been started with the oblique line making an obtuse angle, the illusion of rotation would have come about in the other direction, the illusion of movement being produced in the direction of the supplementary acute angle.

In the case of changing figures, which structural psychology had never been able to explain satisfactorily, even the subsequent distinction between form and objective content was valueless. Here, there was no fixed physical content with a perceptual form superimposed, but rather there was an alternation of figure and ground, with the figure becoming the ground and the ground the figure when the meaning of the experience changed. Add to these experiments the investigations of Köhler on the perceptual experiences of animals, and the foundation was laid for a new systematic approach to psychological experimentation. The question which Köhler set himself to answer was this: If an animal is confronted with two stimuli and is trained to react positively to the one and negatively to the other, what has it learned? According to traditional theory the animal has formed a connection between the one sensation corresponding to the first stimulus and the positive reaction, and likewise between the other sensation and the negative reaction. Köhler, however, introduced an experimental variation which tested this theory. He placed before the animal two stimuli, *b* and *c*, the one lighter and the other darker, with variations in their spatial arrangement. From *b* food could be taken but not from *c*. After a certain amount of training, the animal invariably chose the positive *b*. Then this pair of stimuli was replaced by another pair, *a* and *b*, with *a* lighter than *b*. The animal now reacted not to the stimulus *b*, as the older theory would suppose, but to *a* as the lighter stimulus. The conclusion was inevitable that animals learned to perceive structures and forms rather than identical physicochemical stimuli. The same set of experiments was repeated in the case of fowls, chimpanzees, and a three-year-old child, and the results were the same; this showed that the principle was sufficiently fundamental to be continuous in the biological realm.

The theory of perception which the new school of *Gestalt* psychology has built up is that in the act of perception the entire configuration is cognized and not an isolated object. If we see a specific object, we see it in much the same way that we appreciate the subject of a tableau. The centre or focus of the picture is unintelligible without the background. Carrying this analysis further back, the theory holds that in every act of perception the general psychological state constitutes the field or screen and the external stimulus, the picture on the screen. Field and object are thus relative to one another, but the relation of relativity, if we may so speak, is not constant and predetermined. For certain configurations one may alter the background within various limits and not change the perception of the object. Again, object and background are relatively interchangeable but not absolutely so. This interchangeability or reversibility reaches its maximum in the case of the angular drawings and changeable figures mentioned above, which may be seen facing either "inward" or "outward" at the will of the observer, provided his frame of mind has not been prepared. According to this theory, the experimental psychology of perception has for its task the determining of specific relationships existing between so-called objective stimuli and the various frames of reference in which they happen to be put. In other words, experimental psychological analysis would not be different from analysis of the artist who steps back from his picture and tries to see it at the distance from which it would be seen in the salon. The picture, we may say, remains the same, but the perception of the picture, which is what actually counts, varies in accordance as it is seen at a six-inch or a three-foot distance, in accordance as it is seen with the eye of a connoisseur or with the untutored eye of the man in the street.

The *Gestalt* school has produced a number of echoes from America. R. M. Ogden in numerous articles expounded a theory of meaning embracing the general view of the new psychology; but the mass of experiments on perception will probably continue to be interpreted from the methodological approach of introspective structuralism with its postulate of psychophysical parallelism. See PSYCHOLOGY, GENERAL.

Bibliography. For the theoretical discussion of the problem of perception, consult the article by Kurt Koffka, "Perception: an Introduction to the 'Gestalttheorie,'" together with the appended references, in the *Psychological Bulletin*, vol. xix, 1922, p. 531. For a general presentation of Gestalt psychology, see W. Köhler, *Gestalt Psychology* (1929). For additional references on the experimental side of perception, consult the *American Journal of Psychology*, vols. xxxiii and xxxiv, particularly the articles of F. L. Dimmick, M. Zigler, L. W. Cobbey, A. H. Sullivan, E. Bershansky, L. Knight, and E. Shults.

PERCY, pẽr'sĭ, THE RT. HON. LORD EUSTACE (1887–). A British government official, educated at Oxford, whose early career was that of a diplomat. A Unionist, he entered Parliament in 1921, was parliamentary secretary to the Board of Education for two months in 1923, and then to the Ministry of Health (1923–24). In the autumn of 1924, he became a member of the Privy Council and he was president of the Board of Education (1924–29). He wrote *The Responsibilities of the League* (1920).

PEREZ, pā'rāth, JUAN BAUTISTA (1870–). A President of Venezuela, who was born at Caracas and trained for the legal profession at the law school there. He held many judicial posts previous to his election as President in 1929. He succeeded to the Presidency when General Juan Vicente Gomez refused reëlection after 21 years in the office.

PÉREZ DE AYALA, pā'rāth dā ȧ-yä'lä, RAMÓN (1881–). A Spanish novelist, poet, and critic. Born in Oviedo, he took his bachelor's studies at the Gijón and Carrión de los Condes, under the instruction of the Jesuits, and received his degree of licentiate in law from Oviedo, where he was a pupil of Clarin. He traveled widely in France, England, Germany, and the United States, and during the World War, visited the French, English, and Italian fronts as a war correspondent for the Buenos Aires newspaper, *La Prensa*. His first book of verse, *La paz del sendero* (1904) was highly praised by Rubén Darió and shows that beautiful, harmonious verse can be a vehicle for sound thought. In his prose, he represents the modern movement toward fusion of the critical and creative elements in literature. In 1907, under the pseudonym of Plotino Cuevas, he published his first novel, *Tinieblas en las cumbres*. His work *A. M. D. G.* (1910) is an attack upon the educational system of the Jesuits. Among his many works, the best are: *Troteras y danzaderas*, a novel (1913); *El sendero innumerable*, poems (1916); *Prometeo*, *Luz de Domingo*, *La caída de los limones: tres novelas poemáticas de la vida española* (1916); *Hermán encadenado* (1917); and *Política y toros* (1918).

PERIODIC SYSTEM. See CHEMISTRY; PHYSICS.

PERKIN, WILLIAM HENRY (1860–1929). An English chemist (see VOL. XVIII). He has been Waynflete professor of chemistry and fellow of Magdalen College, Oxford, since 1912. In 1913–15 he was president of the Chemical Society and in 1926 received the Royal Medal of the Royal Society.

PERKINS, FRANCES (1882–). An American sociologist, born at Boston and educated at Mt. Holyoke College, the University of Pennsylvania, and Columbia University. From 1907 to 1909, she was secretary to the Philadelphia Research and Protective Association, and from 1910 to 1912, executive secretary of the Consumers' League. She was director of the investigations for the New York State Factory Commission in 1912–13 and executive director of the New York Council of Organizations for War Service from 1917 to 1919. In 1919–21 she was a commissioner of the New York State Industrial Commission and a member of the State Industrial Board after 1923 (chairman after 1926). Gov. F. D. Roosevelt promoted her in 1928 to the position of Industrial Commissioner at the head of the State Department of Labor. She was a member of many sociological and economic societies and wrote *Life Hazards from Fire in New York Factories* (1912); *The Problem of Mercantile Fire Hazards* (1914); *A Plan for Maternity Care* (1918); *Women as Employers* (1919); and *A Social Experiment under the Workmen's Compensation Jurisdiction* (1921).

PERLIS. See MALAY STATES, NON-FEDERATED.

PERMANENT COURT OF INTERNATIONAL JUSTICE. See LEAGUE OF NATIONS; WORLD COURT.

PERNICIOUS ANÆMIA. See ANÆMIA.

PERRY, RALPH BARTON (1876–). An American philosopher and professor at Harvard (see VOL. XVIII). After 1914 he concerned himself largely with practical and ethical problems. His books, *The Free Man and the Soldier* (1916) and *The Plattsburg Movement* (1921), deal with the problem of military preparedness in democracy. *The Present Conflict of Ideals* (1918) is a companion volume to *Present Philosophical Tendencies*, and surveys the clash of consciences in the contemporary world. Professor Perry's other publications since 1914 include *An Annotated Bibliography of the Writings of William James* (1920); a revision of Weber's *History of Philosophy* (1925); *Philosophy of the Recent Past* (1926); *General Theory of Value* (1926); and numerous studies in American and French philosophical periodicals.

PERSHING, JOHN JOSEPH (1860–). An American army officer, born in Linn County, Mo., and educated at the United States Military Academy. He served in the Apache Indian campaign in Arizona and New Mexico in 1886, in Cuba in 1898, and in the Philippines from 1899 to 1903. In 1905 he was with Kuroki's army in Manchuria. In 1915 the tragic loss of his wife and three daughters, who were burned to death in a fire during his absence, roused the sympathy of the country. In 1916 he headed a punitive expedition into Mexico in pursuit of the bandit Villa, who had committed depredations in American territory. In September of that year, Pershing was made a major general. President Wilson made him commander-in-chief of the American forces in France in 1917, and he conducted their operations in the World War with conspicuous success. He had a free hand in the conduct of American military operations in France. When the Allies agreed on unity of command, in the spring of 1918, General Pershing, acting under President Wilson's orders, tendered the use of the American troops, then numbering over 300,000 effectives and in six months increased to 2,000,000, against Germany. The brilliant success of St. Mihiel greatly stimulated the Allied morale and depressed the German offensive. When the Armistice came, Pershing was almost in sight of his goal, which was Sedan. His contribution to the Allied victory has been widely acknowledged.

Estimates of General Pershing as a commander have been written by his officers—General James G. Harbord, his chief of staff, in *Leaves from a War Diary* (1925), and General Robert Lee Bullard, in *Personalities and Reminiscences of the War* (1925). Anecdotal material relating to Pershing is contained in *A Journal of the Great War* (1921), by Charles G. Dawes. He was appointed chief of staff of the United States Army in 1921 and at once entered on the unprecedented task of combining in one organization the Regular Army, the National Guard, and the Permanent Reserves. He was retired on Sept. 12, 1924. Since his retirement, he has served as head of a commission supervising American war memorials in France and has been largely occupied in writing his memoirs.

PERSIA. A monarchy of southwestern Asia extending north from the Persian Gulf and the Gulf of Oman to the Caspian Sea. Area, variously estimated at from 628,000 to 635,135 square miles; population, from 8,000,000 to 10,000,000. The population is polyglot, and being scattered in widely separated centres, difficult of control. In the west, Kurds, Armenians, and Arabs are to be found; in the northeast, Turks from Russian Turkestan; along the shores of the Persian Gulf, Arab and Negroid elements. Nomads number about 3,000,000; Europeans, 1200, of whom 600 were British. Populations of the principal cities are estimated as follows: Teheran, the capital, with adjoining territory, 350,000; Tabriz, 180,000; Isfahan, 100,000; Meshed, 85,000; Kerman, 40,000. About 90 per cent of the population is Mohammedan of the Shiah sect.

Industry and Commerce. The large desert areas and the dependence upon irrigation for the cultivation of crops account for the comparative unimportance, economically, of agriculture. Grain crops and rice are raised for local consumption, while fruits, tobacco, cotton, and opium are exported to some extent. The sericulture and keeping of sheep support the native silk-stuff and carpet establishments. Wool and prepared skins also enter into the foreign trade. Mineral resources are extensive and include oil, iron, coal, copper, lead maganese, marble, nickel, and cobalt, though none is worked except oil. The Anglo-Persian Oil Company (controlled by the British government) holds concessions covering all but five northern provinces and though the workings are as yet confined only to a single area, the wells yielded 2,959,000 tons in 1922–23 and 5,107,081 tons in 1926–27. The indications are that the Persian oil fields are among the richest in the world. The importance of oil in the economic life of the country may be gauged from the fact that while before the War its export was negligible and in 1915–16 was valued at only 21,758,000 krans (1 kran = 9 cents), by 1927 the oil export totaled 654,383,000 krans, being nearly 60 per cent of the entire exports. See PETROLEUM.

Exports for 1913–14 were 455,839,635 krans; imports, 647,164,841 krans. For 1926–27 exports were 1,104,115,000 and imports 787,397,000 krans. The changing emphasis in the economic life is indicated by the following comparative figures in articles exported for 1913–14 and 1926–27 (in thousands of krans): fruits, 70,000 and 32,019; carpets, 54,000 and 122,564; cotton, 85,000 and 56,492; rice, 42,000 and 20,526; opium, 38,000 and 96,116; skins, 12,000 and 8237; petroleum, 17,000 and 654,383. Leading imports are cotton tissues, sugar, tea, yarn. Up to 1917, the country was barely touched by the World War, but following that year it suffered severely. The presence of the demoralized Russian troops through 1917, the depredations of the Turk in Azerbaijan and the rich plains of the Urumiah, and the flight of the Assyrian Christians accounted for great losses. Drought and famine visited the country in 1917; the influenza took its toll in 1918. Flocks and herds fell off greatly and through the shortage of forage, many beasts of burden were lost. The interruption of commerce with Russia visited great distress on all industries. Before the War, imports from Russia totaled 355,000,000 krans and exports to it, 300,000,000 krans; in 1927–28 imports were £16,450,193 and exports £21,617,164. The United Kingdom, British India, and Russia supplied 75 per cent of the imports and purchased 65 per cent of the exports. In 1926–27 exports to the United States were $7,482,000; imports $2,017,000. These more than quadrupled the 1913 trade.

Communications. Internal transport is carried on by caravan. To 1914 only 6 miles of railway were in existence. In 1916 a Russian constructed railway from Julfa (Perso-Russian frontier) to Tabriz (85 miles) was opened; another line from Pirebazar to Resht, 7 miles long, also was opened; a military railroad in southern Persia, 52 miles long, was constructed from Bushir to Borazjan; the railroad from Quetta to Nushki, in India, was extended to Duzdab. The total railway mileage was 350 miles. Preliminary survey work was completed in 1927 for a Trans-Persian Railway to connect the Persian Gulf with the Caspian Sea. In July, 1928, a German firm signed a contract involving 310 miles of the projected 1070-mile line. The section was to be completed in three years. It was to run from Khormusa, on the Persian Gulf, to Teheran, Firuzkuh, and thence to the Caspian Sea. The cost of the total project was estimated at $80,000,000. The railways open for traffic in 1928 totaled 231 miles.

Finance. By the treaty with Soviet Russia, of 1921, all Russian loans and advances were canceled. In 1920 a British financial adviser was appointed to the Persian government, but he never actively functioned; in 1922, because of the increasing friendliness toward the United States, an American adviser was attached to the administration. See below, under *History*.

In 1927–28, according to preliminary returns, revenues totaled $28,780,000, as compared with $26,200,000 for the previous year. A surplus over expenditures was indicated for both years. The last budget to receive parliamentary approval was for the fiscal year 1925–26. The budget for 1926–27 was not passed. For 1927–28 expenditures were authorized monthly at the rate of one-twelfth of the sums utilized in 1926–27. The total was expected to approximate $25,000,000. On June 20, 1927, the funded public debt totaled £1,667,621 and the floating debt, $788,459. Treasury resources amounted to $19,558,000.

History. When the World War broke out, public opinion in Persia was decidedly in favor of a clash with Russia. Turkey's declaration of hostilities against Russia further increased this war spirit in Persia. The Government, however, was opposed to war, and declared its neutrality. When the Russians were asked to withdraw their troops from Persian soil so as not to entice the Turks, the Czar's government replied by sending in additional troops and organizing Persia as a military base. The consuls of Germany and Austria in northern Persia were arrested, and the property of German firms confiscated. Early in 1915, a large Turkish Army under Hussein Raouf Bey invaded Persia from the west and engaged the Russian forces. British troops were landed in the Gulf region to protect the pipe lines and oil wells of the Anglo-Persian Oil Company, and to seek to effect a juncture with their Russian allies to the north. Meanwhile in March, 1915, the Anglo-Russian Convention of 1907 was secretly amplified by the two powers to do away with the central neutral zone.

By the end of the year, Russian troops were marching on Teheran, the Turkish Ambassador to Persia was arrested, and the Persian government, on the point of fleeing the capital, presented the British and Russian representatives with the draft of a proposed alliance between the three powers; but this attempt on the part of the Persian government to save its people from the horrors of war was futile. The answer to the projected alliance was an ultimatum, dated Aug. 1, 1916, demanding that the Russian and British Armies be recognized as in occupation of Persia; that Persian Armies be raised, commanded in the north by Russians and in the south by Englishmen; and that the finances of Persia be put under the complete control of the two Allied powers. Throughout 1916 and 1917, Persia remained a battleground for her warring neighbors, and not until the Bolshevist Revolution of November, 1917, was there any hope of relief. The Bolshevist government withdrew the Russian troops from Persia at once, but no sooner was a section thus evacuated, than the British forces, who followed closely upon the Russians' heels, occupied it again. As a result, the engagements between the British and the Turks, especially in the Province of Azerbaijan, continued down to the Armistice.

The reason why Russia and Britain refused to accept Persia's offer of an alliance was that they did not want her to appear at the peace conference that would naturally follow the War. They were afraid lest the question of their respective spheres of influence in Persia be brought up at the council table for discussion. Now, however, the Persians insisted upon sending a delegation anyway, even though it was pointed out that, as a neutral, Persia had no right to participate in the negotiations. The Persian delegation, which was headed by the capable and intelligent Minister of Foreign Affairs, Aligholi Khan, presented a list of 10 specific claims which included demands for complete economic and political independence, territorial expansion, and reparation for the very heavy losses suffered at the hands of the warring nations. British intervention, however, prevented the presentation of these matters before the Conference, so that the way lay clear for the Anglo-Persian Treaty of August, 1919. By the terms of this convention, the British government promised to respect the independence of Persia—with the following reservations: the British government was to supply expert advisers to the Persian government at the latter's expense; the British government was to furnish and equip a military force for the preservation of order in the country and on the frontiers; the British government was to grant a loan to be guaranteed by the customs revenues and other sources; railroads were to be built by British enterprise; the tariff was to be revised by Persian and British experts. The agreement never received ratification, however, and was definitely repudiated by Persia in the spring of 1921.

The Russians were quick to sense Persia's irritation over the treaty and over the continued British occupation, and proceeded to make friendly overtures and offers. The Persians, however, were still too suspicious of all foreigners to be willing to negotiate. Nor did they care to become Bolshevist themselves. Accordingly, in February, 1921, a military leader named Riza Khan Pahlevi marched on Teheran with 2500 men, imprisoned 200 of the leading pro-English officials, and set up a new patriot Young Persian cabinet with himself as commander-in-chief of the army.

Meanwhile, the steadily growing sentiment against Great Britain finally forced the British evacuation of Kazvin early in 1921, and the last remnants of British participation in internal affairs disappeared with the departure from the capital of the British controller of Persian finances and the disbanding of the South Persian Rifles (September, 1921). In March, 1921, a treaty between Russia and Persia was signed by which diplomatic rights were accorded to the former, while the Russian loans and advances were completely canceled, Russian concessions were abrogated, Russia's special rights in the northern zone under the Anglo-Russian agreement of 1907 were renounced, the Capitulations were terminated, and the Russian discount and land bank was turned over to the Persian government.

Then, in May, 1921, having become tired of the amateur methods and impractical idealism of the cabinet which he had set up previously, Riza Khan made himself military Dictator of Persia. He reorganized the army, restored order and stability, and gradually instituted economic and social reforms. In November, 1922, Dr. A. C. Millspaugh, former economic adviser to the U. S. State Department at Washington, was called to take charge of the Persian finances, while other American experts were secured to aid in sanitation, etc. Toward the end of 1923, Riza prevailed upon Shah Ahmed Mirza to take a trip to Europe, and it seemed as though a democratic republic might be set up. The monarchist sentiment among the people, however, was too strong, and the National Assembly contented itself, in March, 1924, with deposing the absentee Ahmed and installing in his place his two-year old son, with Riza as Regent.

A year and a half later, on Oct. 31, 1925, the Parliament or Mejliss deposed the entire Kajar dynasty which had ruled since 1799. On Dec. 13, 1925, Riza was elected hereditary Shah. He took the oath to defend the constitution (of 1906) on December 15, was publicly proclaimed the next day, and was crowned on Apr. 25, 1926. The new Shah notified all foreign governments on Apr. 26, 1927, that the Capitulations in Persia would be abolished on May 10, 1928. On July 25, 1927, Dr. Millspaugh refused to accept a new contract because in it his powers were curtailed and restricted. He retired on Aug. 4, 1927, and the Mejliss passed a law engaging the German, Dr. Lindenblatt, to take his place.

In proportion as the Persian leaders grew distrustful of, and antagonistic toward, Great Britain, they displayed a very different attitude toward the United States. The success of Dr. Millspaugh in reorganizing Persian finances and the cordial coöperation of Persian authorities with American experts helped to strengthen this policy. Moreover, in the hope of securing ready capital, of which the country stood in desperate need, the Government turned to American oil companies. There ensued a tortuous series of quasi-diplomatic oil negotiations when, in 1921, the Standard Oil Company put forth claims to exclusive oil exploitation in the five northern provinces, the Anglo-Persian Oil Company countered by presenting concessions which had been obtained by a certain Russian, Khostaria, in 1896 and 1916, and sold by him to a subsidiary of the Anglo-Persian; but the latter was willing to compromise by sharing the northern field equally with the Standard. The Persian Mejliss, however, discountenanced this amicable arrangement, and, in December, 1923, the Persian government made a preliminary contract with the Sinclair interests for oil exploitation in four of the northern provinces, on condition that the concessionaries advance $10,000,000.

Just then occurred the unfortunate murder (July 24, 1924) of the American Vice Consul in Teheran, Maj. R. W. Imbrie. He was killed by an excited mob for his temerity in trying to photograph a Shiite shrine during a religious demonstration. Although the governments of Persia and the United States eventually came to an amicable settlement over the occasion, it nevertheless made it impossible for Sinclair to raise the asked for money in New York. However, the sale of oil and railway concessions to foreign firms remained one of Persia's large sources of income.

Admitted to the League of Nations on Jan. 10, 1920, Persia continued to have rather difficult foreign relations, especially with Iraq, down to 1929. (See IRAQ.) A number of treaties of amity and commerce were negotiated with European nations, one of May 11, 1929, with Belgium, and one of May 15, 1929, with France. Considerable agitation prevailed in Persia toward the end of 1928 and in 1929 as a result of the Government's attempt to westernize the country. Thus, the Mejliss restricted the wearing of turbans or fezzes to religious leaders and theological students, while the other Persians were ordered to wear European dress and a new kind of hat called Pahlevi, after the new dynasty. It was expected, however, that the new clothing would be made within the borders of the land. The violent opposition to westernization in Afghanistan also affected the situation across the Persian border, and fired the Persian Moslems to a similar resistance. The Government, however, persisted in its efforts to emulate the Turkey of Mustapha Kemal. See AFGHANISTAN; IRAQ; PETROLEUM.

PERU. A South American republic on the Pacific coast between Ecuador and Chile. No official census was taken after 1876, with the result that estimates must be unscientific in the extreme. An estimate in 1926 put the population at 5,500,000 (as compared with 2,597,604 in 1876), though any increase in population was questioned in many quarters. The boundaries in 1929 were not definitely settled, estimates placing the area at from 679,600 to 722,461 square miles. See below, under *History*. Lima, the capital, has a population of 220,000 and Callao, 66,000, according to a census of 1925; Arequipa was estimated to have a population of from 58,000 to 60,000.

Industry and Trade. Sugar, cotton, and coffee continue to occupy the most important places in Peruvian agricultural life. Cotton culture in 1928 brought in 60,000 tons, as compared with a crop of 26,170 tons in 1913. The values of cotton exported in the two years were: 1913, 1,424,000 Peruvian pounds; 1928, 6,762,637. Sugar production in 1928 totaled 362,000 tons, as compared with 192,754 tons in 1912. Sugar exports in 1913 were valued at 1,380,000 Peruvian pounds; in 1920, 15,584,888; in 1928, 4,597,381. Among the minerals, copper up to 1920 occupied the leading place, the 1920 output being 32,982 metric tons with a value of 2,358,243 Peruvian pounds. This showed a negligible gain over 1913 output. The production in 1927 was 47,805 tons. On the other hand, petroleum production in recent years has forged steadily ahead, so that by 1920 the value of the output exceeded that of copper. In 1905 the petroleum production was worth little more than 125,000 Peruvian pounds; it reached 2,494,570 Peruvian pounds in 1920 and in 1927, 15,416,900 Peruvian pounds. Other important industries include: silver and vanadium mining, wool, cacao, guano, coca, and the making of Panama hats. Exports totaled $165,929,441 in 1920, $93,464,350 in 1922, and $109,277,000 in 1927, as compared with $45,871,504 in 1912. The leading imports are, foodstuffs, cotton goods, metal goods, and machinery of all kinds. Imports for 1920 were valued at $86,283,654, for 1922, at $52,962,770, for 1927, at $69,056,000, as compared with $25,015,460 in 1912. In 1927 the United States supplied 42.3 per cent of the imports and purchased 29.1 per cent of the exports; Germany, 9.9 and 4.7 per cent; Great Britain, 15.8 and 29.8 per cent.

VALUES IN PERUVIAN POUNDS

	Imports from Great Britain	Imports from United States
1910	1,676,543	1,128,395
1914	1,598,605	1,570,723
1917	1,934,665	8,792,710
1920	2,694,195	10,168,937
1922	2,024,903	4,212,971
1927	3,075,554	8,059,809
	Exports to Great Britain	Exports to United States
1910	3,403,127	2,032,510
1914	3,403,109	3,033,259
1917	3,792,750	10,942,407
1920	12,681,632	16,265,092
1922	6,592,071	6,582,712
1927	8,825,270	8,612,405

Communications. In 1926 there were 2118 miles of railway in operation. This was a gain of 399 miles over 1912. The Peruvian merchant marine consisted of only 43 steamers of 75,814 tons in 1927. The trade of the country is carried mainly in foreign bottoms. In March, 1921, the Marconi Company took over the management of the Peruvian postal, telegraph, and wireless services for 25 years. In 1926 there were 11,929 miles of telegraph line, 986 post offices and 39,433 miles of telephone wire.

Finance. In 1929 the budget balanced at 12,583,636 Peruvian pounds. The public expenditures in 1928 aggregated 12,044,208 while the revenues were 12,198,103 (compared with the 1912 figures of 3,425,543 for revenues and 3,493,629 for expenditures, the Peruvian pound equaling approximately $4, United States currency). In 1913 the internal debt amounted to 3,792,855, and in 1927 to 6,906,000; the foreign debt in the two years was 1,162,700 and 10,342,000; the floating debt, 5,392,457 and 2,667,000 Peruvian pounds.

Government. Up to 1920, internal affairs were the exclusive concern of the central government located at Lima, and provincial matters were handled through a corps of prefects and subprefects, responsible entirely to the President. Each of the 20 departments is under a prefect and these are divided into 114 provinces under a subprefect. There are 967 districts or subdivisions of the provinces. The new constitution of Jan. 18, 1920, the result of a movement toward decentralization, provided for the installation of three regional congresses in the north, south, and centre, with considerable local autonomy. The President's term was increased to five years and he was made ineligible for a succeeding term. (This provision was amended in 1923 and 1927 to permit of reëlection.) The number of senators was fixed at 57; deputies at 128. An important step taken was the grant of absolute political and religious liberty, though Roman Catholicism was still retained as the state religion.

History. Of outstanding importance in the period 1914–29 was the peaceful settlement in the latter year of the Tacna-Arica dispute between Peru and Chile, after nearly a decade of negotiation. Through the friendly offices of Secretary of State Frank B. Kellogg of the United States, diplomatic relations between the two countries, which had been severed for a period of 17 years, were resumed July 13, 1929. On August 29 of that year, the Province of Tacna, awarded Peru under the settlement, was formally placed under the Peruvian flag (see TACNA-ARICA DISPUTE). Agreements for defining Peru's boundaries were also entered into with Brazil, Bolivia, and Colombia, and negotiations upon the same subject were under way with Ecuador, in 1929.

The administration of Dr. José Pardo (1915–19) was marked by the breaking off of diplomatic relations with Germany in 1917 and a great increase in foreign trade as a result of the demand for raw materials by the belligerent nations. In 1919 Peru's imports doubled and her exports trebled those for 1913.

The election of May 18, 1919, resulted in a dispute and the seizure of President Pardo by adherents of Augusto B. Leguía, who had served as President during 1908–14. The installation of the latter, first, as provisional President, and then as regularly elected President, followed. Under Leguía, ambitious projects were set under way for the modernization of the country. Committed to an extension of the federal principle, he promulgated a new constitution and invited foreign countries, through expert commissions, to participate in Peru's reconstruction. In 1919 an attempt was made to attract immigrants by an offer of free transportation; and the construction of the Ayacucho-Cuzo Railway to put the capital in touch with southern Peru was pushed. In 1921, arrangements were made with a British-Canadian company for the construction of some 1500 miles of railway in various parts of the country. In 1922 a programme for important irrigation works was inaugurated to centre around the Cañete and Moche rivers. An American sanitary expert, beginning with 1919, was given full powers to stamp out malaria and yellow fever, and in 1919, General Gorgas was requested to undertake the sanitation of Peru's important cities. The General's death temporarily checked the plan. The reorganization of the army during 1919–21 was placed in the hands of a French commission and of the navy, in 1920, under an American commission with full powers. In 1921, several American educational experts went to Peru and one of their number was made director of instruction. The beginnings of a labor code were attempted in 1924 with the passage of laws for workmen's compensation and the arbitration of industrial disputes, and the financial condition of the Government was much improved. Results of these progressive activities were at once evident. By 1922 foreign interest had increased so enormously that it was estimated British holdings totaled $125,000,000; American, $90,000,000; Italian, $50,000,000; and German, $10,000,000. Other American republics joined with Peru in celebrating at Lima and Ayacucho the centennial of the Battle of Ayacucho on Dec. 9, 1924. General Pershing headed the delegation from the United States.

Despite a constitutional provision forbidding two consecutive terms in office, President Leguía was reëlected in 1924. In 1927 the constitution was amended to permit the reëlection of the President without restriction and on Aug. 5, 1929, Leguía was again elected, without opposition, for the term 1930–35. His régime, which at first assumed the aspects of a benevolent dictatorship, gradually became more severe. An insurrection of peasants in November, 1924, was suppressed after two days' fighting and the revolutionary leaders were executed. In August, 1926, the Chamber of Deputies enacted a measure providing for the suspension of constitutional guarantees of personal liberty at the discretion of the Government. Another law adopted in September, 1928, designated as a capital offense any act committed by Peruvians either at home or abroad which the Government judged contrary to the social order and public welfare of Peru. The punishment provided, upon arrest and conviction, was the confiscation of the defendant's property, as well as 25 years imprisonment. The measure was designed to prevent efforts to overthrow the Government from both within and outside the borders of Peru.

Numerous political opponents of the Leguía régime, forced into exile, at this time were carrying on revolutionary propaganda from refuges in Paris, New York, Havana, and Guayaquil. An opposition paper, called *La Republica*, made its appearance in New York City in 1928. Still another decree, signed by President Leguía June 22, 1929, prohibited the teaching of doctrines opposed to the State religion (Roman Catholic) in official or private establishments. The twenty-fifth anniversary of President Leguía's advent to public life, Sept. 8, 1929, was declared a national holiday and celebrated throughout the nation. The Chamber of Deputies, by resolution, named him "Procer of Peru," a title hitherto held only by a few of the founders and early leaders of the nation. Toward the end of 1927, he inaugurated a larger naval-building programme. Peru celebrated the 108th anniversary of her independence on July 28, 1929. In connection with the celebration, the Government conferred on President Hoover and Secretary of State Stimson, of the United States, decorations of the Order of the Sun.

PESHKOV, ALEXÈI MAXIMÒVITCH. See GORKY, MAXIM.

PESTS, INSECT. See ENTOMOLOGY, ECONOMIC; FORESTRY; HORTICULTURE.

PÉTAIN, HENRI PHILIPPE (1856–). A French army officer, born at Cauchy le Tour, Pas-de-Calais, and educated at Saint-Cyr and the École de Guerre. In 1914 he headed the 33rd Army Corps in a masterly retreat from Charleroi to the Marne, and in 1916, in command at Verdun, he defended it against the great effort of the Germans to capture it and retook Fort Vaux. In 1916 he commanded the central group of French Armies. Appointed commander-in-chief of the French forces on the western front, May 15, 1917, he maintained close relations with his allies, and struck the Germans with great energy at Verdun and the Chemin des Dames. He was made a marshal of France in November, 1918, became vice president of the Conseil Supérieur de la Guerre, inspector general of the French army (1922), and commanded the French forces fighting the rebellious tribes in Morocco (1925–26). In 1929 he was elected to the French Academy. Consult *Les trois maréchaux*, by Le Goffic (1919), and *Comment j'ai nommé Foch et Pétain*, by Painlevé (1924). See WORLD WAR.

PETERKIN, JULIA MOOD (1880–). An American novelist. She was born in South Carolina, early left motherless, and educated at Converse College. While teaching at Fort Motte, S. C., she met and married W. G. Peterkin and became the mistress of Lang Syne Plantation. Her duties in that capacity and the rearing of a son occupied about 20 years of her life before she turned to writing. Her first book, *Green Thursday* (1924), consists of folk-tales of the South Carolina "gullah" Negroes, in dialect. *Black April* (1927), a novel, is largely composed of incidents in Mrs. Peterkin's plantation experiences. In 1928 her novel, *Scarlet Sister Mary*, won the Pulitzer Prize.

PETRIE, pē'trĭ, SIR (WILLIAM MATTHEWS) FLINDERS (1853–). An English Egyptologist (see VOL. XVIII). He continued his excavations in Egypt till 1922, and was knighted in the next year. Among his later writings are *Amulets* (1914); *Heliopolis* (1914); *Scarabs* (1917); *Tools and Weapons* (1917); *Eastern Exploration* (1919); *Some Sources of Human History* (1919); *Prehistoric Egypt* (1920); *Social Life in Ancient Egypt* (1923); *Lahun II* (1923); *History of Egypt, 1894–1923*; *Religious Life in Ancient Egypt* (1924); *Sedment I, II,* (1924); *Tombs of the Courtiers* (1924); *Buttons and Design Scarabs* (1925); *Ancient Weights* (1926); *Glass Stamps and Weights* (1926); *Descriptive Sociology of Ancient Egypt* (1926); and *Hill Figures of England* (1926). See ARCHÆOLOGY.

PETROLEUM. The tremendous development of the petroleum industry that took place in the 10-year interval from 1914 to 1924 was not projected into the 5-year period from 1924 to 1929 in equal proportion. Except for the tremendous increase in production during 1927, which amounted to about 17 per cent in the United States and slightly less than that for the world, the rate of output has been changed but little. The fundamental factor in holding production back, however, appears to have been the unsatisfactory marketing conditions engendered by overproduction.

The demand for petroleum and petroleum products has remained quite steady during the greater part of this period, but even the high rate of consumption has failed to deplete the tremendous stocks of petroleum that have accumulated. Improvement in refining and production practices has served to reduce costs for individual operators, but at the same time it has served to increase the amount of effective overproduction.

Outside of the United States, Mexico continued as the principal producer until 1927, when it was superseded by Russia and Venezuela. Production in Russia has grown steadily since 1920, but in Venezuela the rate of growth may justly be considered as amazing. Venezuelan production, which first appears on the records in 1917 when it amounted to 120,000 barrels of 42 United States gallons, had increased to 64,400,000 barrels in 1927 and was even larger in 1928. Rumania's production, which had dropped from 13,555,000 barrels in 1913 to 3,721,000 barrels in 1917 and only amounted to 10,867,000 barrels in 1923, has shown remarkable growth since 1923, amounting to 30,600,000 barrels in 1928.

Colombia is another producer that has shown extraordinary growth in the past few years. In 1922 the production of petroleum from Colombia amounted to but 323,000 barrels, which had increased to 19,900,000 barrels by 1928. The world's production of petroleum, which was 858,909,000 barrels in 1922 and 1,015,727,000 in 1923, had increased to 1,252,145,000 barrels by 1927, and preliminary estimates for 1928 indicated an output of 1,322,896,000 barrels.

Of fundamental importance to the continued expansion of the petroleum industry has been the great increase in number of automotive vehicles. (See MOTOR VEHICLES.) On Jan. 1, 1914, there were in operation in the United States 1,250,000 automobiles, which by the close of 1923 had increased to more than 15,250,000 and early in 1929 amounted to approximately 25,000,000. Great as has been the expansion in the petroleum industry, it has not been proportionately as great as that in the number of automobiles. The improvement in technical processes and, in particular, the evolution and development of the cracking processes, has served to increase the yield of naphtha from the crude oil to almost 300 per cent of that attained in 1913.

Important American Oil Fields. Though the production of oil in the United States comes from hundreds of pools scattered in many States, the number of pools with huge production records is relatively small. Records show that only a few oil fields in the United States have produced a total quantity of oil exceeding 100,000,000 barrels. Production record is held by the Midway-Sunset Field in California, which has yielded an enormous total of more than 600,000,000 barrels of oil in about 28 years, a record unapproached by any other field in the United States. Other important fields that have produced in excess of 250,000,000 barrels include Coalinga, Kern River, and Long Beach, Calif.; Cushing, Okla.; and Bradford, Pa.

The Salt Creek Field in Wyoming may ultimately reach 255,000,000 barrels, because of its deeper sands, which have not yet been developed but are known to contain a large volume of crude. The Smackover Field in Arkansas, from its several sands producing heavy and light oil has produced approximately 240,000,000 barrels and may ultimately reach 255,000,000 barrels, as the field is yet young. Other important fields in the United States, in the approximate order of their importance, include the Glenn-Pool-Kiefer, Okla.; Santa Fe Springs, Calif.; Healdton and Burbank, Okla.; Santa Maria, Fullerton, and Huntington Beach, Calif.; Caddo, La.; Coyote, Calif., Humble, Tex.; Tonkawa, Okla.; Mexia, Powell, Spindletop, and Sour Lake, Tex., and the Seminole area of Oklahoma.

When an oil field is first brought into production, it is known as a "flush" field; that is, it usually has "flush" production derived from flowing wells, as distinguished from "settled" production from pumping wells of older fields. Production of oil in new flush fields usually increases rapidly after the discovery well is drilled in and quickly reaches an early peak from which the decline is rapid at first and then more gradual. Factors influencing the production of flush fields are the size of dividual leases and the number of wells drilled. Under the system of competitive leasing and drilling, the owner of the first well usually endeavors to get all of the oil possible before it is taken by other owners drawing on the same pool of oil. In cases where a large block of land is held by one or comparatively few interests, the rapid development of a pool seldom occurs, because competitive pressure does not exist in such an aggravated form. The time element in a field's development also is affected by such factors as the size of the pool, whether large or small, whether extensions or new pools are found, or whether producing sands are found at different depths in the same field. Consult *Petroleum Facts and Figures*, published by the American Petroleum Institute.

Total United States production for 1928 was approximately 899,000,000 barrels, as compared with 901,129,000 barrels for 1927, or, in terms of daily average production, 2,461,000 barrels versus 2,470,000 barrels. In April, 1929, the daily production rate was around 2,650,000 barrels. The three major producing areas were Texas, Oklahoma, and California; Texas and California showing increased production rates in 1928, as compared with 1927, whereas Oklahoma showed a decline. New discoveries of greater or less importance occurred in nearly all districts in 1928.

Mexican Production. The rapid rise and fall of the production of petroleum in Mexico has been sensational. As early as 1901, there was a small oil production in Mexico, but it was not until 1910 that its production became a commercial factor. Within a few years, the output became second only to that of the United States. The two principal oil fields in Mexico are distinguished as the Northern and the Southern. The Southern field has been characterized as Mexico's "Golden Lane." From a negligible quantity in 1901, the production of petroleum in Mexico increased to 12,553,000 barrels in 1911, reaching a peak of 193,398,000 in 1921, and steadily declining thereafter until it fell below 100,000,000 in 1926 for the first time since 1919, and was less than 60,000,000 barrels in 1928. Adverse legislation has been an important factor in the declining rate of petroleum production in Mexico during recent years.

Persian Oil Fields. Persia is now the most productive oil area in Asia. The first wells were completed in 1908 and commercial production began about two years later. The principal producing areas are Maidan-i-Napthun, Maidan-i-Naftek, and Maidan-i-Bibian. Recently, a new producing field at Naft Khansa has been added. These fields are controlled by the Anglo-Persian Oil Company. Production from this area in recent years has averaged around 35,000,000 barrels of oil annually. Extensive geological exploration has been undertaken in this field and extensive use has been made of geophysical methods. It is estimated that the present rate of production from this area is about one-quarter of the potential production of existing shut-in wells. The production, being under the control of one company, is limited to pipe-line and marketing capacity.

South American Petroleum. The oldest producing country in South America is Peru; the country of greatest immediate importance is Venezuela. Production also is obtained from Colombia, Argentina, Bolivia, and Ecuador, and other countries of South America have oil possibilities. South America is recognized as one of the world's greatest potential oil continents, and the Caribbean countries, being easily accessible both to the United States and to the world markets, are being rapidly developed for oil. The recent prolific production of established fields throughout the world has had a dampening effect upon prospecting in the interior of South America, though this is commonly accepted as but a postponement.

The production from the established South American producing fields, however, particularly from those of Venezuela and Colombia, has shown the greatest increase of any of the major producing areas of the world. In 1924 Venezuela's production amounted to 9,042,000 barrels of oil; by 1927 this had increased to 64,400,000; and in 1928 it was not far from 90,000,000. In the proven areas, the greatest recent activity has been in the Lagunillas field. The growth of Venezuelan oil production in the last few years has been truly phenomenal. Colombia's production has increased from about 323,000 barrels of petroleum in 1922, to 6,444,000 in 1926; and to approximately 14,600,000 in 1927. In 1927 and 1928, production from the concessions of the Tropical Oil Company became increasingly important in Colombia's total.

Transportation of Oil. That the United States oil industry is highly organized is particularly evident in connection with the transportation available for distribution of the product. At the very outset, there were required pipe lines, which take the oil from the wells and carry it to the refineries where it is treated. From a total mileage of a little less than 40,000 at the end of 1913, the North American pipe lines had increased to approximately 100,000 miles by 1929. The country's pipe-line fabric is curiously like the railroad system. It has trunk lines, feeders, terminals, storage yards, switching systems, stations, dispatchers, and telegraph and telephone systems. If pipe lines had never been built, North America would be an entirely different place, for the 25,000,000 motor cars, the expanding highway system, and most modern and popular transportation facilities would have been impossible.

A petroleum pipe line is much like a city water main, except that, instead of being the length of a street, it may extend half across the continent. Oklahoma oil is piped to refining centres on the Atlantic and Gulf coasts, and Wyoming oil as far east as Chicago. Building a pipe line, like constructing a railroad, involves first a survey of the route with regard to grades, stream crossings and the like; but a railroad seeks the cities to get their business, while the pipe line avoids towns to save expense. Once in commission, a pipe line's operations are virtually automatic and continuous. They proceed 24 hours daily throughout the year.

In proportion to tonnage and distances, a very small force is required to operate a pipe line. In addition to the tank capacity available at the refineries and various other strategic locations, which amount to approximately 850,000,000 barrels of petroleum, the pipe lines of the country have a capacity of 16,000,000 barrels. For it is a feature of pipe-line transportation that the lines to be operating must always be full of oil; in other words, there are always about 16,000,000 barrels of oil in permanent pipe-line storage. California is the leading State in point of storage capacity; Texas is second; and Oklahoma is third. California is the only State to employ concrete tankage to any extent, and also leads in earthen storage, with Arkansas a close second.

Petroleum ranks first among rail shipments of manufactured products, both crude oil and refined products being shipped by rail, although the bulk of crude oil is moved by pipe line. How materially petroleum has contributed to the growth of business of railroads is shown by the fact that the oil movement in 1926 represented a gain of 65 per cent over that of 1920. The rail movement of crude oil and petroleum products is handled by tank cars. Most of the cars in petroleum service are owned by the petroleum industry, the railroads thus being saved the capital requirements represented by ownership and maintenance of this equipment. In 1914 as few as 41,000 tank cars took care of rail shipments of petroleum. By 1928 there were more than 150,000 cars in petroleum service.

Marine Transportation. As California increased its crude-oil production, it developed storage and bunkering facilities at Los Angeles Harbor. It was found that oil could be shipped from California ports by tank vessels through the Panama Canal eastward cheaper than the pipe line charges from the mid-continent fields to the same destination. Likewise, it could compete with oil brought to the Atlantic coast of the United States from Mexico, notwithstanding the fact that each shipment involved a round trip of approximately 10,000 miles. But for the petroleum traffic, the Panama Canal would have shown a deficit in every year of its operation, whereas it is now comfortably on the right side of the ledger and likely to remain there. The enormous petroleum business has been in other ways advantageous to Panama and the canal.

A constantly increasing proportion of maritime shipping nowadays uses oil fuel, and oil-burning ships seek routes on which they can most cheaply buy oil; and because California oil can so cheaply be put into the bunkers of vessels passing through the Panama Canal, there is a substantial inducement to prefer this route. Moreover, Panama's business will still further increase as the enormous oil resources of Venezuela, Colombia, and other South American countries are developed. Tanker fleets, almost entirely owned by oil companies, comprise a substantial percentage of the world's merchant tonnage. Of the total merchant tonna (steam and motor vessels) registered under the American flag, about 17 per cent is composed of tank steamers. Tankers comprise about 9 per cent of all world tonnage. The tonnage of world tankers in 1914 amounted to 1,441,000 gross tons; by 1919 it had reached 2,773,000; and by 1929 it exceeded 6,000,000.

The United States leads the world in tanker tonnage, though before the War, Great Britain held a comfortable lead in that respect. Since 1914 the world's oil-burning merchant-vessel tonnage has increased from 1,722,000 to 20,827,000 tons. The navies of the world have been placed on an oil-burning basis. Consumption of fuel oil by merchant vessels loading at North American ports and United States insular possessions in 1926 totaled 76,591,000 barrels, as compared with 43,053,000 during 1921. With the growth of oil-burning ships, oil has been displacing coal for ships' bunkers. In 1916 there was more coal laden on foreign vessels at United States ports than in 1926. The quantity of oil for bunkers in 1916 was 5,530,000 barrels, whereas in 1926 it had grown to 46,659,000.

Increase in American Refining Capacity. The modern petroleum industry began in 1859, when Drake drilled the first oil well in Pennsylvania. People commonly say Drake "discovered" petroleum, but, in fact, he merely discovered how to get it cheaply and in quantities, by boring. At first, kerosene for illumination was distilled from petroleum. This process left a considerable share of gasoline, explosive and dangerous. For many years, gasoline was a great nuisance; but finally came the internal-combustion engine, in which a little gasoline vapor, mixed with 14 or 15 times as much air, would produce an explosion that, at the head of a piston, would run an engine most cheaply.

In 1859 the Census Bureau reported 78 refineries. These were small plants, scarcely indicative of the vast industrial establishment represented by the modern refinery. In 1925 there were 358 refineries, employing 65,000 wage earners and paying over $100,000,000 in wages. As of Jan. 1, 1927, the U. S. Bureau of Mines reported 466 refineries in the United States, with a total crude-oil capacity of 3,061,007 barrels. Refinery capacity has doubled since 1920, when 373 refineries were reported, having a total average capacity of. 1,530,565 barrels.

Petroleum is a mixture of many hydrocarbons, which boil and vaporize at different temperatures. When a quantity is introduced into a still and subjected to gradually increasing heat, the lightest elements rise and escape as vapor, precisely as steam escapes from the spout of a teakettle. These vapors are then condensed. The lightest to come off are the naphthas and gasoline; then, at a somewhat higher temperature, kerosene vaporizes, flows away, and is in turn condensed. Next come the still heavier oils, which ultimately become lubricants, paraffin, and various other products. In the refining of asphaltic crude, the asphalt will not distill over and is left as residue in the still and is then recovered for commercial use. Such is a simple statement of the bare elements in the process commonly known as "straight" refining.

In response to changing demands for different petroleum products, refining operations have had to be adjusted so that the products in greatest demand could be supplied in sufficient quantity. The most striking and revolutionary adjustment came with the tremendously increased requirements for gasoline, previously a waste product. In 1899 only 5.4 gallons of gasoline were derived from a 42-gallon barrel of crude oil run through American refineries. On the other hand, 24.2 gallons of kerosene were produced—kerosene being the product then in principal demand—together with 5.9 gallons of gas and fuel oil, and 3.18 gallons of lubricating oil. Today, 14.8 gallons of gasoline are derived; only 3.3 gallons of kerosene; 19.6 gallons of gas and fuel oil; and 1.7 gallons of lubricating oil. How the petroleum industry has squeezed more gasoline out of a barrel of crude oil is explained by the introduction of the "cracking" process.

The molecules comprising the lighter components of petroleum are very small, hence the extreme volatility of gasoline, and that of kerosene, which is but slightly less. The molecules of the heavier parts of oil are larger, the volatility less. It was discovered that when these heavier parts are subjected to intense heat, the molecules break and become as volatile as were the lighter parts. So, if the heavier elements are run into a still built for the purpose and are raised to a high enough temperature (provided the vapors are prevented from escaping), the molecules will "crack," and heavy oils will be converted into gasoline. This process is known as "cracking."

Since cracking was first applied, some 15 years ago, it has been widely adopted and has become one of the guarantees of adequate future supplies of motor fuel. So recently as 1914, less than one-fifth of the barrel of crude oil was made into gasoline. With cracking, the proportion has risen steadily till in 1926 over 35 per cent of all crude oil became gasoline. In 1914 the percentage yield of gasoline was 18.2; by 1917 it had increased to 21.7 per cent. The average gasoline yield on straight refining is about 25 per cent and the result of cracking operations is clearly shown by a steady increase above that figure year after year since 1918. The quantity of crude oil run through United States refineries, which was 346,025,000 barrels in 1918, had increased to approximately 800,000,000 barrels by 1928.

The largest refining districts, in the order of their importance, are the Texas division, Oklahoma-Kansas, California, and Indiana-Illinois divisions. The Indiana-Illinois division has shown the highest percentage of cracked gasoline recovery in recent years. Considerably less crude oil is being produced in the United States now, per automobile registered, than in 1918, although petroleum production has increased from 355,928,000 barrels in 1918 to approximately 900,000,000 barrels in 1928, as mentioned elsewhere in this article. The cracking process, of course, is responsible for this situation.

Fuel Oil. The growth in the use of fuel oil for industrial and marine purposes is no less sensational than the increase in the use of gasoline. A tendency on the part of the Great Powers toward conversion of battleships into oil burners was noted just preceding the World War and became an actual development before the War was over. New vessels, as they came off the ways, became oil burners and when the War ended, the conversion was virtually complete. All the navies of the Great Powers are now on an oil-burning basis. Of even more significance in its effect upon the petroleum and coal industries, the one favorably and the other unfavorably, was a similar conversion to an oil-burning basis of the merchant shipping of the world. Thus, before the War, of the world's total gross tonnage, amounting to 45,404,000 tons, probably less than 4 per cent burned oil. In 1920 the world's tonnage had increased to 53,905,000 tons, of which oil burners represented about 17 per cent. In 1926 the total tonnage was 64,784,000 tons, of which 20,827,000 tons or 32 per cent, were listed as oil burners. The American merchant marine has an oil-burning tonnage of 9,217,000 gross, the largest of any country. In 1914 its oil-burning gross tonnage amounted to only 656,000. Great Britain has an oil-burning gross tonnage of 6,064,000, and in 1914 its total was approximately 557,000 gross tons.

Most of the oil imported into the United States is of heavy quality, suitable for use chiefly as fuel oil, and much of it goes into marine use. Some is "topped," or refined, however, and an increasing gasoline recovery is being obtained by modern refining methods. The principle consuming agencies for fuel oil and gas oil are the merchant marine, the U. S. Navy, railroads using oil-burning locomotives, and public utility power plants and industries using oil burners under boilers, or equipped with Diesel engines for power purposes. Domestic heating with oil also is becoming of increasing importance. It has been estimated that the number of burners now installed in homes and apartment houses aggregates in excess of 1,000,000, each consuming an average of at least 50 barrels of oil per annum.

Public Aspects of the Industry in the United States. The year 1907 is memorable in the history of the oil industry because, during that year, the Standard Oil dissolution suit was started. The controlling ownership of the several Standard Oil companies has been widely dispersed since the dissolution decree was put into effect in 1911. No single factor has contributed so much to safeguard our country against the danger of a developing tendency to antagonism, as the easy transportation, the breaking down of the barriers of isolation, the facilitation of acquaintance and mutual understanding between city and country that have come with the age of petroleum, as leaders of the petroleum industry consider the past score of years. Perhaps no present-day industry is more characteristically American than that of petroleum. Over 70 per cent of the world's petroleum industry is in the United States. Among American industries, it rates second only to agriculture. From 1900 to 1925, petroleum production multiplied by 11.8. In that same period, pig iron multiplied by 2.67; bituminous coal by 2.4; copper by 2.7; steel by 2.4; lead by 2.4; and silver by 1.3.

There are no satisfactory data on the number of people in the petroleum industry; it has grown too fast, but it is estimated that there are more than 1,100,000 officials and employees. To this must be added operators of filling stations, of which the number is harder to estimate, but is placed conservatively around 225,000. Owing to constant improvements, the workers tend to grow fewer in proportion to output, though the number is growing steadily. The great number of investors and royalty owners make the industry an exceptionally wide distributor of incomes.

Politically, the petroleum industry has received much public attention since relatively early in the Harding administration. Unfortunately, the essential facts have been obscured by the political aspects of the situation; nevertheless, public opinion has shown but little room for doubt that the entire situation involving former Secretary Fall, Edward L. Doheny, Harry F. Sinclair, and others was of a very unsavory character. The question of oil conservation likewise has been much discussed in recent years and on Dec. 19, 1924, President Coolidge constituted the Federal Oil Conservation Board, consisting of the Secretaries of War, Navy, Interior, and Commerce, to study the Government's responsibilities and to enlist the full cooperation of representatives of the oil industry in the investigation.

The Federal Oil Conservation Board issued questionnaires to the petroleum industry covering every phase of petroleum activity, and in February, May, and June, 1926, held public hearings at Washington, D. C., at which oil executives, technologists, and other representatives of the industry were heard. In September, 1926, the Federal Oil Conservation Board made public its preliminary report. At its annual meeting in December, 1926, the American Petroleum Institute approved the board's prelimary report and passed a resolution calling for the appointment of an institute committee to formulate and recommend a programme of legislation to be advocated giving sanction and effect to agreements by oil producers for the curtailment of production in pools where, and during periods when, there is overproduction, having for their purpose the economical and orderly production of oil.

At the suggestion of Chairman Work of the Federal Oil Conservation Board, a committee of nine was formed late in 1927 to study possible legislative steps designed to effect greater conservation of the country's natural petroleum resources. This committee comprised three representatives of the Government, three of the American Bar Association, and three of the petroleum industry. Early in 1929, it became apparent that international accord on the subject of oil conservation might be forthcoming and a meeting was held in New York in March, 1929, which was attended by representatives of the industry throughout the world. A tentative agreement was reached, whereby the rate of production in 1929 should be held down to the level that prevailed in 1928. The Government, however, refused to sanction this proposal, holding that it violated the anti-trust laws, leaving the entire question of oil conservation in at least as badly muddled a condition as ever.

Bibliography. *Petroleum Facts and Figures* (1928—second and revised edition, 1929), published by the American Petroleum Institute, is perhaps the most illuminating discourse on the petroleum industry available. The frequent reports of the U. S. Bureau of Mines and Department of Commerce, also the annual issues of *The Mineral Industry* afford considerable information, particularly on the statistics of petroleum. From time to time, the American Petroleum Institute in New York also publishes valuable bulletins and technical papers presented at its annual meetings. A most complete and useful work is *Handbook of the Petroleum Industry*, 2 vols., D. T. Day, editor (New York, 1922). Other recent volumes of value are V. R. Garfias, *Petroleum Resources of the World* (New York, 1923); L. C. Uren, *Petroleum Production Engineering* (New York, 1924); J. M. Macfarlane, *Fishes, The Source of Petroleum* (New York, 1923); Dorsey Hager, *Practical Oil Geology* (New York, 1919); id., *Oil Field Practice* (New York, 1921); R. H. Johnson, L. G. Huntley, and R. E. Sommers, *The Business of Oil Production* (New York, 1922); J. E. Pogue, *The Economics of Petroleum* (New York, 1921); Victor Ziegler, *Popular Oil Geology*, 2d ed. (New York, 1920); U. S. Geological Survey, *World Atlas of Commercial Geology*, part i, *Distribution of Mineral Production* (Washington, 1921); U. S. Bureau of Standards, *National Standard Petroleum Oil Tables, Circular No. 154* (Washington, 1924). See MEXICO; IRAQ; SAKHALIN; PERSIA; SHIP-BUILDING, *Oil Fuel*; CHEMISTRY, APPLIED; and GEOLOGY.

PETROVA, OLGA (MRS. J. D. STUART) (1886-). An actress born in Warsaw, Poland, and educated at Paris, Brussels, and London. She began her theatrical career at the age of 20 in Shakespearean productions and later appeared in plays of Ibsen, Bernstein, and Strindberg. After making her American stage début in New York City in 1911, she gave some time to motion pictures and appeared in *The Daughter of Destiny*; *The Orchid Lady*; *Bridges Burned*, and *More Truth than Poetry*, written by herself. She herself wrote *The White Peacock* and *The Hurricane*, in which she starred.

PETRUNKEVITCH, ALEXANDER (1875-). A Russian-American zoölogist, born at Pliski in Russia, and educated at the University of Moscow and at Freiburg. He was lecturer in zoölogy at Harvard (1903–04); acting professor (1906) at the University of Indiana; honorary curator of arachnida at the American Museum of Natural History (1909–11); and professor of zoölogy (since 1917) at Yale. He published: *Gedanken über Vererbung* (1903); *Free Will* (1905); *Index Catalogue of Spiders of North Central and South America* (1911); *Terrestrial Palæozoic Arachnida of North America* (1913); and *Morphology of Invertebrate Types* (1916).

PHELPS, WILLIAM LYON (1865-). An American literary critic and university professor (see VOL. XVIII). Continuing his work as Lampson professor at Yale, Dr. Phelps has conducted in *Scribner's Magazine* a department reflecting his views on books and current topics under the title, "As I Like It." He is also the author of *The Advance of the English Novel* (1916); *The Advance of English Poetry* (1918); *Archibald Marshall* (1918); *The Twentieth Century Theatre* (1918); *Reading the Bible* (1919); *Essays on Modern Dramatists* (1920–21); *Human Nature in the Bible* (1922); *Some Makers of American Literature* (1923); *Essays on American Authors* (1924); *Human Nature and the Gospel* (1925); *Adventures and Confessions* (1926); *Happiness* (1926); and *Love* (1928).

PHILADELPHIA. The third city in size of the United States. The population rose from 1,549.008 in 1910 to 1,823,779 in 1920 and to 2,064,200 in 1928, by estimate of the U. S. Bureau of the Census. In 1920 the municipal government was reorganized and a new city charter adopted. The bicameral council of 144 members was replaced by a small council of 21 members; a budget system was adopted; and model civil-service reforms were introduced, including provisions for a civil-service commission of three persons. A city purchasing agent and a city architect also were appointed, and radical changes were made affecting city contracts. A zoning plan was adopted, dividing the city into residential, commercial, industrial, and unrestricted use districts, five height districts, and five area districts.

Much has been done since 1914 to improve the port, which in 1929 consisted of 267 wharves, 41 railroad piers, and 8 municipal piers. In 1915 the two Southwark piers were completed by the city as the first units of a scheme to give Philadelphia a municipally-owned water front of more than a mile. The complete development of the plan involved the construction of a series of piers, each connected with the belt line on Delaware Avenue, giving access to all the industries along the river; the total cost was estimated at $24,000,000. This development also included the dredging of the Delaware River to the sea to a depth of 35 feet. In 1916 the Navy Department began the construction of a concrete drydock, 1064 feet long by 212.5 feet wide, which was completed in 1921; the drydock may be divided so as to dock one ship 670 feet long and another 330 feet long. During the World War, Congress appropriated $62,000,000 for the construction at the shipyards at Hog Island of 120 vessels of 7500 tons and 60 vessels of 8800 tons capacity. In 1927, 12,086 vessels of 41,290,482 gross tons entered and cleared the port. In that year, the exports of 3,752,939 tons were valued at $90,366,209 and the imports of 2,703,185 tons at $204,891,132.

Between 1914 and 1924, 11 miles of elevated railroad were built from the Market Street elevated north and northeast, roughly parallel with the course of the Delaware River. An effort was made to make the line as noiseless as possible, the steel supports being partly filled with concrete to minimize their vibration and the rails laid in a roadbed of broken stone. In 1915 a $6,000,000 bond issue was voted for the construction of a new subway system, which was to run north and south under Broad Street, crossing beneath the older subway at City Hall, and was planned to cost some $46,000,000. Increasing costs caused by war-time conditions, however, forced postponement of construction, and the work was not resumed until 1923. In September, 1928, two tracks of this subway north from City Hall to Grange Avenue, a distance of about 6 miles, were opened to traffic. The line was temporarily operated by the Philadelphia Rapid Transit Company, pending the conclusion of negotiations toward a permanent agreement. The section between City Hall and South Street was still under construction but was expected to be in operation by April, 1930. The total cost of the work was approximately $95,000,000.

The Delaware River suspension bridge between Philadelphia and Camden, N. J., was constructed between 1921 and 1926, the total cost of $28,871,000 being borne by the two cities and by the States of Pennsylvania and New Jersey. See CAMDEN. In 1923 a bascule bridge over the Schuylkill River was built by the city under the direction of the Bureau of Surveys. In 1929 the completion of the Tacony-Palmyra Bridge over the Delaware River provided a second highway-toll bridge connecting Philadelphia and points on the New Jersey side of the river. The bridge is 2324 feet long and 38 feet wide and was erected at a cost of $4,692,000. Between 1926 and 1929, a 4800-ft. dam and power house were built near the mouth of the Susquehanna River by the Susquehanna Power Company, a subsidiary of the Philadelphia Electric Company. A total of 378,000 horse power in seven 54,000-horse-power units was to be installed in the power house. In 1925 the Pennsylvania Railroad entered into an agreement with the city, in accordance with which a new line, largely subway, was to be constructed between 15th Street and the Schuylkill River to replace the elevated structure and a new terminal was to be erected in West Philadelphia, after which the Broad Street Station was to be abandoned and the viaduct along Market Street removed.

A cultural centre is being developed on the new Parkway, created through the demolition of hundreds of old buildings, so that the city's centre might be directly linked by a grand boulevard with Fairmount Park. Two important units of this centre have been completed: the Art Museum and the Free Library. The Art Museum, which stands at the head of the Parkway, is built in the style of classical Greek structures. The stone used is a pinkish dolomite and the roof and cornices, together with a portion of the interior, are of glazed terra cotta. There are two exhibition floors with a floor space of about 168,000 square feet. The inaugural exhibition was held in March, 1928, the galleries completed comprising 10 period rooms devoted to the English and American sections and nine galleries of European schools. The cost of construction was approximately $11,000,000. The new main building of the Free Library of Philadelphia is situated halfway between the City Hall and the Art Museum, on the Parkway. Indiana limestone was used in the construction of the exterior and artificial stone in the interior. Its shelves have a capacity for 1,750,000 volumes. When completely equipped, it will represent a total cost of approximately $7,000,000. It was dedicated on June 2, 1927. A bequest to the city by the late Jules E. Mastbaum has made possible the construction of a reproduction of the famous Rodin Museum at Mendon, France, in which works of the French sculptor are housed. Plans for the further development of the Parkway as a cultural centre include the construction of a new $1,000,000 home for the Franklin Institute, which will also house a museum of science and industry, and the construction of a new headquarters building for the American Philosophical Society. The Philadelphia Grand Opera Company was organized in 1927, and the erection of a grand opera house was contemplated in 1929. A municipal stadium was erected in 1925, and the Philadelphia airport was established in 1927. In 1926 the Sesquicentennial Exposition was held in the south of the city adjoining the Navy Yard. It was open from June to December, but failed to arouse wide interest and was not financially successful.

In 1928 the census prepared by the director of attendance showed that there were 344,684 children of school age in Philadelphia. Of these 234,257 were enrolled in the public schools, 82,316 in the parochial schools, and 8401 in private schools; in addition, 7418 were employed but were attending continuation school. There were 205 public elementary schools, 4 schools of practice, 1 demonstration school, 1 industrial arts school, 1 trade and continuation school, 2 continuation schools, 16 junior high schools, 13 senior high schools, 1 normal school, 1 residential school. Since the inception of a $57,500,000 building programme in 1921, 81 new buildings have been constructed and 60 unfit buildings eliminated, raising the sanitary rating of the school plants from 81.2 to 90.7 per cent.

In 1927, according to the census of the Pennsylvania State Department of Internal Affairs, 242,249 persons were employed by 5035 industrial establishments in Philadelphia and received $315,249,800 in wages; the value of products manufactured was $1,683,524,200. Philadelphia leads in the production of leather and tanned goods, knit goods, carpets and rugs, cigars and cigarettes, hats, saws, and files and is second in the refining of sugar and manufacture of woolen and worsted goods, confectionery and ice cream, chemicals and druggists' supplies, millinery, lace, and in dyeing and finishing textiles. The financial institutions of Philadelphia play an important part in the industrial development of the city, bank clearings in 1928 being $29,377,000,000. Philadelphia is also the home of the Federal Reserve Bank of the third district. About 25 per cent of the building and loan associations in the United States are located in Philadelphia; these institutions number 3358 in 1928 with 1,189,867 members and assets of $818,000,000. In 1927, 11,004 building permits representing a value of $117,221,245 were issued. The assessed valuation of property in 1927 was $4,454,559,000; the net debt was $381,583,000.

PHILIPPINES. The largest island group of the Malay Archipelago, a possession of the United States since 1899. The population of the Philippines increased from 7,635,426 in 1903 to 10,314,310 in 1918. The estimated population in 1928 was 11,921,600. The population per square mile was 67 in 1903 and 104.2 in 1928. The population designated as Christian numbered 6,987,686 in 1903 and 9,381,357 in 1918. The non-Christian population, 647,740 and 932,953. The population in 1903 as regards sex included 3,496,652 males and 3,491,034 females; in 1918, there were 5,177,568 males and 5,136,742 females. By races: the brown race numbered 6,914,880 in 1903, 9,386,826 in 1918; the yellow, 42,097 in 1903, 50,826 in 1918; white, 14,271 in 1903, 12,390 in 1918; the Negro, 1019 in 1903, 7623 in 1918. In 1903, 6,931,548 persons had attained Filipino citizenship and in 1918 the number had increased to 9,428,291. By religions, there were 6,559,998 Roman Catholics in 1903 and 7,790,937 in 1918. The Protestants in 1918 numbered 124,575; the Mohammedans 443,038; pagans, 508,596; Buddhists, 24,263, and all others, 5454. There are no earlier figures for these last classifications. The largest cities, with their populations, are as follows: Manila, 219,938 in 1903, 285,306 in 1918, estimated in 1926 at 336,500; Cebu, 31,079 in 1903, 65,502 in 1918, estimated 83,980 in 1929; Legaspi, formerly Albay, 14,049 in 1903, 52,756 in 1918, estimated at 32,372 in 1929; Iloilo, 19,054 in 1903, 49,114 in 1918, estimated at 65,248 in 1929; Lepa, 37,934 in 1903, 46,577 in 1918; San Carlos, 9974 in 1903, 42,453 in 1918. Other cities having a population of over 35,000 in 1929 were Zamboanga, estimated at 45,567; Laoag, estimated at 40,625.

Agriculture. In 1927 there were 9,900,000 acres of cultivated land, 13,100,000 acres of grass and open land, and 46,500,000 acres of forests in the Philippines. In the period after 1913, as in the previous years of American administration, vigorous and unremitting efforts were made to encourage and extend agriculture, which is the principal source of welfare of the islands and the chief occupation of the people. The results accomplished were nothing short of remarkable. They were brought about by improving communications on land and sea; lowering freight rates; furnishing expert professional advice; encouraging the building up of agricultural schools; urging the youths of the country to devote themselves to agriculture; by continued efforts to eradicate epidemic diseases among horses, cattle, and carabaos; by vigorous campaigns against locusts; by the enactment of health legislation, and in various other ways. During recent years, the Department of Agriculture also encouraged the raising of poultry and the breeding of hogs, cattle, and other animals with a view to increasing the food supply. It encourages the breeding of carabaos, cattle, and horses for work purposes. Under the supervision of the bureau, a careful study was made with a view to prevention and control of rinder pest, a disease which every year carries off many thousands of carabaos. Rigorous regulations were applied against the importation of cattle from countries affected with rinder pest and other cattle diseases. The agricultural crops are often affected by drought and other disadvantageous conditions. Following the successful rice crop of 1913, the crop of 1914 was damaged by a great drought, which resulted in a decrease of 25 per cent in the production. Rice remains the main food crop although the substitution of corn as a food product has gradually made considerable headway. Figures for the chief crops for the period 1913–28 are given in the accompanying table:

CROPS: AREA, PRODUCTION, AND YIELD PER ACRE

Crop	Area (thousands of acres)				Production, thousands of units—pounds except as indicated)				Yield per acre (pounds)	
	1913	1922–1926	1927	1928	1913	1922–1926	1927	1928	1922–1926	1928
Rice (rough)	2,820	4,263	4,465	4,481	52,140[a]	98,468[a]	106,299[a]	106,332[a]	23.1[a]	23.7[a]
Corn	948	1,333	1,387	1,284	9,994[a]	17,248[a]	17,844[a]	15,639[a]	12.9[a]	12.2[a]
Manila hemp	910	1,217	1,186	1,188	309,791	383,664	380,902	393,285	315.2	403.0
Tobacco	170	170	207	199	101,544	85,277	110,706	101,389	501.6	511.0
Coconuts	552	1,146	1,236	1,273	781,586[b]	1,554,293[b]	1,800,027[b]	1,906,804[b]	1,356.3[b]	1,497.9[b]
Coffee	2	2	2	3	249	2,586	2,668	2,726	1,293.0	970.0
Cacao	3[c]	3	4	4	1,247[c]	2,416	2,401	2,586	805.3	693.0
Sugar[d]	419	577	586	586	763,739	1,196,000	1,404,000	1,477,100	2,072.8	2,520.6

[a] Unit, bushel.
[b] Unit, number.
[c] 1914.
[d] Production of raw sugar for seasons ended following year.

Manguey, tea, pineapples, citrus fruits, quinine, and camphor are other important products. The area devoted to rubber cultivation is increasing yearly, especially in the southern provinces. The acreage planted in 1928 was 6350 acres. Coconut products led all others in value of production and export in 1928, accounting for approximately one-third of the total trade. Progress of the live-stock industry is indicated in the accompanying table:

	1913	1916	1920	1928
Cattle	418,114	567,456	760,920	1,220,000
Carabaos	1,047,164	1,228,836	1,464,285	1,950,000
Horses and mules	179,089	203,364	268,999	325,000
Goats	529,180	661,859	821,661	1,415,000
Sheep	104,147	142,091	195,705	410,000
Hogs	2,086,736	2,734,803	3,369,183	10,300,000

The veterinary division of the Department of Agriculture and Natural Resources performs valuable services by inoculating cattle against rinder pest. During 1920 over 10,000 animals were immunized. Several experiment stations are maintained in the islands, as well as breeding stations for horses, cattle, swine, and poultry. The Plant Industry Division exercises supervision over plant and seed selection, tests fertilizers, and conducts exploration and investigation into various subjects connected with plant industry.

Mineral Production. The islands of the Philippines have important mineral resources. Deposits of gold, coal, petroleum, quicksilver, copper, and platinum exist, especially in the departments of Mindanao and Sulu. What apparently was one of the largest available unexploited iron deposits in the world is located on the Pacific coast in the Province of Surigao and extends from tidewater to the interior, perhaps to the adjacent Province of Agusan. Subsequent to 1913, the Bureau of Science did valuable work in the examination of mineral resources in the islands and there was a considerable development in mining. Gold is the only mineral produced in appreciable commercial quantities, the output increasing from 42,000 troy ounces in 1913 to 107,000 in 1928. A small amount of silver and iron is mined. Chromite has been found in Zambales. The total value of mineral production in 1927 was $4,578,000. The chief nonmetallic products are coal, lime, mineral waters, salt, sand and gravel, and stone.

Manufactures. While the manufacturing development in the Philippines has not kept pace with agriculture and commercial development, there has been considerable progress as is indicated by the fact that the number of establishments increased from 3259 in 1903 to 8354 in 1918. With the exception of 37 sugar mills, 6 coconut-oil mills, 7 desiccated-coconut factories, and three large cigar and cigarette factories, all manufacturing was carried on in small plants in 1929. The manufacture of sugar is the most important industry. Its rapid development may be shown by the fact that the value of the product in 1903 was $3,301,500 and in 1918, $41,072,981. Exports of sugar in various stages of manufacture in 1928 were valued at $47,543,000, or 85 per cent of the total product. Coconut-oil works rank second in value of product, and had a remarkably rapid development, the exports increasing from a value of $1,146,000 in 1903 to $23,490,000 in 1928. Rice mills increased the value of their product and the abacá, or hemp-pressing, industry is also important. The product of cigar and cigarette factories increased in value from $4,370,258 in 1903 to $13,311,687 in 1918. In 1928 the output of cigar factories was 332,000,000, or 5 per cent greater than for 1927. The 1913 output was 282,000,000. Cigarette production increased from 4,385,000,000 in 1913 to 5,110,000,000 in 1928. Other important industries are lumbering, rope making, tailoring, boatbuilding, lithography, printing, and bookbinding.

The total amount of lumber cut for 1928 was 536,000,000 board feet, an increase of 10 per cent over 1927. Twenty-one new sawmills began operation during the year. The 1913 cut was 117,456,000 board feet. The manufacture of copra is of increasing importance. The production for 1928 was 1,168,000,000 pounds, as compared with 258,000,000 in 1913.

Transportation. The length of the railway lines in the islands increased from 681 miles in 1913 to 791 in 1927. In the latter year, they carried 9908 passengers and 1,893,000 tons of freight, the gross receipts being $6,426,000. In the city of Manila, there were about 80 miles of electric railways which carried over 36,000,000 persons annually. The number of automobiles in the islands increased greatly; in 1928 there were 20,547 automobiles, 5510 trucks, and 2753 busses. The mileage of telephone wire was 38,340 in 1928. There were 19,850 instruments in use. Telegraph wires stretched 9789 miles,

Education. The development of education in the islands has been one of the chief concerns of the Government since the establishment of American rule, and the efforts have been extraordinarily successful. From the establishment of the Bureau of Education in 1900, a great public-school system has been developed in the islands. This achievement has been made possible only through persistent struggles against adverse conditions. Buildings and equipment had to be renewed and teachers had to be trained. The people in general had to be educated to appreciate the value of the public schools and their interest in them and their readiness to support them are in distinct contrast to the apathy which existed at the time the system was founded. Their change of attitude is an indication of an intellectual awakening exceptional in its speed and inclusiveness. At the time the bureau was established, there were over 1,000,000 children of school age in the islands and it was the aim of the bureau to bring 800,000 of these into the public schools at the earliest possible date. In 1913–14, the annual enrollment for the school year was 621,000. In 1928, 1,111,509 were enrolled in the public schools and 84,813 in the private schools.

The problem of teachers was a very serious one; at first, a large portion of the instructors in the schools were American, but the training of Filipino teachers at the Philippine Normal School, the Philippine School of Arts and Trades, the provincial secondary schools, the intermediate schools, and the University of the Philippines later met the need. There were, in 1925–26, 25,268 teachers. The number of male American teachers decreased from 268 in 1917–18 to 134 in 1921–22, while the male Filipino teachers increased from 8421 to 14,417. The number of female American teachers rose from 138 in 1917–18 to 231 in 1921–22; Filipino female teachers in 1917–18 numbered 4400 and in 1921–22 there were 9253.

Special forms of education, such as physical, agricultural, and industrial instruction, were successful from the beginning. In 1920, there were over 250 agricultural schools; 15 of these were classed as agricultural schools, 14 as farm schools, and 222 as settlement-farm schools. The famous Central Luzon Agricultural School at Munoz is said to be the best institution of its kind in the Orient. Improvement in the quality and quantity of the industrial work done in the public schools was steady.

Records attained by students of the public schools of the Philippines in the carnival interscholastic games and Far Eastern meets show conclusively that physical education also has received the closest attention. Instruction in civics, hygiene, and sanitation is given in the first six grades of the public schools. The spread of education among the non-Christian tribes has been a difficult problem. The purpose of the Bureau of Education has been to bring these people to the cultural level of their Christian brethren and at the same time to strengthen the bond of union between them and their Christian kinsmen. To bring about this result, a large number of Christian Filipino teachers were assigned in the period starting with 1913 to these provinces. In 1920, there were 1728 of these teachers. The insular expenditures for public schools in 1927 were $4,331,500, compared with $3,132,389 in 1913. In 1921–22 there were 371 public vocational schools in the islands. Of these, 338 were schools of agriculture, 23 were trade schools, and 7 were normal schools.

The University of the Philippines at Manila steadily increased in influence and importance. It is composed of the colleges of agriculture, education, engineering, liberal arts, law, medicine and surgery, veterinary science, junior college of liberal arts, and schools of dentistry and pharmacy. Also connected with the university is the conservatory of music, school of fine arts, school of forestry, school of nursing, and university high school. The total attendance in 1927–28 was 7078, compared with an enrollment of 1398 in 1913.

Trade and Commerce. The development of the general import and export trade of the islands for the period 1913–28 and the quantity and value of the principal Philippine exports in 1913 and 1928 are shown in accompanying tables:

VALUE OF FOREIGN TRADE IN MERCHANDISE

	Thousands of dollars	
Calendar year	General imports	General exports
1913	53,313	47,773
1914	48,589	48,690
1915	49,312	53,813
1916	45,496	69,937
1917	65,797	95,604
1918	98,599	135,194
1919	118,639	113,118
1920	149,438	151,124
1921	115,839	88,115
1922	80,198	95,583
1923	87,500	120,753
1924	108,011	135,345
1925	119,733	148,877
1926	119,299	136,884
1927	115,851	155,574
1928	134,657	155,055

The foreign trade of the Philippine Islands during the fiscal year ended June 30, 1929, amounted to $315,446,256, or an increase of approximately $5,000,000 over the previous year. Imports amounted to $146,326,859, or an increase of approximately $20,000,000 over the corresponding period in 1927–28, and exports, to $169,119,397, or an increase of approximately $24,000,000 over 1927–28. These figures were of interest in view of the fact that the prices obtained for the leading commodities were lower than in the previous year; while the sugar shipments, which were somewhat less than one-third of the total trade of the islands in 1929, reached a total of $50,214,099, this being a slight increase over the value of the shipments for the previous year. Approxi-

EXPORTS OF PRINCIPAL PHILIPPINE COMMODITIES

Commodity	Quantity		Value (thousands of dollars)	
	1913	1928	1913	1928
Total			47,381	154,169
Coconuts, desiccated, 1000 lbs.	([a])	44,896	([a])	3,724
Sugar, million lbs.	347	1,256	7,033	47,543
Copra meal and cake 1000 lbs.	([a])	180,011	([a])	2,887
Tobacco and manufactures			4,967	8,572
Leaf 1000 lbs.	28,089	44,571	1,855	3,030
Cigars thousands	191,762	220,884	3,012	4,765
Textile fibres, vegetable tons	([a])	196,817	21,774	29,636
Abaca (Manila hemp) do	117,929	172,139	21,121	26,594
Maguey do	6,960	16,901	591	1,765
Manufactures of vegetable fibres			826	6,755
Cordage 1000 lbs.	609	14,495	62	1,776
Embroideries			176	4,396
Hats, all sorts number	547,218	1,426,202	409	3,359
Buntal hats do	218,947	1,239,629	322	3,250
Lumber and timber 1000 bd. ft.	7,728	85,836	324	3,127
Copra 1000 lbs.	181,263	516,795	9,546	22,542
Coconut oil do	11,046	313,589	1,146	23,490
Gold ore, bullion, and coin [b]			868	1,866
All other			1,356	2,543

[a] Not shown. [b] Not included in totals.

mately 58 per cent of the import trade and more than 75 per cent of the export trade of the Philippine Islands was with the United States in 1928–29. In 1913 the United States took only one-third of the Philippine exports and supplied one-half of the imports. The principal imports of the islands are cotton and its manufactures, agricultural implements, machinery and other iron and steel products, and petroleum products. Cotton manufactures imported were valued at $28,135,000 in 1928, $23,043,000 in 1927, and $11,844,000 in 1913. The value of iron and steel imports rose from $5,243,000 in 1913 to $11,481,000 in 1928; of machinery and parts, from $5,924,000 in 1926 to $10,853,000 in 1928; and of petroleum products, from $1,813,000 in 1913 to $8,668,000 in 1928.

Finance. Financial conditions in the islands suffered subsequent to 1914 from the disturbances created in general by the World War and also by local conditions. The Philippine National Bank, the largest financial institution of the islands (see *Banking,* below), suffered during 1920 as a result of an extension of its loans for the development of the industrial and commercial resources of the islands. This had an unfavorable result on the finances of the Territory. The general progress of financial administration will be noted from the fact that the receipts for the fiscal year 1913 amounted to $13,489,700 and the expenditures to $14,804,041. In 1920 the receipts amounted to $45,452,889 and the expenditures to $37,755,572. In 1927 total revenues were $41,751,500 and total expenditures, $42,095,000. The 1928 budget called for receipts of $36,222,000 and expenditures of $36,170,000. Returns for the first 11 months showed that receipts increased by $6,300,000 and expenditures by $3,325,000 over the corresponding period for 1927. The total bonded indebtedness on Dec. 31, 1927, was $88,975,000 and the net debt was $69,703,500, or $5.50 per capita. Currency and coins in circulation amounted to 127,446,000 pesos, or $63,723,000.

Health and Sanitation. Perhaps the greatest problem faced by the American government in the Philippines was the spreading of ideas of modern sanitation among the people. For the most part, the average Filipino is born, lives, and dies without medical attendance or nursing. There is also great lack of hospitals and dispensaries. Although great progress was made in sanitation after 1913, there was later an increase in the number of preventable diseases, especially typhoid, malaria, beriberi, and tuberculosis. The death rate per 1000 in the islands was 16.817 in 1913; 18.553 in 1914; 35.467 in 1918; 19.385 in 1921; and 18.1 in 1928. As a result of intensive general vaccination, smallpox almost entirely disappeared from the islands. Cholera, however, continued more or less prevalent. There was an outbreak of considerable intensity in 1916. Typhoid fever caused many deaths, and systematic anti-typhoid vaccination carried on by the health service contributed much to the gradual diminution of this disease. An active educational campaign was carried on year after year by public conferences, lectures, demonstrations, pamphlets, and other measures. Leprosy, which is common in the islands, was greatly reduced by the administration of various esters of chaulmoogra. A leper colony is maintained at Culion, where about 6000 patients were under treatment in 1927. The colony, till then maintained by the Philippine Health Department, received subscriptions in 1928 to a fund of $2,000,000, solicited in the United States by Governor General Leonard Wood just before his death. A school for sanitary inspectors was instituted, which included a six months' intensive training course for nurses.

Banking. The resources of the banks in the Philippines increased from 63,745,929 pesos ($31,872,964) in 1913 to 431,405,077 ($215,702,538) in 1920. In 1927 they amounted to 508,744,000 pesos ($254,372,000). The Filipino National Bank was established in 1916 and by law was made the depository of all provincial and municipal governments. As the result of inefficient management, the bank suffered a series of losses in 1920 which reached a total of $22,500,000. The American government, becoming alarmed at the situation, secured the services of an experienced banker from the United States under whose guidance the bank was placed on a sounder footing. A large part of the assets, however, had been loaned to concerns which for many years would be unable to repay them. These were chiefly sugar centrals and coconut-oil factories. The bank also established branches and agencies throughout the islands in charge of which were placed untrained Filipinos, and these branches, without exception, were mismanaged. These losses seriously involved the Philippine government. Twelve commercial or savings banks in the islands reported in June, 1927, total resources of $127,186,000. Bank notes in circulation in 1928 totaled 30,678,000 pesos ($15,339,000).

Government. The insular government is divided into the legislative, executive, and judicial branches. At the head of the executive branch, since the passage of the Organic Act of 1916, is the Governor General, who is appointed by the President, by and with the advice and consent of the Senate. He is assisted in the performance of his duties by the departmental secretaries. All these, with the exception of the secretary of public instruction, who is also vice Governor General and is appointed by the President, were Filipinos in 1924. These officers are appointed by the Governor General. The other officials of the government, appointed by the President, are the auditor, the deputy auditor, and the nine justices of the Supreme Court. As regards provincial government, the Philippines are divided into 48 provinces, 36 of which are known as regularly organized provinces and the remaining 12 as specially organized provinces.

The chief executive of a province is the provincial governor, who in a regularly organized province is an elected official. He, together with the other two elected members, forms the provincial board which constitutes the legislative branch of the provincial government. In some of the specially organized provinces, the provincial governors are elected and other officials are appointed. There are in the Philippines 890 municipalities. The executive of a municipality is called a municipal president. The municipal council, which is the legislative branch of the municipal government, consists of from 8 to 19 councilors, depending on the size of the municipality. The Legislature is made up of the Senate and the House of Representatives. Of the 24 senators, only two are appointed by the Governor General. All the others are elected by popular vote. The 93 representatives also are elected, with the exception of nine, who are appointed. In August, 1928, the Council of State was established by executive order to form a connecting link between the executive and the legislative branches of the insular government. It is composed of the Governor General, as president, the presidents of both Houses of the Legislature, the leaders of the majority parties in both Houses, and the six secretaries of the major governmental departments.

Judiciary. The administration of justice is entrusted to the Supreme Court, the courts of first instance, the municipal court of the city of Manila, and the courts of justices of the peace. The Supreme Court is made up of nine justices, one of whom is chief justice. Decisions of the Supreme Court may be appealed to the United States Supreme Court in certain cases. In 1928 the latter voided an act to create a Board of Control to take control of much public property out of the Governor General's hands.

Political Events. The period commencing with 1913 included some of the most important events since the American occupation. From 1913 to 1916, the period was marked by political changes which had a marked influence on the later political history of the Territory. From 1907 to 1913, under the influence of the Philippine Commission, many constructive measures were passed and special emphasis was placed upon the improvement of education and the construction of permanent improvements. From 1913 to 1916, the restraining influence of the Commission was withdrawn by the appointment of a majority of Filipinos in that body.

In September, 1913, Francis Burton Harrison was appointed Governor General, succeeding W. Cameron Forbes. In conformity with his policy, President Wilson nominated a majority of Filipinos as members of the commission. Since the membership of the Lower House of the Philippine Assembly was already composed entirely of elected Filipinos, this placed the majority vote of the Filipino Legislature in the hands of the Filipino people. In 1914 the Legislature passed many important measures, especially relating to finances. Governor Harrison carried on the policies of the Federal administration by appointment of an increasing number of Filipino heads of the executive branches of the government. During 1914 there occurred the so-called Ricarte movement. A man of this name, from a refuge in Hongkong, attempted to create an uprising among the more ignorant classes of persons in Manila and elsewhere. This was quelled without serious trouble.

In 1915 the greater part of the legislative sessions was devoted to consideration of financial reform and the economic development of the Islands. During this year, there were practically no disturbances requiring the attention of the constabulary in any part of the islands. The year 1916 was signalized by the passage in Congress of a new Organic Act which was approved by President Wilson on Aug. 29, 1916, and which did away with the Philippine Commission and established a governor general as executive head and in addition, executive, legislative, and judiciary departments. The first session of the Philippine Legislature created by the bill convened in Manila on Oct. 16, 1916. For the first time in the history of the islands, the non-Christian tribes were represented in the legislative assembly.

In 1917 Congress passed no measures directly affecting the Philippines. The Immigration Act passed in that year applied to the islands but only until superseded by an act of the Philippine Legislature on the subject. The first election for senators in the Philippines was held in October, 1916, and at the meeting of the Legislature on October 16 of that year, the Philippine Commission ceased to exist. The session of the Legislature held in 1917 created a new budget system which was approved by the President. A currency act provided for the reduction of the bullion value of Philippine coins, when circumstances required, and made other provisions in relation to the currency.

The year 1919 was one of political activity and economic disturbance in the islands, as a result of conditions brought about by the end of the World War. The statements of the Allied leaders during and after the War in regard to the rights and liberties of small nationalities had been widely spread in the Philippines and led to a demand on the part of a strong political element for immediate independence. Immediately after the signing of the Armistice, the Filipino Legislature appointed a commission to the United States ostensibly for the purpose of establishing improved economic relations, but before its departure for the United States, the commission was instructed to present the case for immediate independence. The agitation for independence, while it continued much later, was less active after 1924. By 1920 all the branches of the government, except the Supreme Court, had been Filipinized.

Following the election of President Harding in 1921, Governor General Harrison resigned and was succeeded on October 15 of that year by General Leonard Wood, who, with W. Cameron Forbes, former Governor General, had been appointed as a special commissioner to the Philippines to examine the political and economic conditions. The commission arrived in Manila on May 4, 1921, and at once undertook a general survey of the government and conditions of the islands. Following General Wood's service as chairman of the commission, he was appointed, in October, 1921, Governor General of the islands. General Wood and Mr. Forbes, in their report on the work of the commission, recommended that the present general status of the Philippines continue until the people had had time to absorb and thoroughly master the power already in their hands. They recommended also that the Governor General have authority commensurate with the responsibilities of his position. The report concluded as follows: "We recommend that under no circumstances should the American government permit to be established in the Philippine Islands a situation which will leave the United States in a position of responsibility without authority."

At the very outset of his administration, Governor General Wood found himself bitterly opposed by the aggressive advocates of independence. Controversy over appointments and other details of administration in 1922 resulted in a demand on the part of political leaders for Governor Wood's recall. The Legislature of 1921–22 provided for the issuance of bonds in the amount of $5,000,000 for the purpose of protecting the financial interests of the government. Two parties, the Collectivista or Coalition Party, headed by Manuel Quezon and Señor Osmena, the two most powerful politicians in the islands, and the so-called Democratic Party, were the most important political organizations in the islands. The Collectivistas carried on, from 1921 onward, an aggressive campaign for independence and against the administration of General Wood. The Democratic Party took the more moderate position. The Collectivistas refused to coöperate with Governor General Wood. The Philippine Independence Commission, in November, 1923, appointed Manuel Roxas, speaker of the insular House of Representatives, commissioner to visit Washington and explain the Filipino side in the controversies with the Governor General.

A resolution introduced in Congress for an investigation of the administration of General Wood failed of passage. The Filipino Independence Commission, in January, 1924, presented to Congress a memorial denouncing the administration of General Wood and asking for the immediate independence of the islands. In March, 1924, Señor Roxas made a plea for independence to President Coolidge, who replied adversely.

Governor General Wood remained in office until his death in 1927, but was persistently opposed by the majority element in the Legislature. This opposition tended to hinder opportune legislation that might otherwise have passed without affecting the independence issue. A legislative measure to remove from the Governor General's control public property of a reported total value of $70,000,000 and place it with a native Board of Control was voided by the United States Supreme Court. An issue was made of the American aides of the Governor General, whom the majority declared to be out of sympathy with Filipino views. An election of members of the Legislature, June 2, 1925, somewhat reduced the representation and standing of the Nationalist-Consolidated majority party. In 1926 President Coolidge sent Col. Carmi A. Thompson to the islands to report on conditions. Colonel Thompson, in his report, recommended that the granting of independence be postponed and that further autonomy be granted as circumstances might warrant. An act of the Philippine Legislature calling for a plebiscite on the issue of independence was vetoed by President Coolidge Apr. 6, 1927. In December, 1927, Henry L. Stimson was appointed Governor General, and undertook a conciliatory course with the legislative element. The Council of State, established in August, 1928, to form a connecting link between the executive and the legislative branches of the insular government, resulted in greater coöperation in the conduct of insular affairs. In March, 1929, Governor General Stimson resigned to become Secretary of State in President Hoover's cabinet and was succeeded by Dwight F. Davis, former Secretary of War, who continued the conciliatory policy. On Oct. 9 and 10, 1929, the United States Senate voted down two amendments to the Hawley tariff measure which would have granted immediate independence to the Philippines. The first was introduced by Senator King of Utah. The second, introduced by Senator Broussard of Louisiana, proposed an international conference to guarantee the independence of the islands and included a declaration that "the Government of the United States proposes to grant independence to the Philippines in the immediate future." The Senate also rejected Senator Broussard's proposal for duties on produce brought into the United States from the Philippines. While many Senators objected to the linking of Philippine independence with the tariff and voted against the two amendments on that ground, it was nevertheless felt that the vote indicated a majority sentiment adverse to the granting of immediate independence. The Broussard amendment was rejected by a vote of 63 to 19.

PHILLIPS, Charles (1880–). An American poet and playwright, born at New Richmond, Wis., and educated there and in Toronto. He had much experience as an editor. During the World War, he served overseas. Since 1924 he has been professor of English literature at the University of Notre Dame, Ind. Among his best books are *Back Home—An Old-Fashioned Poem* (5th ed., 1913); *The Divine Friend*, a poetic drama produced by Margaret Anglin in 1915; *Tarcisius*, a drama (1917); *A Buccaneer of Christ* (1918); *A Saint for Soldiers* (1918); *The New Poland* (London, 1923); *The Teachers' Year* (1924); *The Doctor's Wooing*, a novel (1926); *High in Her Tower*, verse (1927).

PHILLIPS, Ulrich Bonnell (1877–). An American historian and university professor, who was born at La Grange, Ga., and graduated at the University of Georgia. He held a fellowship in history at Columbia (Ph.D., 1902) and then for six years was instructor and assistant professor at the University of Wisconsin. He was professor of history and political science at Tulane University (1908–11) and since 1911 has held the chair of American history at the University of Michigan. In the World War, he served as captain, U. S. Army, Military Intelligence Division. In 1901 he received the Justin Winsor Prize of the American Historical Association. He is the author of *Georgia and State Rights* (1902); *History of Transportation in the Eastern Cotton Belt* (1908); *Life of Robert Tombs* (1913); *American Negro Slavery* (1918); and *Life and Labor in the Old South* ($2500 prize for the best work on American history, 1928).

PHILLIPS, William (1878–). An American diplomat, born at Beverley, Mass., and educated at Johns Hopkins University and the Harvard Law School. He was private secretary to the Ambassador to Great Britain from 1903 to 1905 and served in various capacities in the

State Department until 1908. He was appointed chief of the division of Far Eastern Affairs and then became first secretary of the American Embassy in London. He served again in the State Department and from 1917 to 1920 was Assistant Secretary of State. From the latter year to 1922, he was minister to the Netherlands and was appointed Under-Secretary of State in 1922. In 1924–27 he served as Minister to Belgium. During 1927–29 he served as U. S. Minister to Canada (the first to hold that office).

PHILLIPS UNIVERSITY. An institution of higher learning for men and women at University Station, Enid, Okla., founded in 1907. The student enrollment increased from 583 in the autumn term of 1923 to 879 in the autumn of 1928, the freshmen admission being limited to 270. The faculty during the same time was increased from 34 to 39; the productive funds from $532,870 to $548,830, and an endowment campaign completed in 1928 pledged $1,252,184 for equipment. The library was increased from 10,000 to 16,537 volumes, exclusive of public documents. President, Isaac Newton McCash, A.M., D.D., LL.D.

PHILLPOTTS, Eden (1862–). A British novelist and dramatist (see Vol. XVIII). His later novels include *The Judge's Chair* (1914); *The Girl and the Faun* (1916); *A Shadow Passes* (1918); *Orphan Dinah* (1920); *The Bronze Venus* (1921); *Redcliff* (1924); *Circe's Island* (1925); *The Jury* (1927); *Arachne* (1928); and *Tryphena* (1929). He also wrote the plays: *The Farmer's Wife* (1917), *St George and the Dragons* (1919), *Yellow Sands*, with Adelaide Eden Phillpotts (1926), *The Blue Comet* (1927), and *Three Short Plays* (1928); and the poems: *Plain Song, As the Wind Blows, Pixies' Plot, A Harvesting Man,* and *Brother Beast.*

PHILOLOGY, Classical. The World War, 1914–18, grievously interrupted the publication of periodicals and books, especially the former. Even in 1924, conditions in the book trade abroad were still unbalanced. It was hard to find out what was being published abroad, and far harder to obtain copies of books. The greatly increased prices of foreign books, especially of books published in Germany, made it difficult still in 1928–29, not only for individuals but also for libraries, to keep abreast even of the more important foreign publications.

In *The Nation* (New York), May 11, 1911, Prof. Paul Shorey, of the University of Chicago, in a paper entitled "American Scholarship" (reprinted in *The Classical Weekly*, vol. iv, pp. 226–230), supplied adequate proof that American classical scholarship need not fear comparison with the classical scholarship of Germany or England. At the semicentennial of the American Philological Association, in December, 1919, Professor Shorey returned to the subject, in a paper entitled "Fifty Years of Classical Studies in America." At the same meeting, Prof. F. G. Moore, of Columbia University, traced the history of the American Philological Association, and Prof. M. Bloomfield, of Johns Hopkins University, considered "Fifty Years of Comparative Philology in America." For these three papers, see *Transactions of the American Philological Association* (vol. l, pp. 5–83).

American classical scholarship has suffered grievous losses through the deaths of the following scholars (the name of the university with which the scholar was connected at the zenith of his career is given in parenthesis): Frank Frost Abbott (Princeton), Charles E. Bennett (Cornell), Maurice Bloomfield (Johns Hopkins), John M. Burnam (Cincinnati), Basil Lanneau Gildersleeve (Johns Hopkins), William Gardner Hale (Chicago), Thomas D. Goodell (Yale), Francis W. Kelsey (Michigan), Tracy Peck (Yale), Bernadotte Perrin (Yale), Samuel Ball Platner (Western Reserve), Moses S. Slaughter (Wisconsin), Kirby Flower Smith (Johns Hopkins), James Rignall Wheeler (Columbia), and John Williams White (Harvard).

Professor Gildersleeve, whose death occurred on Jan. 9, 1924, was for 40 years editor of *The American Journal of Philology.* In the *New International Year Book* for 1921, p. 553, reference was made to the fact that vol. xl, no. 4, of that journal appeared on Oct. 3, 1921, the ninetieth anniversary of the birth of Professor Gildersleeve, and that the whole volume was dedicated to him. The number mentioned contains the "Index Scoliodromicus," of 13 pages, which lists Professor Gildersleeve's extrasyntactical contributions to *The American Journal of Philology* and supplements the "Indiculus Syntacticus" (vol. xxxvi, 1917), a bibliography of Professor Gildersleeve's long array of very valuable notes in the sphere of syntax, all published in the same periodical.

One of the most interesting developments since 1900 is to be seen in the efforts made, especially in England, America, and Germany, to bring a knowledge of the contents of classical works and their value to a wider array of readers. Of prime importance here is the *Loeb Classical Library,* whose aim is to present all the more important classical authors, Greek and Latin, with the ancient text on one page and an English translation opposite. Over 200 volumes of the *Library* have been issued. For general observations on the *Library,* see *The Classical Weekly* (vols. v and vi); for detailed discussions (by C. Knapp) of various volumes of the *Library,* see *The Classical Weekly* (vols. vii, xii, xiii, xv–xix, xxi, and xxii (1929).

Another important movement in this field is represented by the series of volumes entitled *Our Debt to Greece and Rome,* published under the general editorship of Prof. G. D. Hadzsits, of the University of Pennsylvania, and Prof. D. M. Robinson, of The Johns Hopkins University. For the plan and the scope of the series, see *New International Year Book* for 1922 and 1923.

In Germany, a series of volumes whose purpose is to popularize the classics is *Das Erbe der Alten.* More scholarly, but still of interest to the general reader, are such works as *Einleitung in die Altertumswissenschaft,* under the general editorship of A. Gercke and E. Norden; *Die Hellenische Kultur* and *Die Hellenistische-Römische Kultur,* both edited by F. Baumgarten, F. Poland, and R. Wagner; and *Die Griechische und Lateinische Literatur und Sprache.*

Germany has long had an authoritative series of texts of the classical authors, both Greek and Latin—the famous *Teubner Series.* In the course of 30 years, by 1924, the Oxford University Press, in the *Oxford Classical Text Series,* had presented a fair array of texts of authors, Greek and Latin, edited by competent scholars, in most cases English. A very notable event is the establishment of several new series of classical texts. During the World War, 1914–18, Paravia & Co., Italian publishers, began a series entitled *Corpus Scriptorum Classicorum Paravi-*

anum (see *The Classical Weekly,* vols. xi, and xv; *New International Year Book,* 1918, p. 493). The *Corpus Paravianum* aims to show the manuscript text, with emendation only where the manuscript tradition gives no sense; otherwise, conjectural alterations proposed or accepted in other editions are not even to be mentioned.

About 1917 or 1918, French scholars began the publication of a series of texts of authors, Greek and Latin, under the patronage of the Association Guillaume Budé, which derives its name from Guillaume Budé, the great humanist of the French Renaissance, the founder of the Collège de France. In each instance, the text, with a brief critical apparatus, and a translation, in French, are given. Editions (with translations) of many authors, Greek and Latin, have been published. Under the head of "Literary and Historical Studies," the Association has published many works, such as *Histoire de la Littérature Latine Chrétienne,* by P. De Labriolle; *Introduction à L'Odysée,* by V. Bérard (see *The Classical Weekly,* vol. xix); and *Sénèque Prosanteur, Études Littéraires et Grammaticales sur la Prose de Sénèque le Philosophe,* M. A. Bourgery. The association has also published the first volume of a very important work, *Dix Années de Bibliographie Classique: Bibliographie Critique et Analytique de l'Antiquité Gréco-Latine pour la Période* (1914–24); see *New International Year Book,* 1927, p. 635; 1928, p. 587.

In 1923 there was begun at Barcelona in Spain, under the auspices of the Fundació Bernat Metge, the publication of another series of this sort. It is known as *Colleció Catalana dels Clàssics Grecs i Latins* and gives new editions of the texts of classical authors, Greek and Latin, with translations in Catalanian. For a brief account of the series, by C. Knapp, see *The Classical Weekly,* vol. xix, pp. 151–152.

In Germany, certain monumental works had long been under way before 1914, whose aim was to make accessible what was known (or conjectured) in various fields of classical philology. The most ambitious efforts of this sort were the *Handbuch der Classischen Altertumswissenschaft,* and the classical encyclopædia known by the abbreviation, "Pauly-Wissowa." The *Handbuch* was begun under the editorship of Iwan von Müller. Since 1922 a thorough revision, under the direction of W. Otto, has been in progress. In the 50 years that had elapsed from the time the publication of the *Handbuch* was begun, the horizon of the classical scholar had been greatly widened, particularly through the discoveries connected with the so-called Minoan civilization. This extension of knowledge took scholars several millenia back of the point at which, six decades ago, classical civilization was supposed to begin. Scholars have gained also a far better understanding of the relation of the historic classical civilization to the civilization that preceded it, in the Mediterranean Basin, on the European side, in Egypt, and in Asia. Hence, in the revision of the *Handbuch,* new topics are being included, such as "Grundriss der Politischen Geschichte des Alten Orients," and "Kulturgeschichte des Alten Orients," to each of which a volume is to be devoted. The full title of the *Handbuch,* in view of this wider ranger of its subjects, has been altered to *Handbuch der Altertumswissenschaft.*

Pauly's *Real-Encyclopädie der Classischen Altertumswissenschaft* was begun so long ago as 1830 (see an article by C. Knapp, *The Classical Weekly,* vol. xxi, pp. 216–217). A revision was begun in 1890, by G. Wissowa; the first part of this appeared in 1894. In 1924 the work was under the direction of W. Kroll and W. Witte. Between 1913 and 1924, four enormous volumes, viii–xi, carrying the first part of the encyclopædia forward from "Helikon" to "Kynegoi," were published. During 1925 volumes xii–xiii, and half of volume xiv appeared; these contain the articles "Kynesioi" to "Mantike." To facilitate the progress of the work, what is called a "Zweite Reihe" was begun in 1920. Three and a half volumes of this, covering the articles "Ra" to "Sparsus," have been issued. In 1918 appeared also *Supplementband III,* dealing with "Aachen" to "Ad Iuglandem"; *Supplementband IV,* dealing with "Abacus" to "Ledon," with a "Nachtrag" entitled "Delphoi," was issued in 1924.

Another notable German undertaking, *Ausführliches Lexikon der Griechischen und Römischen Mythologie,* begun by W. H. Roscher, with the coöperation of many scholars, has been completed. The great *Thesaurus Linguæ Latinæ,* the most comprehensive and authoritative of all Latin lexicons, has been advanced; six volumes, carrying the work through the article "Frustum," were issued by the end of 1928. A further part appeared in 1929. In France, the *Dictionnaire des Antiquités Grecques et Romaines,* by Daremberg and Saglio, was completed.

A very notable event was the publication, by the Oxford University Press, of four installments (out of 10) of a new edition (ninth) of the great Greek-English Lexicon, compiled by Henry George Liddell and Robert Scott (8th ed., 1897). The work on the ninth edition was in charge of Henry Stuart Jones and Roderick McKenzie. It is, as the preface says, "the work of many hands and represents a great sacrifice of leisure and an earnest devotion to Greek learning on the part of the present generation of scholars, and that not in this country [England] alone." The preface gives an extraordinarily interesting account of the development of this edition, of the methods by which it was prepared, and of the participation by various scholars in its preparation. The Oxford University Press deserves the grateful thanks of all lovers of true learning for its daring courage and its generosity in undertaking, in this practical world, a project so exacting and so costly, not merely in money, but in human devotion and effort.

A significant movement in the United States is the attention paid to the classical element in English literature. Important studies here are *The Relation of Latin and English as Living Languages in England During the Age of Milton,* W. P. Myers; *The Influence of Horace on the Chief English Poets of the Nineteenth Century,* Mary R. Thayer; *Horace in the English Literature of the Eighteenth Century,* Caroline Goad; *Vergil and the English Poets,* Elizabeth Nitchie; *The Classical Mythology in Milton's English Poems,* C. G. Osgood; *Classical Mythology in Shakespeare,* R. K. Root; *Ovid and the Renascence in Spain,* R. Schevill; *The Tradition of European Literature from Homer to Dante,* Barrett Wendell. For discussion of these works, see *The Classical Weekly* (vols. xii, xiv, and xvi). Many of the volumes in the series entitled *Our Debt to Greece and Rome,* mentioned above in this article, contain materials on this topic.

About 1918 steps were taken in America to concentrate support for a project that had been under way for a long time in Europe. This movement sought to further the study of mediæval Latin by pointing out the indebtedness of the mediæval languages and mediæval culture to the language and the culture of ancient Rome. The European sponsors of the movement have undertaken a revision of Du Cange, *Glossarium Manuale ad Scriptores Mediæ et Infimæ Latinitatis*, a work which, though several times revised and enlarged since the death of its author, is still sadly defective. Since it is, however, the only work of value within its field, its revision and enlargement are conditions precedent to the successful prosecution of fully fruitful studies in mediæval Latin. Under stress of necessity, the authorities in charge of the revision of Du Cange have, most reluctantly, decided to restrict the revision to the collection of the requisite lexicographical materials from the Latin writings of 500 to 1000 A.D.

A Committee on Mediæval Latin Studies has been organized, under the jurisdiction of the American Council of Learned Societies, with representatives from associations dealing with classics, history, modern languages, and philosophy. A report of the committee was printed in *Modern Philology*, xxi (February, 1924). Prof. J. F. Willard, of the University of Colorado, has issued seven bulletins (1923–29) on the *Progress of Mediæval Studies in the United States of America*. Several volumes of selections from mediæval Latin writers, issued by American scholars, have done something to make instruction in mediæval Latin a little less difficult than it was; but well-annotated editions of *whole* works in this field are sorely needed.

In May, 1925, the Mediæval Academy of America was organized. It has published four volumes of its journal, *Speculum, A Journal of Mediæval Studies*. Further interesting illustrations of the results that may be expected from the impulse given to studies in mediæval Latin may be seen in such works as the translation of Walter Map, *De Nugis Curialium, or Courtiers' Trifles* (see *New International Year Book*, 1924, p. 578) and the translation of the complete *Chronicle, or the History of the Two Cities*, by Bishop Otto of Freising. This version, by C. C. Mierow (see *New International Year Book*, 1928, p. 587) is the first translation of the whole *Chronicle*.

Increasing attention has been paid to the papyri discovered from time to time, especially in Egypt. These have been studied for the light they throw on works of classical writers already known, by giving recensions of the ancient text hundreds of years older, in some instances, than the earliest manuscripts. They have been examined also for additions to the store of classical texts. Illustrations of the profits of such study are to be seen, for example, in these volumes: *Oxyrhynchus Papyri*, edited by the English scholars, Grenfell and Hunt (see, for instance, *The Classical Weekly*, vol. xiv, pp. 14–16; *Classical Review*, vol. xxxiv, pp. 67, 179; *South Atlantic Quarterly*, April, 1914), and in such a book as *New Chapters in the History of Greek Literature, Recent Discoveries in Greek Poetry and Prose in the Fourth and Following Centuries B. C.*, by J. U. Powell and E. A. Barber.

A striking illustration of the value of the papyri in yet a third field, the study of Greek and of Roman life, is afforded by an important volume, "A Large Estate in Egypt in the Third Century B. C., A Study in Economic History," by M. Rostovtzeff, published as *University of Wisconsin Studies in the Social Sciences and History, No. 6*. The author undertook to assemble into a complete picture the 350 papyri, or more, that give the correspondence of a Carian Greek named Zenon, manager of a great estate, of land originally unimproved, which Ptolemy II (Philadelphus) turned over to his Treasurer of Finance, a Greek named Apollonius. For a review of this book, by Prof. W. L. Westermann, of Columbia University, see *The Classical Weekly*, vol. xvi, pp. 110–112.

Through efforts organized by Prof. F. W. Kelsey, of the University of Michigan, various American universities have come into possession of papyrus documents. These have been studied by various scholars. In the *Transactions of the American Philological Association*, vol. liii (1922), are two articles, "Some Literary Papyri in the University of Michigan Collection," by Prof. J. G. Winter, of the University of Michigan, and "A Papyrus of Dioscurides in the University of Michigan Collection," by Prof. C. Bonner, of the same university. The latter gives part of a work entitled *De Materia Medica*, by Dioscurides of Anazarba. At the meeting of the American Philological Association at which these two papers were read, Prof. A. G. Laird, of the University of Wisconsin, presented a paper, "The Wisconsin Papyri," and Prof. A. E. R. Boak, of the University of Michigan, discussed "The Record Office of Tebtunis and Cersesuchon Oros." The last-named paper dealt with a register of contracts for a period of four months, Apr. 28 to Aug. 28, 42 A.D. In 1926 appeared the volume, *Greek Papyri in the Library of Cornell University*, edited, with translation, by W. L. Westermann and C. J. Kraemer, Jr. For a review of this work, by M. Rostovtzeff, see *The Classical Weekly*, vol. xxii (1929). It may be noted here that increasing use is being made of the papyri in the study of Egypt under the Greeks, that is, under the Ptolemies. Thus, a genuine history of the so-called Hellenistic world is finally becoming possible.

Prof. B. W. Bacon, of Yale University, writing in *The Classical Weekly* (vol. vi, pp. 213–214), declared: "Until very recently, no manuscripts of first-rate critical importance had come into American hands." Later, however, classical manuscripts of importance found a resting place in the Morgan Library in New York City. One of these, a fragment of a manuscript of Pliny's *Letters*, has been decidedly in evidence since 1922. It had been bought by the late J. Pierpont Morgan in 1910. Dr. E. A. Lowe, a leading authority on classical palæography, and Prof. E. K. Rand, of Harvard University, published the fragment, in 1922, in a sumptuous monograph, well illustrated by plates, entitled, *A Sixth-Century Fragment of the Letters of Pliny the Younger, A Study of Six Leaves of the Uncial Manuscript Preserved in the Pierpont Morgan Library in New York*. Dr. Lowe believes that the fragment is a genuine relic of antiquity, and that it was written in Italy, about 500 A.D. Professor Rand believes that it is a part of a codex used by Aldus Manutius, in the preparation of his printed edition of Pliny's Letters. This codex, the *Codex Parisinus*, is now lost. In his views of the fragment, and of Aldus's edition of Pliny, Professor Rand is in sharp collision with Prof. E. T. Merrill, formerly of the University of Chicago, who, in 1922, published a critical edition of the text of Pliny's *Letters*. For reviews of the monograph by

Messrs. Lowe and Rand, see *Classical Journal*, vol. xviii; *Philogische Wochenschrift*, vol. xliii; *The American Journal of Philology*, vol. xlv; *Classical Review*, vol. xxxvii; *The Classical Weekly*, vol. xviii. Professor Merrill, in a paper entitled "The Morgan Fragment of Pliny's Letters," in *Classical Philology*, vol. xviii, takes issue with the views of Professor Rand. Professor Rand made an elaborate reply, in "A New Approach to the Text of Pliny's Letters," published in three parts, *Harvard Studies in Classical Philology*, vols. xxxiv (1923), xxxv (1924), and xxxvi (1925). For other articles inspired by this controversy, see, e.g., "On the 1508 Aldine Pliny," by Blanche B. Boyer and A. P. Dorjahn, *Classical Philology*, vol. xx; "Impressions of the 1508 Aldine Pliny," by F. E. Robbins, *Classical Philology*, vol. xxiii (1928); and "Another 1508 Aldine Pliny," by B. L. Ullman, *Classical Philology*, vol. xxiii.

On Dec. 19, 1906, Mr. Charles L. Freer, of Detroit, Mich., bought of an Arab dealer in Gizeh, near Cairo, four Biblical manuscripts. These were carefully studied by Prof. H. A. Sanders, of the University of Michigan. The results appear in the following volumes: "Old Testament Manuscripts in the Freer Collection, Part I, The Washington Manuscript of Deuteronomy and Joshua"; "The New Testament Manuscripts in the Freer Collection, Part I, The Washington Manuscript of the Four Gospels"; "The Old Testament Manuscripts in the Freer Collection, Part II, The Washington Manuscript of the Psalms"; "The Minor Prophets in the Freer Collection and the Berlin Fragment of Genesis," by H. A. Sanders and C. Schmidt, of the University of Berlin, published in 1910, 1912, 1917, and 1927, as parts of the *University of Michigan Studies, Humanistic Series*. For the importance of the manuscripts, see *The Classical Weekly*, vol. vi, p. 214.

In the field of palæography, we must mention E. A. Lowe, *The Beneventan Script, A History of the South Italian Minuscule* (1914), a book which C. U. Clark, in a review in *The American Journal of Philology* (vol. xxv, pp. 340–343), described as "the most important recent palæographic investigation in any language." A book on a kindred subject is *Roman Cursive Writing*, by H. B. Van Hoesen (1915).

The most important contributions made by American classical scholars in Greek and Latin literature, Greek and Roman history, Greek and Roman life, linguistics, and grammar appear in various periodicals. Books within this field include a very important volume by the late Prof. John Williams White, *The Scholia on the Aves of Aristophanes, with an Introduction on the Origin, Development, Transmission, and Extant Sources of the Old Greek Commentary on his Comedies* (1914). Professor White, of Harvard University, undertook to make a collation of all Aristophanic manuscripts. One outcome of the study was this volume of nearly 400 pages. For an elaborate review of the book, by G. E. Howes, see *The Classical Weekly*, vol. x, pp. 90–95. As a preliminary to that volume, Professor White, who died in 1917, had published *The Verse of Greek Comedy* (1912), reviewed by M. W. Humphreys (*The Classical Weekly*, vol. ix, pp. 141–144). In *Harvard Studies in Classical Philology*, vols. xxix, xxx (1918, 1919), there appeared two articles, "Collation of the Manuscripts of Aristophanes' *Aves*" and "Collation of the Manuscripts of Aristophanes' *Vespæ*," by J. W. White and E. Cary.

At least three American scholars have won distinction by their articles on Homer, published in various periodicals—G. M. Bolling, of Ohio State University; S. E. Bassett, of the University of Vermont; and J. A. Scott, of Northwestern University. Professor Scott has published two books on Homer, *The Unity of Homer* (1921) and *Homer and His Influence* (1925). Professor Bolling has issued *The External Evidence for Interpolation in Homer* (1926). For information on the general progress in Homeric studies, see the *New International Year Book*, 1921, p. 558.

Mr. Paul Elmer More, formerly literary editor of *The Nation* (New York), has published three volumes on Plato: *Platonism* (1917), *The Religion of Plato* (1921), and *Hellenistic Philosophies* (1923).

Works more general in character are *Athenian Tragedy, A Study in Popular Art*, by T. D. Goodell (1920), and *The Greek Theater and Its Drama*, by R. C. Flickinger (in three editions, 1916, 1922, 1926). Professor Flickinger's book is of prime importance in its field; for a notice of it, see *The Classical Weekly*, vol. xvii, p. 197. An important annotated edition of Cicero, "De Divinatione," the first published in the United States, by A. S. Pease, was published in the *University of Illinois Studies in Language and Literature*, vols. vi, viii (1920, 1923). Two biographies of Cicero by classical scholars appeared: *Cicero of Arpinum, A Political and Literary Biography, Being a Contribution to the History of Ancient Civilization and a Guide to the Study of Cicero's Writings*, by E. G. Sihler (1914); *Cicero, a Biography*, by T. Peterson (1919).

Of great service to the student of Horace is *A Concordance to the Works of Horace*, by L. Cooper (1916). Professor Cooper has published also *A Concordance to Boethius* (1928) and, in conjunction with A. Gudeman, *A Bibliography of the Poetics of Aristotle* (1928). Prof. G. C. Fiske, in *Lucilius and Horace, A Study in the Classical Theory of Imitation* (1920), examined again the whole question of the relation of Horace to Lucilius, his predecessor in satire. Prof. W. A. Merrill published many studies on Lucretius, dealing with his versification, imitations of his expressions by Vergil and other poets, etc. In 1918 he issued an edition of the text of Lucretius, complete (see *New International Year Book*, 1918, p. 492). Prof. Kirby Flower Smith, of The Johns Hopkins University, edited, with introduction and notes, the *Elegies* of Tibullus.

To Vergil, scholars of all countries have been giving much attention. In America, two biographies of Vergil appeared: *Vergil, a Biography*, by Tenney Frank, of The Johns Hopkins University, and *Virgil's Biographia Litteraria*, by Norman W. DeWitt, University of Toronto (1923). Both authors assume that the poems of the so-called *Appendix Vergiliana* were practically all written by Vergil himself, in his youth, and that we may, therefore, confidently rely on them for important information concerning Vergil's earlier years. Both books abound with interesting and stimulating suggestions on individual points, but as wholes they are to be used only with great caution, especially since there is, as yet, nothing like agreement among scholars concerning the authorship of the pieces in the *Appendix Vergiliana*. At the close of the nineteenth century, few scholars believed in their Vergilian authorship. F. Skutsch, however, in his *Aus Virgils Frühzeit* (1901, 1906), set the pendulum swinging, for a while, in the opposite direction. The tendency to accept one or more of the poems in the *Appendix* as Vergilian, as work of Vergil's youth, is seen in the following articles, or books: Miss E. S. Jackson, "The Authorship of the *Culex*," *Classical Quarterly*, vol. v; Th. Birt, *Jugendverse und Heimatpoesie Vergils, Erklärung des Catalepton* (1910: for reviews by N. W. De Witt and H. W. Prescott, see *The American Journal of Philology*, vol. xxxii, *Classical Philology*, vol. v); J. W. Mackail, "Virgil and Virgilianism, A Study of the Minor Poems Attributed to Virgil," *Classical Review*, vol. xxii; W. G. D. Butcher, "The Cæsura in Virgil and its Bearing on the Authenticity of the Pseudo-Virgiliana," *Classical Quarterly*, vol. viii; R. S. Conway, *The Youth of Vergil* (1915); J. S. Phillimore, "The Text of the *Culex*," *Classical Philology*, vol. v; T. Frank, "Vergil's Apprenticeship," *Classical Philology*, vol. xv; E. K. Rand, "Young Virgil's Poetry," *Harvard Studies in Classical Philology*, vol. xxx (1919); A. R. Bellinger, "Catullus and the Ciris," *Transactions of the American Philological Association*, vol. liii (1923).

Latterly, however, the view of those who would accept the pieces in the *Appendix* as Vergilian has been sharply challenged. Especially suggestive here is the work of R. S. Radford: "The Juvenile Works of Ovid and the Spondaic Period of his Art," *Transactions of the American Philological Association*, vol. li (1920); "The Priapeia and the Vergilian Appendix," *Transactions of the American Philological Association*, vol. lii (1921); "Tibullus and Ovid," *The American Journal of Philology*, vol. xliv (1923). Professor Radford believes that the whole Vergilian Appendix is the youthful work of Ovid, "composed by him in the period extending from 27 to 8 B.C." In the *Transactions of the American Philological Association*, vol. liii (1923), Prof. H. R. Fairclough, of Stanford University, in a paper entitled "The Poems of the *Appendix Vergiliana*," after study of the vocabulary of the poems in the *Appendix*, maintained that "probably not a single one of these poems has been correctly assigned to Vergil."

More general works in the field of Latin literature are E. G. Sihler, *From Augustus to Augustine, Essays and Studies Dealing with the Contact and Conflict of Classic Paganism and Christianity* (1923), and E. T. Merrill, *Essays in Early Christian History* (1924).

In the field of Greek history, we may note, first, G. W. Botsford and E. G. Sihler, *Hellenic Civilization* (see *New International Year Book*, 1915, p. 497). C. W. Blegen wrote *Korakou, A Prehistoric Settlement Near Corinth* (1921), published by the American School of Classical Studies at Athens. The civilization unearthed by excavations at Korakou, a hillock 3 kilometers west of the site of ancient Corinth, is of the type known as "Helladic," a term (see under ARCHÆOLOGY) devised to distinguish the prehistoric civilization of the Greek mainland from the prehistoric civilization found in the Cyclades Islands ("Cycladic") and in Crete ("Minoan"). Mr. Blegen's book deals with remains dating from 2500 to 1100 B.C. Important are works by M. Rostovtzeff, *Iranians and Greeks in South Russia* (1922), *The Ancient World*, vol. i, "The Orient and Greece" (1926).

Of *The Cambridge Ancient History* (see *New International Year Book*, 1923, p. 587), seven volumes of text and two volumes of plates have thus far appeared. Vol. iv (1926) deals with "The Persian Empire and the West," vol. v (1927) with "Athens, 478–401 B.C.," vol. vi (1927) with "Macedon, 401–301 B.C.," vol. vii with "Rome, Early Periods." See *The Classical Weekly*, vol. xxii, pp. 137–141.

Works on Roman history are the following: F. F. Abbott and A. C. Johnson, *Municipal Administration in the Roman Empire;* A. E. R. Boak, *A History of Rome to 565 A. D.*, (2d ed., 1929); T. Frank, *Roman Imperialism* (1914), *An Economic History of Rome to the End of the Republic* (2d ed., 1927) and *A History of Rome* (1923); Ida Thallon Hill, *Rome of the Kings;* Louise C. Holland, *The Faliscans in Prehistoric Times;* T. S. Jerome, *Aspects of the Study of Roman History* (1923); A. D. Randall-Mac Iver, *Villanovans and Early Etruscans* (1924), *The Etruscans* (1927), and *The Iron Age in Italy* (1927); M. Rostovtzeff, *The Ancient World*, vol. ii, "Rome" (1927), and *A Social and Economic History of the Roman Empire* (1926); G. Showerman, *Eternal Rome, The City and Its People From the Earliest Times to the Present Day* (1924).

In the field of Greek and Roman life, we can mention only W. S. Fox, *The Mythology of the Greeks and Romans* (1916, 1928); W. C. Greene, *The Achievement of Greece* (1923); W. W. Hyde, *Olympic Victor Monuments and Greek Athletic Art* (1921), reviewed by G. H. Chase, *The Classical Journal*, vol. xix, and D. M. Robinson, *The Classical Weekly*, vol. xvii; C. H. Moore, *The Religious Thought of the Greeks* (1916) and *Pagan Ideas of Immortality During the Early Roman Empire* (1918); E. Tavenner, *Studies in Magic from Latin Literature* (1916); L. Van Hook, *Greek Life and Thought* (1923).

In the field of Greek grammar, two important books are by H. W. Smyth, of Harvard University: *A Greek Grammar for Schools and Colleges*, (1916), and *A Greek Grammar for Colleges* (1920). The latter book is well worthy of a place beside the Greek Grammar of W. W. Goodwin, long the favorite Greek Grammar of Greek scholars and teachers in the United States and in England. Of prime authority in its field is A. T. Robertson, *A Grammar of the Greek New Testament in the Light of Historical Research.*

In the field of Latin grammar, quite the most impressive achievement in America since 1900 is the work of Prof. C. E. Bennett, *The Syntax of Early Latin*, vol. i, "The Verb" (1910), vol. ii, "The Cases" (1914). This work supersedes all previous discussions of the syntax of early Latin. For reviews by C. Knapp, see *The American Journal of Philology*, vols. xxxii, xxxv.

In linguistics, three American scholars are doing excellent work—L. Bloomfield, R. G. Kent, and E. H. Sturtevant. The work of all three is to be found largely in the periodicals. Professor Bloomfield has published a book, *An Introduction to the Study of Language*, Professor Kent a work entitled *Language and Philology*, and Professor Sturtevant two books, *Linguistic Change* and *The Pronunciation of Greek and Latin.*

In 1925 the Linguistic Society of America was formed; and in that year it began to issue a quarterly journal entitled *Language.*

In lexicography, foremost is the monumental work, *Lexicon Plautinum*, by Prof. G. Lodge, of Columbia University. Of this work, which has been in course of publication since 1901, fifteen parts, totaling nearly 1400 large pages, have been issued: these carry the work into the article *Quidem.* Prof. M. N. Wetmore, of Williams College, published two important works, *Index Verborum Vergilianus* and *Index Verborum Catullianus.* For reviews of them, see *The Classical Weekly,* vol. vi. Professors W. A. Oldfather, A. S. Pease and H. V. Canter, of the University of Illinois, published "Index Verborum Quae in Senecæ Fabulis Necnon in Octavia Prætexta Reperiuntur," in *University of Illinois Studies in Language and Literature,* vol. iv (1918). Professors A. A. Howard and C. N. Jackson, of Harvard University, published *Index Verborum C. Suetoni Tranquilli Stilique Proprietatum Nonnullarum* (1922).

PHILOLOGY, Modern. In making this brief sketch of the progress of philology since 1914, it behooves us to stress, first of all, a few of the salient tendencies characterized by the vast volume of production in this ever-growing field of research. Thereafter, the most important languages, as viewed from the vantage point of intensity and originality of investigation, will claim our attention. To attempt to go further into detail is well-nigh impossible, considering space limitations. There shall even be no endeavor to list all the chief contributions made during this period, for such a classification would perforce be tentative and subject to the criticism of divergent opinion. It is necessary, therefore, that the selection be limited mainly to such technical works as indicate the direction in which investigations are being carried on. Hence, all titles in archæology, anthropology, religion, literature, architecture, art, history, etc., are omitted notwithstanding the great value of many of these contributions to the growth and development of the study of modern philology.

The World War, which interrupted the period to which we are to devote our attention, had, from the philological point of view, two important consequences. On the one hand, it served to check, though not entirely, the outworn methods of investigation which had attained the zenith of their effectiveness before the close of the nineteenth century; while on the other, it made obvious to students of philology the vast possibilities that lay within their reach.

It was already noted in the pages of the 1914 *New International Year Book* that the study of philology was undergoing a process of transformation. The self-styled "back to nature" school, founded in the early nineties by German scholars under the leadership of Schuchardt, believed that they could arrive at general laws, applicable to all possible cases, by means of the study of dialects. Their preferred method, so aptly designed *Sprachmischung,* or the mutual penetration of dialects, failed to satisfy expectations, because of the numerous historical factors and variable accessory circumstances which must always be taken into consideration. The new French school, with Meillet at its head, hastened to reject entirely the esoteric philology which isolates linguistic facts from all contact with life, and began to interpret linguistics by the social movements of civilization—in a word, to seek in the development of languages the result of political and social actions.

Toward the close of the year 1915, there appeared the two-volume epitome entitled *La Science Française* issued under the auspices of the International Exposition at San Francisco. In the second volume is to be found the very suggestive survey of linguistics by Antoine Meillet. According to this scholar, while there have been numerous German schools of philology, there has never been a French school for the mere reason that *savants* of that nationality have always drawn their conclusions from data, and have refrained from accepting any theory that was not entirely in harmony with facts. At the outset, French philologists sought to approach the subject from every angle in order to bring all possible light to bear upon it.

It is this, above all, which has led to the introduction of new fields of investigation, such as semantics, dialectology, phonetics, and kindred subjects. The results of these methods were not only the monumental *Atlas Linguistique de la France,* by Gilliéron and Edmont—of which, according to Gaston Paris, French scholarship may well be proud—the *Sémantique* of Bréal, in which are laid the foundations of the science of the development of meanings of words, and the *Dissimilation Consonantique,* by Grammont, a work so original that further investigations were required to grasp its full significance; but also the *Histoire de la Langue Française,* by Brunot—which, says Jeanroy, has no equivalent in any other country—the great impulse given to experimental phonetics by the researches of Abbé Rousselot and others, the development along characteristic lines of the school of Celtic philology, and finally, the rehabilitation of the spoken language made by Meillet himself in his suggestive contributions to the study of Armenian, Slavic, and Greek. It is thus not so much by *des recherches de détail* (which, however, have their importance), as by the *introduction de vues neuves et de directions originales* that comparative philology has received new vigor from French thought.

Following the lead of Meillet, one of the editors of the comprehensive *Atlas Linguistique de la France,* J. Gilliéron, published a series of lectures entitled *La Faillite de l'Étymologie Phonétique,* in which he opened the attack from a new quarter. As the title indicates, the learned author admits the inadequacy of the antiquated methods in vogue to cope with present-day problems.

The most striking feature of the year 1921 was the great revival of interest in the study of language and its attendant problems. It seems that many Europeans sought solace from the disillusionments of war in the inspiration furnished by President Wilson's theory of self-determination according to linguistic and racial unity. This has been a most vital and stirring problem with all of these peoples more or less from almost time immemorial.

Encouraged no doubt by this general tendency, Meillet returned to the investigation of fundamental problems of comparative linguistics. In a volume of essays entitled *Linguistique Historique et Linguistique Générale,* published in 1921, this scholar laid definitely the basic principles for the reconstitution of the methodology of this subject. In his opinion, all languages show common tendencies, determined, on the one hand, by the structure of the vocal organs and the limited number of phonetic possibilities that they offer, and, on the other, by the laws of general psychology. These tendencies are obvious in such universal changes as the weakening of intervocalic consonants, vowel-breaking, or in the normalization of paradigms through the principle of analogy. *"Le changement linguistique,"* says Meillet, *"est lié à des faits de civilisation et à l'état des sociétés qui emploient les langues considérées."* In so far as it is a means of communication between the members of a same clan or of a same nation, language tends either to become infinitely differentiated or to fuse its divergent dialects into a common speech, according to the inclination to division or unification of the groups or peoples that speak it. The progress of language is inseparably bound up with the progress of society.

It is thus in extending our grasp of the great problem of linguistics that we are approaching more closely an understanding of the race, as well as the individual. However imperfect language may be as an expression of our thought, it nevertheless serves in its limited way to reveal our mental attitude. As a consequence of Meillet's investigations, the term philology now signifies much more than a mere juggling with forms: it is rather, to use the words of H. C. Wyld in his address, *English Philology in English Universities* (Oxford, 1921), "the study of human speech modified, altered, enriched at every stage by influences both literary and historical."

If we now turn to a more specific aspect of linguistics, i.e., grammar, we find that the same conditions obtain. In 1914 we noted that in regard to grammar there was a reaction against the study of the history of languages in favor of the general principles of the theory of language. O. Jespersen, *Modern English Grammar on Historical Principles* (Heidelberg, 1914), represents to a certain extent an effort to revive the teaching of grammar which, it may be said, had only slightly shown the effects of the progress of linguistics in the nineteenth century.

It was while making efforts to broaden and improve their methods in accordance with modern scientific resarch that scholars became aware that, like philosophy, theology, and medicine, the study of language was impeded on all sides by tradition and intolerance. From the more or less remote past, we have inherited a rigid methodology applicable to dead synthetic languages but totally inadequate to solve the problem of living analytic tongues and their relationship with a dynamic life teeming with new ideas. So, just as science was obliged to engage in open warfare with theology, modern philology entered the lists against its most redoubted opponent, which is our antiquated, though universally accepted, conception of grammar and its laws.

Consequently, *La Pensée et la Langue*, by Ferdinand Brunot (Paris, 1922), dean of the University of Paris, is in many respects an epoch-making work. Bearing as a sub-title *Méthode, principes et plan d'une théorie nouvelle du langage appliqués au français*, this manifesto purports to be a "methodical statement of facts derived from thought and interpreted and classified in its relation to language, and of the means of expression corresponding to them." After showing how every innovation in linguistic methodology has sooner or later been thwarted by a heritage of mediæval grammatical concepts and nomenclature—even comparative philology was obliged to surrender many of its revolutionary doctrines when confronted by a glowering and tyrannical tradition—Brunot observes that, thanks to the efforts of our "grammatical commissioners of police," the study of language today—like theology—is "a drudgery, the pet aversion of both pupils and teachers." Not even does orthographical reform escape the inquisition. Brunot, then, passes in review many gross blunders that the high priests of grammar dole out to the young as established facts, such as a tense which they interpret as a mood, a future-perfect disguised as a conditional, theories built upon misconstructions, etc. He adds, therefore, that it is high time to prepare a *Manual of Wrong Rules* as a pedagogical breviary which should protect the young against the "fundamentalism" of misguided dogmatists. Therefore, the object of Brunot's work is "the practical study of grammar with a view to enable the student to understand and express everything."

As a consequence of the rapid development of motion pictures, aviation, and radio, which are rendering geographical boundary an anachronism and are ameliorating international communication and good will, more widespread attention is rightly being devoted to comparative philology. Though only a century old, its influence in the cause of international understanding has been far-reaching. In past ages, each country had the utmost contempt for foreigners unable to speak its own tongue. To the ancient Hindus, such persons were *mlecchas* (Prakrit, *milicchu*, Pāli, *milakkhu*, barbarians, incomprehensibles; to the Jews, *gojim*, infidels; to the Arabs, *abscham*, babblers; to the Turks, *giaours* (Turkish *jawr*, *gawur;* Persian, *gaur*, another form of *gabr*, *gueber*, infidels), unbelievers, miscreants; to the Greeks, *barbarophonio* or *barbaroi*, stammerers, and later uncultured, or barbarians. Even today, the French *charabia*, gibberish (Spanish, *algarabia*, the "Arabic language"), or *baragouin*, jargon (Breton, *bara*, bread, and *gouin* wine, offered to the French invaders of Brittany) or the Mexican, *gringo* (Spanish *griego*, Greek), applied especially to the inhabitants of the United States, or the North American *wop* (Spanish *guapo*, handsome), or *dago* (Spanish-Portuguese, *Diego*, James, a term of address) have all now assumed a pejorative connotation and betoken the same spirit of contempt for the foreigner. But when comparative philology began to reveal that the so-called Indo-European languages were offshoots of the same parent stock, the alien tongue was no longer despised as the product of an inferior civilization. The finest compliment ever paid to a somewhat abstruse subject of research were the numerous efforts during the War to explain acts of aggression as a moral obligation to preserve continuity or relationship of speech.

The writer has often felt that the present period of the world's history will be designated in future times as the "dictionary epoch." In fact, never has such interest been shown in living foreign tongues. The vast number of dictionaries or vocabularies issued in the past fifteen years furnishes striking testimony to the desire of most nations to avoid cultural or commercial isolation. Likewise, the study of phonetics, which during the first half of its 40 years of history passed almost unnoticed, is now arousing widespread interest. In response to this great demand on the part of our public, several of our largest educational institutions are offering courses in this subject, as well as opportunities for research; and it may be added that the 10 distinguished foreign scholars, representing

France, Spain, and Italy, who lectured or taught in Columbia University in the summer of 1923, stressed the culture, civilization, and language of their respective countries. A final indication of the awakening of the spirit of international fraternization may be gathered from the recognition of the need of a universal tongue, which, since the decline of Latin in the seventeenth century, has been a mooted question with scholars. Now, the very urgent necessity of a common "radio language" is obvious to everyone and requires no further discussion here.

On Dec. 28, 1924, the Linguistic Society of America held its organization meeting in the Museum of Natural History in New York. Since its creation, this Society has been the guiding force in linguistic and philological thought in America. Among its numerous activities are the founding of a journal, *Language*, the publication of several monographs, and the inauguration of the first summer sessions devoted solely to the study of philology and its attendant problems, which were held at Yale University in 1928 and 1929 under the supervision of Professor E. H. Sturtevant.

A. Meillet and Marcel Cohen's *Les Langues du Monde* (Paris), which also appeared at the end of the year 1924, differs from the German *grundriss* type of work in that it does not consist of a collection of separate articles replete with philological minutiæ and technical terminology. On the contrary, within the compass of less than 850 pages are condensed in nontechnical language all of the essential facts pertaining to the numerous groups of languages of the world. That such a comprehensive work would contain lacunæ was a foregone conclusion —such as, e.g., the omission of the Andaman group of languages, Katt, Zandawe, etc.—but aside from these defects, this volume can be recommended as without doubt the most comprehensive and, at the same time, succinct work on this vast and important subject which has yet been published.

The founding of the Mediæval Academy of America at Harvard University in January, 1926, is also of significance to students of philology, because it aims to promote research in the literature and languages of the Middle Ages.

Finally, the completion in April, 1928, of Dr. J. A. H. Murray's *New English Dictionary on Historical Principles*, popularly known as the *Oxford English Dictionary*, marks the close of an important lexicographical epoch. Begun in 1857 by a committee of the Philological Society, which was appointed to list all words not to be found in existing dictionaries, this stupendous undertaking belongs, then, to the period when Littré and Hatzfeld and Darmesteter were issuing their monumental works in France, and the Grimm and other exhaustive lexicographies were either being planned or developed in Germany. In the *Oxford Dictionary*, one can, therefore, trace the progress of methodology in a phase of philology which has undergone much transformation in the past half-century or more.

The main tendency of philology at the present time (1929) is rather toward the investigation of concrete facts than toward general compilations which have been characteristic of the past. There is little doubt that the progress of this science will depend more and more on the evidence adduced from exhaustive and accurate interpretations of such phenomena. General theories built upon insufficient data, such, e.g., as we behold in the works of modern anthropologists, are being gradually discarded. As a consequence, contributions of the type of Karl Vossler's *Geist und Kultur in der Sprache* (Heidelberg, 1925), admittedly a very stimulating philosophical interpretation derived from Crocean hypotheses, passed almost unnoticed.

Another interesting tendency is the eagerness with which philologists are availing themselves of the contributions of anthropology, archæology, and kindred sciences. Until recent years, each one of the above groups of scientists seemed to resent any coöperation from others in solving its special problems. It is therefore to be expected that many plausible theories evolved in the past are doomed, if not to utter annihilation, at least to considerable modification. See INTERNATIONAL LANGUAGE.

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PHILOSOPHY. The developments of greatest philosophical significance in the field of natural science were incidental to the attempt of the scientists to find a way of passing from one supposedly discrete science to another. The attempt to bridge the gulf between mathematics and physics issued in the theory of relativity; similarly, the attempted transition from physics to chemistry resulted in the statement of the problem of the structure of the atom and the quantum theory as a tentative answer. Less was done to articulate biology with its forerunning sciences because the questions in that region are still manifold, but the controversy over vitalism and mechanism and the investigation of colloidal substances is significant. Psychology, at least in the English-speaking world, was in great danger of being subsumed under the other sciences such as physics, biology, and physiology, rather than being recognized as sufficiently independent to warrant the assignment of a special place and function in the scientific field, though the work of Wertheimer, Koffka, and Kohler in Gestalt theory tended to concentrate and establish the diverse experimental and theoretical findings on an independent basis which was not wholly divorced from the European tradition.

However, this tendency to integrate the sciences did not exactly follow the lines of development laid down by Comte. Neo-positivism accounted for scientific thought in terms of mathematical correlation. Its chief spokesman reduced scientific hypothesis to the level of mathematical equation; the entity hypothesis was excluded as far as possible; the terms in these equations were merely convenient expressions substituted for observations and thus made amenable to mathematical treatment. This intellectual asceticism was justified by the facility it contributed to the scientific treatment of experience. It also enabled the scientist to appeal to mathematical presuppositions instead of outworn metaphysics when he was hard pressed to give some further account of his theories.

This need for interpretation, especially with regard to scientific formulas which involve non-Euclidean geometry, led to the further development of postulate theory and mathematical logic. So when, in 1919, it appeared that at least one of Einstein's predictions, which were based largely on non-Euclidean geometry and rather unconventional postulates, had been verified, greater importance was attached to the work of Peano, Frege, Cantor, Dedekind, Whitehead and Russell in mathematical theory. Here was observational evidence not only for Einstein's theory of relativity, but a naïve philosophical mind was tempted to conclude that the mathematical presuppositions were also verified. Some not so well trained in mathematical theory were tempted to claim verification for their own special brand of metaphysics on the same ground. The discovery of the displacement of Mercury at perihelion was like Thales' discovery of the marvelous uses of the waters of the Nile and the subsequent founding of the Ionian school of nature philosophies: water, fluid, ice, steam, mathematics, non-Euclidean geometry, postulates, mathematical logic. We now had a scientific method in philosophy.

The more cautiously minded mathematicians and scientists disowned any such extrapolation, and rejoiced over the great advantages afforded by the theory of relativity for scientific method. The more philosophically minded saw the problem of rendering such an enormous system intelligible not so much for science as for human culture.

The problem arose from technical specializations and the complicated symbolisms that they employ. Symbolic logic is merely one of a host of such devices which dehumanize subject matters, and mystify the lay person. Following H. G. Wells's *Outline of History*, there was an avalanche of popularized knowledge. These were, in most cases, amateur attempts to expound the meaning of opaque symbols, and merely succeeded in confusing the settled knowledge of the ordinary mind. A problem in philosophical interpretation had been thrown to the mob and thus made more acute.

European continental philosophers had for a long time been fulfilling their interpretative functions, exercising both critical acumen and metaphysical insight in the assimilation of the new technical knowledge. England and America were far behind, but certain British philosophers and scientists came to fill the breach, Whitehead and Russell were conversant with the new physical theories and had become familiar with the problems of symbolism. Whitehead himself had an alternative theory of relativity and proceeded to introduce an organic model for scientific objects more adequate to the new mathematical usages than the old mechanical model. Russell decoded physics and chemistry and reëxpressed them in fine imaginatively clear pictures. Finally, Eddington, the astrophysicist, added his daring imaginative exposition to the interpretive process, and Haldane did likewise for biochemistry. In each case, some special brand of historical metaphysics was called into service as a basis for the summary and criticism of scientific knowledge. In America, Burtt made a survey of historical metaphysical doctrines underlying physics, and Bridgman gave an account of physics in terms of scientific instruments and their operations.

The popular interpretation of scientific knowledge also had its recoil on the laboratory, and philosophers came to the aid of the scientist himself. There were specialized works on the problems of measurement, probability, induction, and verification, giving rise to new theories of sense perception, instrumental controls, and statistical mathematics.

The other natural sciences present problems like these, though less clearly formulated. The best scientific mind uses imagination and mathematics, the best philosophical mind criticizes and sets the results in consistent order; but it should be remembered that this is science, with philosophy as handmaiden. The scientist discovers and classifies, calling for philosophical criticism only to render his material intelligible, when no further progress can be made without such insight. Insight or wisdom performing this function is intellect domesticated or enslaved; mathematics and logistics take the place of logic; ethics, æsthetics, and metaphysics are ignored. Yet one sees in this commandeering of the philosophic insight and intuition the start of a return to the greater tradition in philosophy. The reference of scientific findings to an intellectually grasped or constructed system is not a new trick. One remembers that Plato found a function for hypothesis in his ascent to the ideas. Also, one must not forget that the modern procedure is not accidentally Platonic. The earlier Russell did not despise Platonism, and the latest Santayana embraces it with true æsthetic enthusiasm. What matters it that system or essence is substituted for the idea?

The rivals of this positivistic naturalism are the modern humanists. One would like here to review the so-called realistic and psychological novel and compare it with the Greek tragedy as the objectification of opinions on fundamentally philosophical themes. Or, on another level one might sift behavioristic and Freudian psychology for nuggets of wisdom, but here again we find the professional philosopher buying and using the novelist's and scientist's knowledge. The rationale of his doctrines is the biologist's or the sociologist's dogmas. The most obvious illustration of this is the pragmatic tradition in America. James, Freud, and Watson have sold their functional psychologies to both the professionals and the guildsmen of humanistic sciences. Their psychologies are ultimately physiological, biological, or sociological, and the philosophizing which one finds is the reference of this or that particular fact to one of these systems. Humanism means then that man the organism, man the psyche, man the citizen of a commonwealth is the measure of all things. Glands, unit characteristics, instincts, conditioned responses, complexes, survival value, adaptation, social expediency are terms to conjure with. They are the inner Fates and Nemesis of our human existence. Yet the relativism of these concepts is admitted in the writings of Dewey, Pound, and McDougall. Man's creative intelligence measures and moves on.

In France, Durkheim and Lévy-Bruhl and in England Westermarck and Hobhouse set up the science of anthropology as a system of reference. Æsthetics, logic, ethics, all have a genesis and *raison d'être* in man's social experience. Mores, taboos, and ritual supply the necessity of man's life and knowledge. But there was a more sophisticated European tradition which had not only appropriated but assimilated the concepts of biology and anthropology. It not only avoided but condemned what it called psychologism. It reduced scientific classification and subordination to the level of arbitrarily specialized categories and asserted the superiority and finality of the intuitive comprehension of experience. It drew upon Spinoza, Kant, and Hegel. It placed the æsthetic at the foundation of knowledge and the ethical at the top and demanded the integration of this or that bit of knowledge in the light of the immediately given whole. However, that it paid for its sophistication is evident from the difficulties it encountered. More often than not an attempt was made to characterize its ultimates in terms of its most hated scientific discreteness. Bergson never escaped the biologism of his *élan vital;* Croce fell into the Hegelian fiasco of identifying spirit with human history; Brunschvicg fell short of Spinozistic substance and was content with the onward march of man through his flux of experience. Humanism had its usual limitations. Santayana's Realm of Spirit illumines, enchants, and dies away.

In general, recent philosophy has taken its critical duties more seriously, particularly with regard to science, and thus has brought about a shift in its own emphases. Specialization in the sciences is reflected in the many methods of philosophic speculation. This methodological pluralism has in turn revived an interest in dialectic and the versatile use of its many forms.

The most widely accepted dialectical doctrine is called creative or emergent evolution. Its fundamental intent was foreshadowed in Spencer's *Synthetic Philosophy*, but it remained for Bergson to provide it with a more sophisticated formula. He took his cues from Schelling, Schopenhauer, and Aristotle and succeeded in splitting the various scientific analyses off from the immediate data of consciousness, and stating the philosophical problem in terms of abstraction and intuition. Alexander paid more attention to the abstractions. He arranged them in a series ascending from space and time to God, bridging the gaps by a creative synthesis which he renamed "emergence." This has become, in the hands of his followers, a metaphysics in the grand manner; it is essentially a reversal of the neo-Platonic theory of "emanations." Deity reveals itself through an emergent evolution in time.

The greater part of the philosophy of science distributes itself around this theme in truly dialectical fashion. Empirical data are referred to this or that level of a hierarchy in which any higher stage is a synthesis of the lower stages. Abstractions are particularized and find concrete embodiment in the temporal process.

However, creation and emergence are taken as problems by logicians, and are usually rejected by philosophers who have logical scruples. They rather maintain an abstract discreteness and look for logical devices for passing from one universe of discourse to another. In some cases, this is achieved by mathematical transformations like those used in Einstein's relativity, or in some neo-Hegelian form of idealism. For the most part, there is a return to a Platonic theory of ideas, and there have been many signs of a return to the old metaphysical themes of ancient Greek, mediæval scholastic, or seventeenth-century rationalism. Taylor's work on Plato with reference to the mathematics and physics of Eddington, Whitehead, and Russell; new editions, translations, or critical studies of Scotus Erigena, Thomas Aquinas, Roger Bacon, and Duns Scotus; and scholarly expositions of the systems and methods of Descartes, Spinoza, and Leibniz have been brought to bear on the dialectical problems. Original modern work in science and logic has reached a point where long forgotten subtleties of the past reappear and historical forms of thought can again be appreciated.

In all this, the fundamental problem is Platonic, the relevance and significance of ideas in their relations with things. Slowly, the whole field of philosophy is gaining the Platonic orientation and rigorous formulation.

In general, Platonic method proceeds from observed particulars through hypotheses to principles. Modern science and historical studies aid in this process. Perhaps the most promising of these dialectical philosophies is being constructed by Husserl. Hypotheses are disregarded and the "ground principles" are caught in the immediate forms of experience. Husserl avoids the method of mathematical logic and scientific symbolisms and invents his own terminology. His own writings are difficult and his work is yet incomplete, so that an estimate is very difficult to make at present. The attention of professional philosophers, however, is turned in that direction and expectation is high. If the expectation is fulfilled, a great deal of lyrical impressionism and empty professional ritual in philosophy can be dispensed with in the near future. It is time for philosophy to break through the confining authority of the scientific movement.

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PHŒNIX GROUP. See Pacific Ocean Islands.

PHONETICS. See Philology, Modern; and Philology, Classical.

PHOSPHATE ROCK. The abundant supplies of phosphate found in the United States offset the utter deficiency of nitrates and potash. These three materials are essential fertilizing substances for agriculture and where not available must be imported. In 1920, the world's production of phosphate rock was estimated at 6,725,215 long tons, of which the United States produced 4,170,056 long tons. This, of course, was a record production, there being subsequently a marked decline. The phosphate deposits of Florida furnish from 75 to 85 per cent of the annual American output, and are followed by Tennessee and Kentucky. The two main types of phosphate rock are hard rock and pebble. The Florida deposits are mainly land-pebble rock, while the Tennessee deposits are of various types. In the western United States, phosphate rock has been discovered chiefly in Idaho, Wyoming, and Utah, where they occur near the base of the Carboniferous. In 1924, the United States had two extensive phosphate reserves, one in Florida and one in the Western States, and there was no anxiety regarding future needs. In fact, high-grade superphosphate had been produced by a copper-mining company from material mined in one of the Rocky Mountain States.

Though the production of rock phosphate in the United States has consistently remained below the 4,170,056-long-ton record set in 1920, the world output has steadily increased, reaching 9,386,288 long tons in 1926, and not far from 10,000,000 in 1928. The most important phosphate-producing countries in 1926, in the order of tonnage produced, were: United States, Tunis, Morocco, Algeria, Ocean and Nauru Islands, France, Egypt, Gilbert and Ellice Islands, Christmas Island, and Makatea Island. Before the World War, the domestic production was about equally divided between the United States and Europe, but the bulk of the native output is now consumed in the United States. Not only does the growing demand for fertilizers assure an increase in the production of phosphate rock, regardless of the export trade, but the use of phosphate acid and phosphate compounds for other purposes is always expanding.

The gradual exhaustion of higher grade deposits of phosphate rock has not only brought about an increase in the production of phosphoric acid using lower grades of rock at source but has stimulated research in various methods of using lower grades of phosphates in the production of phosphoric acid or conversion to concentrated fertilizers. The U. S. Bureau of Soils is engaged in investigating pyrolytic or heat methods, as well as wet methods, for the manufacture of phosphoric acid. The U. S. Bureau of Mines is engaged in research in the concentration of the low-grade phosphate rocks for the production of a high-grade phosphate product. See FERTILIZERS.

PHOSPHATES. See FERTILIZERS.

PHOTOCHEMISTRY. See CHEMISTRY.

PHOTOGRAPHY. The photographic industry, that is, the organized manufacture of sensitized materials and apparatus, began about 1876 and since that date has expanded very rapidly. One of its offsprings, the motion-picture industry, has in the last two decades so far overshadowed its parent that it now is to be recognized as the world's fourth largest industry. This rapid expansion unfortunately was not accompanied by a corresponding increase in an understanding of the scientific laws underlying the photographic process. Emulsion making continued to be largely a practical art. About 1908, however, hopeful signs of a new regime appeared as photographic manufacturers started to organize research staffs. The Kodak Company established a research department at Rochester, N. Y., in 1912, which grew from a nucleus of 15 to over 175 scientists and assistants during the succeeding decade and a half. Laboratories were established also by other firms in England, France, and Germany. The British Photographic Research Association was founded in 1918. It was supported largely by the Government and contributions of photographic manufacturers. A research laboratory was established in 1928 by Kodak, Ltd., Harrow, England. As a result of this changed attitude, theoretical research advanced so rapidly during the period covered by this report that it outdistanced practice. During that interval, photography passed through a transition period, and the future holds much promise for a more precise science when the knowledge gained will be applied to control emulsion technic and development practice.

Photographic Organizations. Interest in photography is fostered by about one thousand camera clubs and associations in various parts of the world, England leading with over four hundred societies chief among which is the Royal Photographic Society. This association sponsored the Seventh International Congress of Photography held in London in July, 1928. The Sixth Congress met in Paris in 1925 under the auspices of the Société Française de Photographie. These meetings were great clearing houses of information and much was accomplished toward international standardization of methods and apparatus used in photographic research.

Military Photography. The World War, 1914–1918, had an important effect on increasing national appreciation of the value of photography. Hundreds of thousands of photographic records of cities and towns, terrain conditions and troop movements were made, and millions of feet of motion-picture film were exposed. The art of camouflage was analyzed and studied by means of photography.[1] Aërial photography was developed from an almost unknown application into a valuable ally of the armies.[2] Special cameras and film were manufactured to suit its exacting requirements. In more recent years, aërial photography has been used extensively in connection with surveying, map making, studying unexplored territories, revealing hidden shoals under water, surveying traffic in large cities, etc. The use of the photographic film and plate as a recording medium for X-rays was developed extensively during the War. The majority of modern hospitals later were equipped with X-ray apparatus; dentists utilized the X-ray in diagnosis; and most of the large manufacturing plants considered its installation a valuable and necessary part of their medical departments.

These applications and other uses of photography were probably an underlying cause for the present position of photography as a "key industry."

Theoretical Progress. Significant among the achievements of theoretical interest which formed the groundwork for future practice were (1) the study of the cause of sensitiveness of photographic emulsions (the name commonly applied to a suspension of finely divided particles of silver salts in gelatin), (2) the progress made toward a better understanding of those physico-chemical reactions which form the basis of emulsion making, and (3) the investigation of the laws underlying the use of photographic materials, that is, the fidelity with which the tones of the original subject are reproduced in the final photographic print. Valuable contributions to all these subjects have been published by investigators in the United States, England, France, Germany, Sweden, Austria, Italy, and Russia.

Besides the reported progress in many fields, the literature of photography was enhanced by the following new publications: *Le Photographe*, 1913; *Abridged Scientific Publications of the Kodak Research Laboratories*, issued since 1914; *Monthly Abstract Bulletin*, issued since 1915 by the Kodak Research Laboratories; *Transactions, Society Motion Picture Engineers*, 1916; *Nordisk Tidskrift for Fotografi* (Swedish), 1917; *Svensk Fotografisk Tidskrift* (Swedish), 1917; *Die Kinotechnik*, 1919; *Revue française de Photographie*, 1920; *American Cinematographer*, 1920; *The Camera* (Ireland), 1921; *Photofreund*, 1921; *Photographic Abstracts*, initiated in 1921 by the Royal Photographic Society; *Camera* (Swiss), published first in 1922; *Educational Screen*, 1922; *New Photographer* (English), 1923–28 combined in 1928 with *Amateur Photographer* (English); *Filmtechnik,* 1925; *Movie Makers,* 1926; *Soviet Foto* (Russian), 1926; *Fotograf* (Russian), 1926; *Ciné Miniature,* 1927; *Bulletin of the Academy of Motion Picture Arts and Sciences,* 1927.

Applications of Photography. One of the notable applications of photography has been its use in photomechanical processes. The extensive and continually increasing use of illustrations in books, magazines, and newspapers for the most part can be attributed to photography. Rotary photogravure has come to be a common addition to magazines, pictorial news weeklies, and Sunday supplements, being printed about 1927 in two and more colors. The tremendous increase in the use of color in advertising is closely related to developments in three-color lithography. Photo-composing machines were developed to replace mechanical typesetters, and also the wet collodion plate used for over a half-century began to be displaced in 1928 by the use of a gelatin-coated stripping paper.[3] Pictorial telegraphy found increasing use in illustrated journalism about 1926 and radio and wireless transmission of photographs also showed promise.

Motion Pictures. Motion-picture photography has developed considerably since 1914, contributing not only to the world's amusement but also to its education and instruction. Reliable estimates made in 1928 stated that there were over 57,000 film theatres throughout the world. In the United States alone, there were 20,500 theatres and some two billion dollars was invested in the industry, which used a billion and a quarter feet of film yearly. There were approximately 235,000 persons engaged actively in furthering motion-picture production and exhibition. Leading production centres were Hollywood, Calif., and New York City in the United States, Elstree in England, Berlin in Germany, and Paris in France.

In the earlier years of the industry, motion pictures were all taken either out of doors or in large glass studios resembling huge greenhouses. With the development of suitable apparatus, artificial lighting came into use, and made film production independent of weather conditions. Arc lights and mercury vapor units for lighting interior sets were used almost exclusively until about 1927, when panchromatic (all-color sensitive) film came into great favor and incandescent lamps were commonly employed. The carbon arc manufacturers then developed panchromatic carbons which were cored with rare earth metals giving a wide range of spectral illumination. A combination lamp suitable for exposing panchromatic film was also introduced in the form of a mercury-vapor-neon-gas lamp.

Modern studios established for this growing industry soon constituted small cities where many branches of activity were in progress as represented by the carpenters, machinists, masons, plumbers, painters, decorators, artists, sculptors, etc., each group contributing its share to create sets for the director to populate and the cameramen to reproduce on miles of film "ribbons."

In 1928, studio routine was greatly changed by the introduction of methods of reproducing sound in conjunction with pictures. The silent actors now acquired voices or stepped aside for those who could speak as well as act, and directors had to develop a new technique. Special recording studios were built having one or more silent "stages," where the action took place. Electrical, acoustic, and mechanical engineers became associated with the industry as the delicate recording and reproducing equipment and conditions for its use required scientific control. This development was made possible only by the increased understanding of the properties of photographic emulsions and a greater knowledge of the theory of tone reproduction.

Distribution of motion pictures to the theatres grew into a business-like though rather complex trade by 1920.

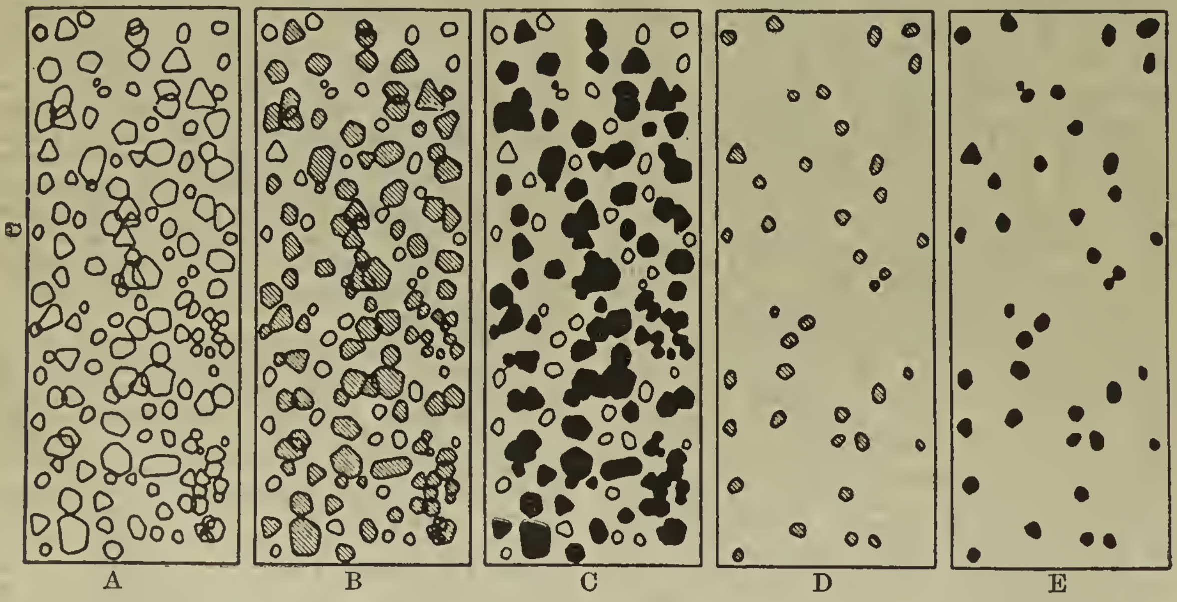


FIG. 1. DIAGRAM OF DEVELOPMENT OF AMATEUR CINE FILM BY THE REVERSAL PROCESS.
a, Light-sensitive silver bromide grains; *b,* shaded grains indicate those affected by light during camera exposure; *c,* black metallic silver negative image produced by development; *d,* black silver removed by bleaching solution and remaining silver bromide grains exposed; *e,* developed silver comprising final positive image. (Note grains are smaller in final image than in original negative image).

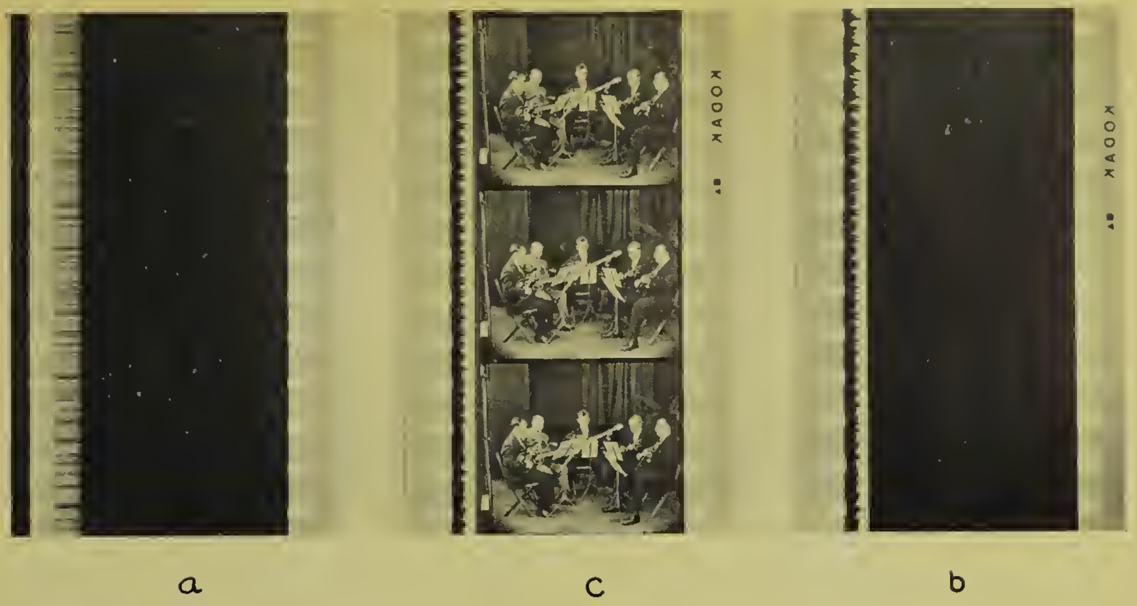


FIG. 1. TYPES OF PHOTOGRAPHIC SOUND RECORDS ON MOTION PICTURE FILM
(a) Variable density record (Movietone); (b) variable width or area record (R. C. A. Photophone); (c) picture and variable width record.

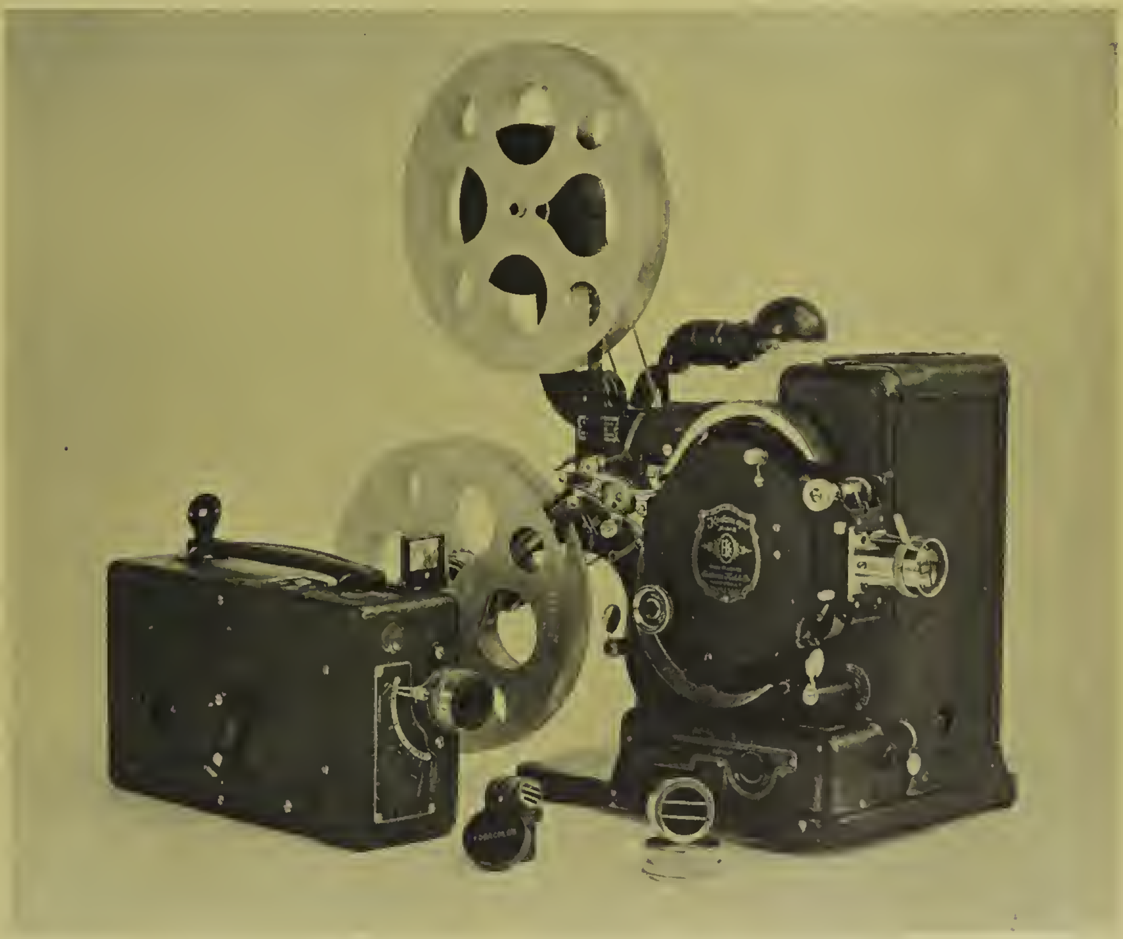
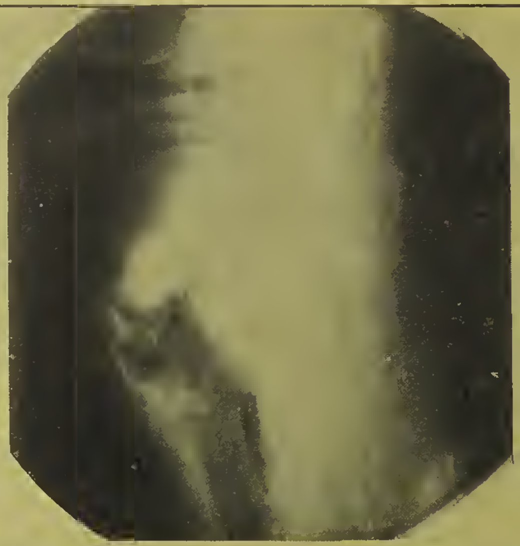


FIG. 2. CAMERA AND PROJECTOR WITH COLOR-FILTER ATTACHMENTS USED FOR AMATEUR COLOR MOTION PICTURES
The same equipment, without the filters, is used for ordinary amateur cinematography.

MOTION PICTURE APPARATUS AND FILM

PHOTOGRAPHY—II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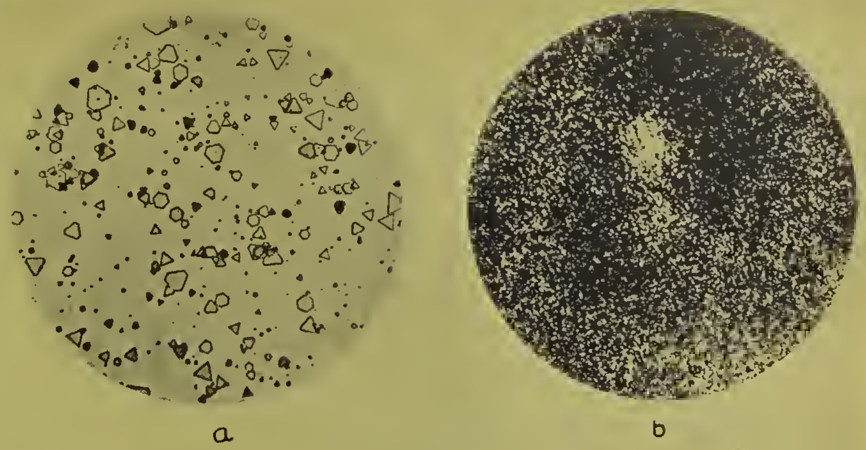

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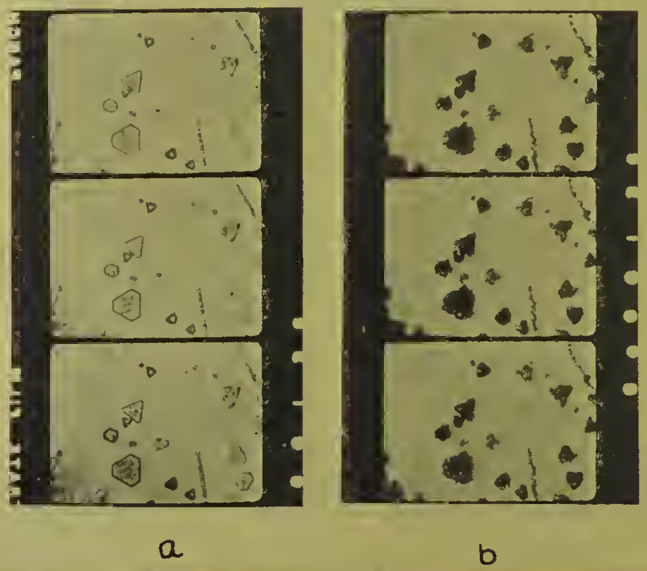

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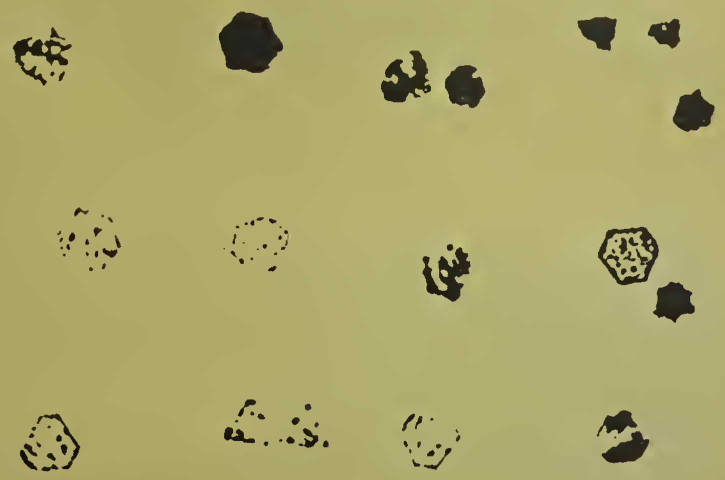
4

1. X-ray photograph of decayed area in a tree. Decayed area in the lower left and the annular rings are clearly visible. Dark horizontal lines near top are drillings.
2. (a) Silver bromide grains in a photographic emulsion. (b) Structure of an actual developed image (pupil of a human eye).
3. Motion photomicrographs of undeveloped and developed silver bromide grains.
4. Partially developed silver bromide grains showing development starting at preferred points (Hodgson, 1917).

The motion picture has had a profound effect on American architecture. Previous to 1918, most pictures were shown in rejuvenated vaudeville houses. New buildings then began to appear incorporating many beautiful designs of ancient and modern art, Chinese, Spanish, Gothic, and even the early Mayan civilization of Central America being represented. The largest of these theatres was the Roxy, which has been called the "Cathedral of the Motion Picture." It seats 6000 persons and was opened in 1926 in New York City.

Research in motion pictures is fostered by the Society of Motion Picture Engineers organized in 1916. The *Transactions* of this society contains accounts of much of the significant research done in this important field throughout the world, as papers are solicited from foreign countries as well as from the United States. Two other societies which exert an important influence on the trend of the industry's affairs are the Motion Picture Producers and Distributors of America, Inc. and the Academy of Motion Picture Arts and Sciences, representing the writers, technicians, actors, directors, and producers.

Well-organized programmes for the production and distribution of films for classroom use were under way in 1928 in connection with geography, general science, and medicine. Universities were awakening to the need of cultural, as well as instructional, courses in motion-picture photography.

A successful, practical method of amateur cinematography[4] was introduced in 1923. It grew rapidly until in 1928 there were about 100,000 users of such equipment. The success of this process depended upon (1) the introduction of a special, fine-grained emulsion; (2) the use of a small-sized safety film of 16-mm. width (compared with 35-mm. width used for standard film) having 40 pictures to the foot instead of the usual 16 pictures; (3) the conversion by a special developing process of the original negative into the projection positive (Fig. 1); and (4) a general lowering of costs. Many designs of cameras, projectors, and accessories were introduced, film libraries were formed, and amateur cinema clubs organized to produce pictures.

Color Photography. Since 1914 there have been witnessed many courageous attempts to realize the ultimate in photographic perfection—photographs in natural colors.[5] Natural-color processes fall into two broad classes, *additive* and *subtractive* methods. All processes of both types having any commercial success thus far have utilized some form of color filter when taking the pictures. In the additive type, the positive record is nearly always a black-and-white transparency and is examined by placing suitable color filters in the optical path of the light transmitted by the image. Examples of the additive method are the Zoechrome process of color motion pictures demonstrated by C. H. Friese-Greene in 1925 and J. Szczepanik's continuous camera and projector for the three-color motion pictures which was exploited in 1924–25.

The Agfa color plate originally announced in 1916 and introduced in 1923 also met with considerable favor. This is a screen-plate process in which the three-color screen in near contact with the emulsion is composed of dyed particles of gum arabic rolled out in collodion. It represents the most successful screen-plate process since the Lumière Autochrome was introduced in 1907. Color-screen methods were first applied with some commercial success to roll film and film packs by the Lignose Company in 1927.

The subtractive method appeared to find greater favor, perhaps because the final image is actually colored and usually requires less complicated apparatus for examination. Print processes usually embody the subtractive principle. In 1923 H. J. C. Deeks announced his Raylo process in which three negatives were exposed simultaneously through primary filters in a special camera. Prints were made from them by projection on to specially sensitized tissues and the separate tissues were then brought in to register under water. Several years later, this same inventor introduced specially sensitized color sheets for use with any set of three-color negatives. Two other print processes deserve mention, namely, the wash-off Jos-Pe method introduced about 1924 and the Lage process announced in 1927. Two-color subtractive processes having certain features in common were Kodachrome based on the patents of J. G. Capstaff and Technicolor founded on the Comstock patents. The latter was used more extensively in commercial motion-picture production than any other color process devised up to 1928.

Natural color motion pictures for the amateur[6] became available in 1928 when Kodacolor film was announced for use in 16-mm. equipment distributed by the Kodak Company[6] (Fig. 2 on the accompanying Plate I). This is a three-color additive process which realizes the principles of a line-screen method without the added difficulty of ruling a screen on the film support. The secret of the process is based on a means of impressing a parallel series of microscopic cylindrical lenses into and along the length of the support side of panchromatic film. A banded three-color filter is fitted into a support in front of the lens of the camera and projector. The film is threaded into the camera with the emulsion side away from the lens so that the light passing through the filter must be transmitted by the tiny embossed lenses each one of which thus images the bands of the color filter on the film.

X-ray photography found extensive use in conjunction with commercial work,[7] besides its employment in connection with clinical diagnosis. A few of the many uses are examination of welds in steel, detection of decayed areas in living trees (Fig. 1 on Plate II) inspection of the quality of false teeth, revealing changes in paintings, etc. An English firm inspected over 2000 articles per day with one X-ray outfit.

Photography has come to be used very extensively for recording scientific data. Astronomers have found it an indispensable ally for many years in the determination of the size, composition, color, and location of stars, planets, and nebulæ. Without its aid, one of the most valuable checks on the Einstein theory could never have been obtained; this was the deflection of light from stars near the sun which was verified during the eclipse of May 29, 1919. See PHYSICS.

The photographic emulsion offers the only means of accurately recording many reactions invisible to the eye. Rapid physical and chemical changes may be recorded quickly for later examination with more deliberation. A review[8] containing over 150 references to papers on applications of photography was published in 1927. Examples described dealt with uses in chemistry, physics, geology, phychology, astronomy, engineering, and medicine, besides numerous miscellanous applications.

Physical Measurements. A quantitative method for expressing the characteristics of photographic emulsions was first worked out by F. Hurter and V. C. Driffield in 1890. They studied systematically the relation between exposure, development, and the silver deposit produced in the photographic process.[9] Subsequent investigators confirmed their results and the fundamental method devised by them is essentially that used today.

Since 1918 great progress has been made in the design of precision instruments[10] for controlling exposure, processing the sensitive material, and interpreting the result. Instruments for impressing a series of known exposures on a sensitive material are called *sensitometers* and the method of exposure and recording the results, *sensitometry*. Instruments for measuring the opacity or reflection of silver deposits are known as *densitometers*. These two types of instruments have been used extensively in connection with most all precision work in photography.

For many years there has been an organized effort made to reach definite international standards in regard to the methods of measuring the properties of photographic emulsions and expressing the results, so that experimenters in various parts of the world would be able to conduct their investigations on a comparable basis.[11] Two problems of utmost importance have been examined extensively, namely (1) the quality of the light source used for sensitometric work, and (2) the intensity level used in making photographic exposures. The latter is called the *reciprocity* effect and expresses the relation between time and intensity in the resulting photographic density. The Congresses of Photography and the national physical and optical societies have assisted greatly in bringing about international agreement on many of these problems.

A question of fundamental importance in all photographic work is that of tone reproduction. According to Mees,[12] this has been summarized as follows: "When a photograph of a natural object is made, the form can be represented only by differences in brightness. The accuracy with which the form is represented depends upon the precision with which the tones of the original subject are reproduced." Although much progress had been made on this problem previous to 1913, it was not until that year that an intensive attack was organized by the newly formed Research Laboratory of the Kodak Company. The effort was centred mainly on the behavior of printing materials, which had been studied only slightly. A series of papers was published dealing with the properties of printing papers, the sensitiveness of the eye under different illumination conditions, and a graphic solution of the theory of tone reproduction. Workers in Germany and England also published a great deal on the same subject. It may reasonably be stated that a fairly complete solution for the problem is now known.[13]

There has been considerable inconsistency in the methods used by various manufacturers for specifying sensitiveness or "speed" numbers for photographic films and plates. A method which gives a value conforming more nearly to the usage of modern emulsions was worked out and instruments which simulate conditions like those existing in the camera were described.

The extensive employment of photography as a working tool in almost all branches of physics, spectroscopy, astronomy, atomic structure, studies on electrons, etc., indicates the importance of adequate knowledge of the advantages and limitations of the photographic emulsion as a recording medium. Valuable work was done toward this end[14] relating to the formation of details of images, resolving power of photographic materials, and distortion of images.

Other important physical measurements[15] on which work was done dealt with methods of measuring the color sensitivity of photographic materials, the spectral transmission of filters, and the reflecting power of colored objects.

Manufacture of Sensitized Materials. Two broad classes of sensitized materials are known, namely, (1) those in which the silver halide is formed in the presence of excess silver salt, examples of which are wet collodion, and most printing-out-emulsions, and (2) those in which the silver halide is formed in the presence of excess soluble halide, which includes positive and negative emulsions requiring chemical development. The former types though still used to some extent in photomechanical processes, are rapidly losing favor for general photographic work and have been replaced largely by the latter group.

Negative emulsions usually contain a small quantity of soluble iodide comprising about 5 per cent of the total silver halide. Positive emulsions normally consist of nearly pure silver bromide, or chlorobromide, or of pure silver chloride. Precipitation of the silver halides in all emulsions is a very critical operation. Some emulsions are "ripened" by heating the emulsion above the temperature of the melting point of the gelatin, which introduces certain changes in the size of the particles and affects their sensitiveness.

Glass, nitrocellulose, acetocellulose, and paper have been used as supports for coating emulsions. Although glass has certain advantages such as rigidity and non-flammability, it is heavy, easily broken, and bulky and has been replaced to a great extent by nitrate and acetate film. The properties of nitrocellulose have been studied very thoroughly since it was first used by Eastman as a film support in 1889. The patent literature was amplified considerably by individuals and manufacturers who disclosed various cellulosic compositions. Numerous patents were also taken out in relation to the use of antifogging agents, non-halation chemicals, and antistatic compounds, as well as methods of laminating film. The properties of papers for photographic use and materials for coating substratum have been examined very thoroughly.

With the introduction of amateur ciné equipment in 1923, and even previous to that, acetate film was used to some extent; in fact, its use was compulsory in certain European countries. A survey of patents taken out since 1923 indicated a definite trend toward a wider adoption of the so-called "safety base." Its difficulty of manufacture and tendency toward brittleness no doubt retarded earlier adoption.

The technic of coating film support in sheets continues to be one of the secrets of the film manufacturer, although descriptions of the machinery and methods used have been published.[16]

Physical properties of gelatin, choice of gelatins for photographic use, and changes in gelatin during processing were investigated critically during the last fourteen years. Instruments for measuring swelling, viscosity, resistance to scratching, and other properties of gelatins were devised.[17]

For many years, emulsion makers knew that certain gelatins were satisfactory and others were unsatisfactory for photographic use. In 1925, Sheppard[18] announced the discovery of the presence in gelatin of a definite chemical substance known as allyl thiocarbimide. Its presence in minute concentrations of one part in 1,000,000 to one part in 300,000 was shown to be the cause of the suitability of certain gelatin samples for use in photographic emulsions. During the emulsion-making process, this substance is converted over by a series of chemical reactions into silver sulphide which was shown to be present as extremely small specks or *nuclei* on the crystals of silver halide. The presence of these nuclei was proven to be necessary in order to make the grains developable after exposure. Other investigators subsequently corroborated many phases of Sheppard's discovery, which was regarded as the most valuable advance made in photographic science in the last 25 years.

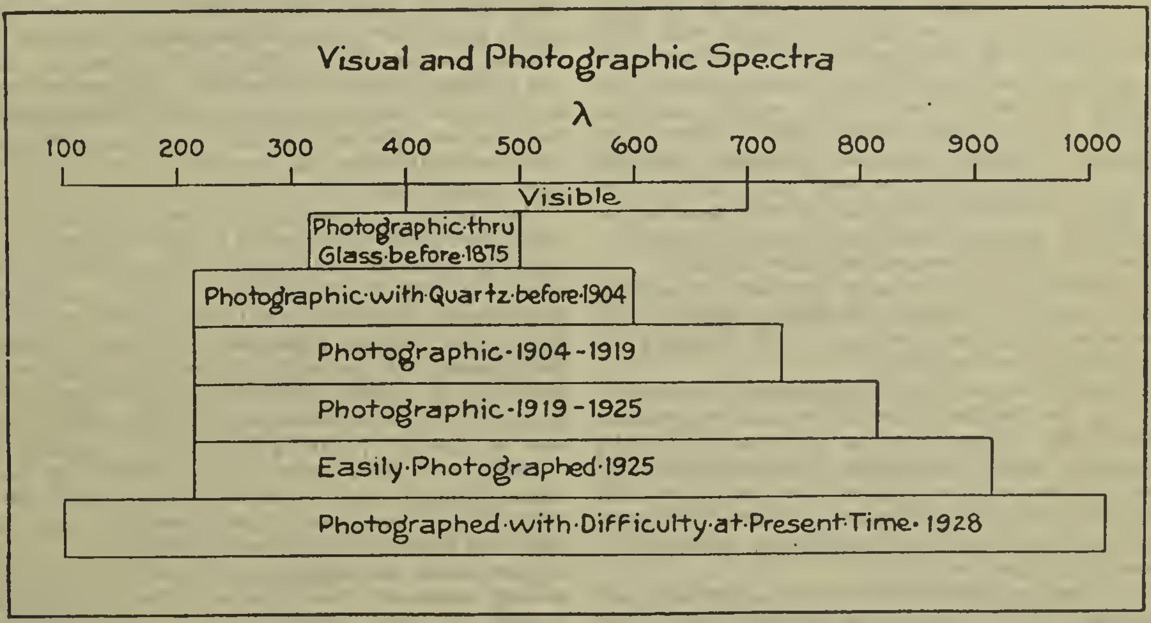

FIG. 2. PROGRESS IN COLOR SENSITIZING OF PHOTOGRAPHIC EMULSIONS

A number of papers and patents dealing with emulsion making have been published by various authors throughout the world. One important series, whose publication was encouraging to note, represented investigations by scientists at the U. S. Bureau of Standards.

Panchromatic film was introduced about 1914 and although much less sensitive than the orthochromatic film, the speed was increased until in 1927, it was rated about 20 per cent faster than the usual portrait emulsions. Its use for motion-picture work became very general about that same year and by 1928 the major portion of all ciné negatives were being made on panchromatic film. Panchromatic reversal film on 16-mm. safety base was made available for the ciné amateur in 1928. The difficulty of making duplicate negatives of valuable original motion-picture negatives was greatly lessened by the introduction of a special film emulsion for this purpose in 1927.

The spectral sensitivity of photographic emulsions has greatly extended since 1914 mainly as a result of the discovery of additional sensitizing dyes[19] (Fig 2). Spurred on by the shortage of dyes during the World War, the bulk of which had been made previously in Germany, English scientists, especially Mills and his collaborators, studied and elucidated the structure of the sensitizing dyes. Experimenters in America discovered new sensitizers. Kryptocyanine was announced in 1919 and neocyanine in 1925, each of which sensitized well into the infra-red region, the latter to wave-length 1000. Plates sensitized with such dyes found valuable application in astronomy in connection with the photography of Mars and other planets and films so sensitized were used to reproduce "night effects" by daylight exposure. Methods of hypersensitizing emulsions were worked out whereby the white light, as well as the color sensitiveness, could be enhanced by bathing the films in certain solutions after manufacture.

Various types of X-ray intensifying screens were devised incorporating calcium tungstate which fluoresced under ultra-violet radiation. These were placed in contact with dupli-tized X-ray film (coated on both sides with emulsion) in order to reduce the effective X-ray exposure and thus decrease the danger to the patient.

Several papers and a great many patents described light-sensitive diazo compounds and allied substances.[20] Papers coated with these compounds and a coupling agent are used as substitutes for blue-print paper. Inclusion of a weak organic acid prevents the two chemicals from reacting to form a dye, but if this acid is neutralized by treating the paper with ammonia gas, the diazo compound is decomposed and no dye is produced by the ammonia treatment.

The process is therefore a method of producing positive images directly. Ozaphane motion-picture film consisting of a diazo compound coated on an extremely thin viscose layer was used commercially in Europe about 1928.

Photographic Apparatus. Studio cameras have not changed appreciably during the last quarter century, though notable improvements have been made in accessories for them such as lenses, shutters, and film and plate holders. Anastigmat lenses were introduced and faster emulsions permitted much shorter exposures. Home portraiture particularly of children was thus made possible and a marked improvement in naturalness of expression was noted. Perhaps the greatest advance in amateur camera design was the introduction of small lenses of wide aperture. Several manufacturers and the United States government did considerable research on methods of making optical glass during and after the World War, until a product of high quality was produced.[21] Anastigmats working at a maximum stop of f/1.5 were used in a few small cameras, and lenses of f/4.5 and f/6.3 were quite common. Professional motion-picture cameras were regularly equipped with f/1.9 lenses. Used in conjunction with the fast panchromatic film, such lenses made possible exposures of street scenes at night, such as lighted store windows and electrical advertising displays. Several types of precision shutters were introduced and various exposure meters designed. The era of color in merchandise invaded the camera field and several firms marketed cameras in colored leathers in 1928.

Artificial light was very popular in portrait and commercial studios beginning about 1925. Incandescent lamps, arc lights, and mercury vapor units were employed.

Printing methods were somewhat revolutionized by the introduction of projection printers about 1920. These devices were automatically focussing, used bromide or chloro-bromide papers, and enabled very rapid changes to be made in the size of the enlargement. Contact printers working more rapidly than earlier models also found considerable favor.

The modern professional motion-picture camera was a marvel of precision workmanship and cost several thousand dollars. Motor-driven cameras replaced hand-cranked cameras almost entirely for professional work. For "trick" photography, special devices for cameras, backgrounds, and printers were worked out. Several portable cameras taking 35-mm. film were adopted. Cameras for exposing pictures at definite time intervals for subsequent projection at a normal rate were developed as well as a camera which operated at speeds as high as 5000 pictures per second. A special exposing device developed by Tokio Imperial University made records at the inconceivable speed of 20,000 pictures per second.

Sound motion pictures resulted in fundamental changes in camera and projector design. In several processes, the sound record was printed along one edge of the film [22] either as a variable density or a variable width record. In another method, it was recorded separately on wax discs like those used for phonographic recording.[23] (See Fig 1, Plate 1). Elaborate devices in certain of these systems were used for keeping the picture and the sound in synchronism. Special portable recording units were fitted on auto trucks for use by the cameraman recording news events.

Arc lamps were used in most theatres as the projector illuminant. Mirror arcs were introduced about 1923 and on test these showed a higher screen illumination for a given amperage than the more common triple-condenser arc. Improvement in carbon manufacture also produced more efficient lighting units. Extensive improvements in ease and uniformity of operation of projectors were noted, relating to methods of voltage control, automatic carbon feeds, safety shutters for fire projection, etc. Intermittent mechanisms were used universally, but a few projectors showed promise which utilized optical principles permitting continuous projection.

Many devices for realizing stereoscopic relief in motion pictures were described and patented, but none had sufficient merit to cause their commercial adoption.

Nearly all amateur ciné cameras were spring-driven and a large number of different models were placed on the market after amateur motion pictures came into use about 1923. The bulk of these cameras used 16-mm. film but a few were designed for use with 35- 28-, and 9.5-mm. films, respectively. Amateur projectors were very compact, motor driven, and projected pictures on screens ranging from 16½ by 22 inches, as used for amateur natural color films, to sizes as large as 4½ x 6 feet. Almost as many attachments for cameras, projectors, and other purposes were made available for the amateur as were used by the professional.

Automatic processing machines began to be used about 1927 in plants which developed and printed amateur roll films. This work, which was originally done for years by the amateurs themselves, was segregated about 1920 in finishing plants. These expanded so rapidly that by 1927 about 90 per cent of amateur films were handled by such establishments. Rapid delivery service was featured, made possible by the use of special printing machinery, capable of turning out 2000 prints daily from each unit when handled by experienced operators. Drying devices were used that simultaneously imparted a gloss to the print surface.

Automatic machinery was patented for processing amateur ciné reversal film. A unique feature of these machines was an exposure device which measured the heat transmitted by the silver image and thereby regulated the exposure for the second or positive image.[24]

The processing of motion-picture film was done for many years on reels or racks on which the film was wound before immersing it in the solutions. Negative film used in the camera for taking the pictures was much more sensitive and required more careful handling than the positive film used for printing and theatre projection. As the industry expanded, automatic developing machinery was devised, first for the positive film and later for the negative. These machines automatically developed, fixed, washed, dried, and wound the film again into rolls. With the introduction of sound pictures, greater care was necessary in the processing, and scientific control of development [25] was introduced in 1928.

Coin-actuated automatic cameras were brought out in 1926–27 which exposed, developed, fixed, washed, dried, and delivered a series of portraits. Accounting by photographic methods virtually was inaugurated in 1928 with the installation by several New York and Philadelphia banks of a unique camera which photographed the checks passing each day through the bank. Eight thousand checks could be recorded on 100 feet of 16-mm. film.

The Photographic Process. Previous to the World War, many developing agents were manufactured in Germany and certain of these, particularly metol, were supplied exclusively by a German manufacturer. With imports cut off, chemists in England, France, and America began to study methods of preparing developing substances. By 1916, fairly satisfactory substitutes were in use and in 1917, metol and p-aminophenol were being produced in England and the United States. A great many other developers were marketed, but most of them were open to one or more objections and their use was only temporary. The chief developers in use in 1928 were pyrogallol, hydroquinone, methyl-p-aminophenol (elon) and to a more limited extent, amidol, glycin, pyrocatechin, and p-aminophenol.

The chemistry of development was still only vaguely understood though much valuable progress had been made. Types of fog were classified and a theory proposed as to their probable cause.[26] Other subjects discussed were: staining properties of developers; the reducing power of various developing agents; the effect of age on development properties; effect of agitation on the rate of development; the cause of rack marks and air-bell spots; the action of solutions on containers; the function of various developer ingredients; etc. A constituent of metol causing skin poisoning was isolated. A motion picture made by Tuttle and Trivelli of the actual development of silver bromide grains represented a very fine example of photomicrographic technique. See Plate, II, Fig. 3.

A group of dyes called *desensitizers* were found to be very useful in connection with development technique. The first of the series, phenosafranine[27] was announced by Lüppo-Cramer in 1920. Very dilute water solutions of these dyes (1:500,000 to 1:10,000) were used as a preliminary bath or actually added to the developer. After about one minute's immersion, the film could be developed before a much brighter safelight than was normally used. The chemistry of desensitizers was investigated and theories proposed as to the mechanism of their action.[28]

Methods for handling film under adverse conditions such as exist in the tropics or arctic regions were described. The causes and prevention of static electricity markings were treated.

The chemistry of fixing baths was studied[29] and valuable suggestions advanced relative to methods of recovery of silver from used hypo solutions.[30] A series of important articles were published on the mechanics and chemistry of washing films and papers.[31] The sensitometry and use of intensifiers and reducers was studied. Toning of silver images with sulphide and hypo-alum mixtures continued to be popular, but newer methods utilizing palladium, selenium, tellurium, tin salts, copper salts, and various dye solutions found limited favor. In this connection, the introduction of positive motion-picture film coated on various colored supports largely displaced and made unnecessary the use of dye-tinting solutions.

The subject of methods of treating photographic materials to insure preservation on long-time storage was being seriously investigated in 1927–28. Film samples containing silver images prepared 30 years before were known to be in excellent condition, but other cases where complete decomposition had occurred in a few years were all too frequent. A committee of the Royal Photographic Society prepared a valuable report on the subject of sensitive material preservation.[32]

Photo-Theory. The study of the fundamental theory of the photographic process has been in progress for many years. Individual workers have done and are continuing to do research of the first order, but the greatest strides toward the solution of some of these complex problems have been made as a result of organized research supported by governments and by large industrial concerns. This work has been directed largely along two main channels, namely (1) the determination of the cause of sensitiveness of photographic emulsions, and (2) the explanation of the mechanism of the formation of the latent image, or the invisible image resulting from exposure.

Although photographic images are homogeneous in appearance, their heterogeneous composition is readily seen upon examining them under a high-power-miscroscope. See Plate II, Fig. 2. This instrument has proven an invaluable tool in studying the characteristics of the structure of the image. A statistical microscopic study of the properties of single grains was started in 1921 by the Swedish chemist, Svedberg.[33] Very thin films were coated on glass plates so that the sensitive grains were practically in a single layer following the method devised by Bellach in 1903 and later used by Sheppard and Mees. Svedberg found by actually classifying individual grains into sizes and counting the number in each class, that for any given exposure, the number of developed grains increased with increasing grain size. He also found that the number of developed grains for a given size increased with the exposure increase.

Besides these important researches, another series of investigations of equal value dealt with a statistical study of methods employed in the preparation of emulsions and the photographic properties of the material obtained.[34] Single-layer coatings were made in various ways, magnified 10,000 times, and the size-distribution of the individual grains determined. This work is still in progress but evidence up to 1928 indicated that there were very close connections between the grain size-distribution and photographic properties of emulsions.

Both chemical as well as physical theories of the nature of the latent image have been proposed. With print-out emulsions, actual amounts of liberated halogen have been weighed and other observable facts made known. With developing-out emulsions, where no visible change is produced by light, the extent of the change cannot be detected by any known method of weighing, and it is only by treatment with certain developing chemicals that any effect can be revealed.

Extensive studies were made of the action of various oxidizing agents such as chromic acid on the latent image. It was shown also that sodium arsenite and hydrogen peroxide produced effects similar to light action when emulsions were treated under certain conditions with these chemicals. Although there was other valuable work being done on the chemical side of this problem, space available for its discussion is limited and the original papers should be consulted for further details.

For many years it has been suggested by various investigators that the latent image consists of a reduction product of silver halide, and very probably, according to Lüppo-Cramer,[35] of colloidal silver. Investigations by Svedberg, Toy, Trivelli, and others showed that, in spite of the enormous number of silver halide grains in an emulsion (as high as one billion to the square centimeter), the individual grains act independently unless two or more are in actual intimate contact. A more or less critical minimum exposure was found necessary to make a grain developable in a given time, in a given developer, and at a definite concentration and temperature; below this amount of exposure, the grain is undevelopable under the given conditions; above this amount, it is capable of being developed completely and as a rule does develop completely. All grains are not equally sensitive but in general for the most part it has been shown that for a particular emulsion, larger grains are on the average more sensitive than smaller ones.

In 1917 Hodgson [36] observed that there were preferred points on silver halide grains where development started initially. (See Plate II, Fig. 4.) These "sensitive centres" were shown later to be scattered haphazardly on grain surfaces. A theory of photographic sensitivity was proposed by Silberstein in 1922 which explained the developability of the grains as due to haphazard action on them of light which Einstein had previously conceived to be transmitted as discrete particles or "bundles" instead of continuous waves. Silberstein gave the name "light darts" to these light particles. Subsequent investigations [37] by Toy, Svedberg, Sheppard, Trivelli, and Loveland, discredited the idea of light creating one developable spot by the absorption of one "light dart" and showed fairly conclusively that there were sensitive nuclei preexistent to light action and whose presence was necessary for a high degree of sensitivity.* Since then Silberstein [38] has put in mathematical form a new theory which is independent of the nature of the light and depends upon the nature of, and change in, the sensitivity speck during exposure and development. This is based on the views of Toy, Sheppard, Trivelli and others that sensitiveness varies with the size and distribution of the specks preëxistent to exposure.

Sheppard showed in 1925 (previously noted under *Manufacture*) that these nuclei were actual specks of silver sulphide resulting from the decomposition, during manufacture, of sulphur compounds in the gelatin. He also found that these compounds were not the only substances capable of forming sensitivity specks; in fact, he described similar effects rising from tellurium and selenium compounds. Various patents on these substances were taken out during 1927-28 by the Kodak Company and on other substances by German manufacturers indicating the practical significance of this discovery.

In 1925, Sheppard, Trivelli, and Loveland [39] suggested that light falling anywhere on the silver halide grain had its energy transferred to the nearest sulphide centre. In 1927 Trivelli[40] proposed a theory which provided a specific mechanism for this effect based on the knowledge that light causes silver halides to conduct electricity and that a potential difference exists between silver bromide crystals and many foreign specks that might be contained in them. The theory assumes that the sensitive specks consist of both silver sulphide and silver which would act as the two electrodes of a battery. When exposed to light, the surrounding silver bromide acted as an electrolyte, decomposing so that the quantity of silver increased in size until sufficiently large to induce developability. Subsequently Toy,[41] and later Kirillow,[42] published experimental data which were in agreement with the theory.

Some progress has been made also in the study of the theory of development, the microchemistry of the action of various developers on the shape of the silver grains, the chemical nature of organic developers, and allied theoretical problems.[43]

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PHOTOPERIODISM. See BOTANY.

PHOTOPLAY. See MOVING PICTURES.

PHOTOSYNTHESIS. See BOTANY; CHEMISTRY; PHYSICS.

PHYSICAL CHEMISTRY. See CHEMISTRY; BIOCHEMISTRY.

PHYSICS. Recent years have been eventful in physics, as the leading topics suggest: relativity, confirmed by crucial tests, partly supplementing Euclid and Newton; cosmic rays coming to earth from everywhere, with wave lengths, of great significance; atomic structure and its infra-cosmogony; crystal lattices—the newly found geometry of matter: the wave atom and the wave electron; the photo-electric cell—Aladdin lamp of science; super-voltage; the closing up of the 62-octave gamut of electromagnetic waves; the discovered rhythmic variation in the rotation period of the earth; the talking film and television; the synthesis of the methane series; positive ray spectrograph for weighing atoms; the beta-ray spectra measuring nuclear energies; the boiling of carbon and the freezing of helium; all three states are now attainable for all chemical elements; the production and recording of radio-echoes from the Kennelly-Heaviside layer of the atmosphere and long-period echoes suggested as coming from far beyond the atmosphere; these and other recent achievements are of epoch-making importance.

The discovery of X-rays, of the inert elements, the radioactive elements and the electron, the quantum, and relativity, inaugurated an unprecedented advance in physical science during the first quarter of the twentieth century. Any attempt prior to this epoch to supplement Newton's laws and Euclidian geometry with laws of superior rigor would have been deemed heresy. The quantum of Planck and the relativity equations of Einstein have won their way steadily to a commanding position, the one by the beauty with which it fits observed phenomena, and the other by the accuracy with which it predicts quantitatively phenomena contrary to those of classical mechanics. The one began as an empirical necessity, the other as a logical necessity: both have been astonishingly successful in their agreement with certain observed phenomena of nature.

Relativity. The year 1915 was notable for the publication of Einstein's short but epoch-making paper on his generalized theory of relativity. This, with his paper published in 1905 on the special theory of relativity, has wrought the most profound advance in physics since Newton. The finitude of the material universe, the non-objectivity of time and space, the meaninglessness of absolute motion, the effect of gravitation fields on light and other radiant energy, the equivalent of mass and energy, the acceptance of time as a fourth coördinate, the introduction of the relativity effect of the finite velocity of light into physical equations—all these were so new to the physicist who had not followed the course of philosophical or mathematical theory that skepticism, even ridicule, greeted the new theory set forth by Einstein.

To demonstrate his theory, Einstein selected three necessary results of his theory which might be tested by observation, each of them contrary to the classical laws of mechanics and inexplicable under classic physics. He even predicted these results quantitatively by the simple use of his relativity equations unmodified by special assumptions. The three predictions have now been confirmed by observations of unquestioned precision. The agreement is within about 1 per cent or better. Classic physics, based on Euclid's geometry and Newton's laws, was shown to have failed in crucial tests.

Testing the Relativity Theory. The first test of the relativity theory was the mathematical determination by relativity equations of the full value of the precession of the perihelion of the planet Mercury. The rotation is in the direction of motion of the planet and was inexplicable according to Newton's laws by an amount equal to 43 seconds of arc per century. The Newtonian failure was notable, small as it was. Using relativity equations without special assumptions, Einstein computed the true rate of rotation of the perihelion of Mercury to within one second of arc per century. His success was astonishing and furnished the first confirmation of his theory. The relativity effect on the apsis of Venus is too small to observe on account of its slight orbital eccentricity. The relativity effect of like character has been observed for the planet Mars, but observational confirmation of the exact amount must await fuller data.

A second triumph, even more spectacular, was the confirmation of Einstein's prediction that gravity affects light and that starlight passing the sun's disk at grazing incidence would be deflected on his theory by an amount twice the value to be looked for from classical theory. Maxwell long before had shown that light waves should exert pressure. Years later, experiment confirmed the prediction. It was only at a total eclipse that the stars could be photographed to test the theory that a gravitational field produces a curvature of space which gives a corresponding curvature to the path of a ray of light. If the photographic images of stars near the eclipsed sun during totality showed an apparent displacement away from the sun equal to that predicted by Einstein—double that called for by classical mechanics—it would be strong evidence for the relativity theory; but if the amount was one-half that predicted by Einstein, then Newtonian laws might account for the displacement as a simple effect of gravity on light.

Decisive success came on May 29, 1919, when at Principe light from near-by stars was found deflected 1.72″ + 0.11″ by the sun, almost exactly equal to that predicted. In 1922, in the most careful eclipse observations yet made, Campbell found his observations, as finally adjusted, agreed within about one-half of 1 per cent of the Einstein prediction. The mass of Jupiter is great enough to produce a perceptible deflection and an occultation of a star by this planet may yet be a favored method of studying this phenomenon. Einstein's predicted deflection of light by the gravitational field of the sun was quantitatively confirmed by measurements just completed of the apparent positions of the stars photographed during the total solar eclipse of 1926. Einstein had said that a hundred experiments might support his theory, but that one proven adverse result would destroy it.

The third relativity prediction to be verified was that, in the gravitational field of the sun, light waves would be lengthened—for example, about 0.008 angstrom unit for the blue light of wave length 4000 A. The lengthening varies with the wave length. Grebe and Baehem, however, in 1920 reported that they had detected a lengthening equal to the recession of the light source 0.56 kilometers per second. A light wave in the sun was thus shown to vibrate at a slower rate than a similar atom on the earth.

Other observers found effects of the same order which made the determination difficult by masking the relativity shift. St. John found close agreement between predicted and observed shifts when such factors were carefully considered. For iron rays from the centre of the sun's disk, above the photosphere, the mean observed shift is .009, while .0091 angstrom is the computed Einstein shift for that position. Adams found an astounding shift in the spectrum of the companion of Sirius, many times that of the sun. On the basis of the known mass of that star, Eddington computed its size and density. The density reported was 50,000 times that of water, more than 2000 times heavier than the heaviest substance theretofore known. Adams in this astounding announcement confirms the last of the trio of the crucial quantitative predictions upon which Einstein was willing to rest the acceptability of his theory.

Chazy, in his *Le Théorie de la Relativité et la Méchanique*, issued in 1929, gives the evidence for accepting 42.9 seconds per century as the perihelial advance of Mercury, and 1.74 angular seconds for the deviation of light passing the sun at grazing incidence, both quantitatively predicted by Einstein.

Adams found that one remote nebula, 100 million light years away, showed an apparent radial recession of 2500 miles per second, nearly double that of any hitherto measured speed. The "crumpling of space," as deduced from general relativity, is the possible cause assigned by Adams for this "spurious velocity of recession." Shapley reports a proportionate effect predicted by relativity on nearer galaxies at 10,000,000 light years, about a tenth of the distance of the nebula reported on by Adams. Relativity thus seems to have additional confirmation in phenomena unknown until recent years.

Relativity was conceived because absolute motion could not be detected nor measured; that is, we have no means of telling in what direction we are moving, nor how fast. The ether-drift experiment is therefore crucial. Early experiments gave negative results. After a carefully planned research at Mt. Wilson, D. C. Miller reported that his results showed a relative motion of the earth and the ether at Mt. Wilson observatory, equal to nine kilometers per second, about one-third of the earth's orbital velocity. Tomaschek, at heights from 120 to 3457 meters from observations which would have detected an ether-to-earth relative velocity of 20 meters per second, obtained only negative results. Meinur found that the ether-drag calls for a density gradient of 5 to 1 for the ether-from-earth to the point where the drag is zero, and concluded this to be unlikely. Lodge regarded the partial drift as a minute residual, and doubtful. Miller replied that the effect is always present and cannot depend upon the instruments or their surroundings.

Thirring denied the cosmic cause and attributed the displacements to local disturbances. The matter reached a more settled stage when Michelson himself announced the negative results of his extended series of experiments at Mt. Wilson for detecting the ether drift. Even with highly sensitive apparatus, the results showed no displacement as large as 2 per cent of that expected if, as Miller suggested, the solar system moves through space 300 kilometers per second. The result is profoundly significant for the tenability of the relativity theory. Michelson announced that while he accepted Einstein's relativity, he still believes the existence of the ether is necessary for light-wave phenomena.

The abstract mathematics used to enunciate Einstein's theory were such that few physicists could follow the reasoning. The verification, however, of three predictions contrary to classic mechanics could be comprehended by all but could be ignored by none.

Whittaker holds that relativity requires the entire rewriting of electromagnetics, even though such essays as Weyl and others have made must be modified or abandoned. Einstein himself objected to his own 1915 field equations of gravitation, since a solution was possible with an empty universe. His "cosmological term" introduced to avoid this proved to have a solution in the so-called "De Sitter world" in which all minor irregularities are smoothed out resulting in a manifold of constant curvature, the simplest example of which is the surface of a sphere. Einstein has developed equations for electricity and gravitation identical in form, which may indicate a remarkable unification in the direction aimed at by Weyl.

The actual dimensions of the universe are derived from star measurements, interpreted by the implication that the lines of the spectrum of a very distant star are displaced proportionally to the ratio of the distance of the star to the constant radius of curvature of the universe.

In the words of Planck, Einstein's theory "surpasses in boldness everything previously suggested in speculative philosophy and even in the philosophical theories of knowledge" and that "the revolution introduced into the physical conceptions of the world is only to be compared in extent and depth with that brought about by the introduction of the Copernican system of the universe."

Heyl confirmed the isotrophy of crystals with respect to a gravitational field. With highly accurate weighings, he found no variation as much as one-billionth part in the weight of crystals weighed in various orientations. This confirms the correlation of gravitation with inertia which Einstein suggested. Heyl's determination of the constant of gravitation is now nearly completed. From the observations already computed, the provisional value is $6{,}664 \times 10^{-8}$.

Cosmic Physics. Confirmation continues to come in as to the effects of solar cycles of the sun-spot period upon terrestrial conditions. Koppen proves that the temperature of the earth's atmosphere in the tropics is 1.1°F. warmer when the sun-spots are most frequent. This temperature rise increases the evaporation and lowers the level of the tropical lakes in Africa. How the effect works out is not fully known, but the fact is undoubted. The work of Douglass in correlating the tree-ring growth with the climatic cycles and the sun-spot cycles adds further proof. So well advanced is this correlation that the particular years in which a tree was planted and cut down can often be deciphered from the characteristic pattern of the curves of ring-growth sequence. Petrified forests may yet disclose prehistoric weather cycles and tell much regarding solar radiation in geologic times. The subject is fascinating. Every lumber camp becomes a potential solar and terrestrial weather observatory, and every tree has its tale to tell of the sequence of weather changes through which it grew.

Douglass describes observations of cloud formations taken from an airplane including record of temperature within the cloud and the surrounding air and the dimensions of the cloud formation. A new field is now open for airplane work in collecting data with suitable autographic instruments.

Jeffrys accepts the tidal theory of the origin of the solar system, showing that mere condensation could not produce the system. His results agree well with the age of the earth as determined by its radioactive constitutents. He also shows that no satellite less than 1000 kilometers could have been gaseous, since the mass could not hold itself together in gaseous form. He assumes that the asteroids were formed from a primitive planet broken up by the tidal action of Jupiter.

Solar physics is the object of particular study among other things, on account of the correlation which Abbott and others are establishing between solar variations and terrestrial meteorological phenomena. Angenheister finds the sun hotter at sun-spot maxima. These show strong vertical movements, cooler layers sinking, hot masses rising, increasing the radiation. Jupiter and Encke's comet vary in brightness with the sun-spot cycle, the maxima coinciding. Evidently, factors other than temperature at spot maxima cause the striking 11-year cycle in tree-ring growth. Mean air temperatures are at least one-half degree lower at spot maxima. The influx of cool air from higher latitudes is greatest at spot maxima, as shown by the records of the winds at Samoa. Trade winds at that point appear to be 10 per cent more frequent. The frequency of cirrus clouds also parallels the spot cycle. The air at spot maxima absorbs 0.05 calorie per square centimeter less per minute and the mean temperature of the earth drops a fraction of a degree. Abbott, Fowle, and Aldrich give 1.94 calories per square centimeter per minute as the solar constant, based on 20 years' observations.

The variable rotation of the earth was the startling headline of the announcement by Boss that the systematic errors in right ascension are attributable to a secular change in the rate of rotation of the earth. The change appears to be periodic with a period of 80 years and a cumulative total drift of 40 seconds in this time. The rhythms are diurnal, monthly, annual, duplicating the three chief tidal forces acting upon the body of the earth. That a gradual shortening of the mundane day is occurring has long been believed, but that the day rhythmically lengthens and shortens in turn is a surprise. The significance is that our unit of time is changing and that it may be necessary to find a clock more constant than the changing earth, perhaps in the frequency rate of cadmium-red radiation.

Brown reports a correlation between the frequency of British earthquakes and the differences between Greenwich observation and occultation times, and he attributed the change in the length of the day to internal causes, equivalent to radial variation of five inches if the whole earth is involved, or of 12 feet if a crust of only 50 miles thickness is concerned.

Boss attributed the measured variation in the day to the swelling and shrinking of the earth and correlates the change with variations in the rotation rate and earthquake frequency. *Nature* reports that tidal friction has increased the terrestrial day .0025 second per century during the past three centuries. The tidal drag on the earth is computed to be equal to a billion and a half horse power. A rhythmic increase and decrease about the mean value also occur, not, however, exceeding .0036 second deviation from the mean.

The earthquake of June 25–26, 1924, with origin 500 miles south of Australia, was perhaps the most fruitful in seismological history, for it proved that the iron ball (about 4000 miles in diameter) which forms the heart of the earth has a sharply defined spherical surface.

The age of the earth has been determined by the ratio of radioactivity end-product lead to the uranium content in uraninite, yielding a value of between one billion and one billion, three hundred million years since the ocean beds were formed. The result is found by using the rate of lead formation from uranium to measure the length of time the uranium has been disintegrating.

It is characteristic that unsuspected indicators of phenomena are found in this interchange of scientific thought. Estimates of the age of the earth are based upon the atomic lead and its percentage in uranium ores. Knowing the rate per year at which the lead is accumulating from the final stage in the disintegration of uranium atoms, the age of the ore is readily computed. The figures check with good concordance with the age of the earth as estimated by six other methods. Apart from its unique interest, the method is capable of effective use in geological theory.

That the mass of radiation which causes its pressure is not a mere abstraction of academic interest only is seen in the theory of giant stars and the powerful rôle which radiation pressure plays in the architecture of stellar evolution and especially in limiting the growth of mass to approximately 10^{35} grams, the mass at which radiation pressure begins far to exceed the inward pull of gravitation. Practically all the visible stars are between 10^{35} and 10^{34} grams, where ether pressure of the soft X-rays just begins to dominate the situation. Knowing the mass, it becomes possible to tell what stage of its evolution it has reached.

In the days of Laplace, gravitation was assumed as the only building force of the cosmos. About the middle of the nineteenth century, the pressure of light was postulated from theory and later confirmed. In the heart of a star, the pressure of light is now known to sustain most of the vast weight of the star's mass.

During the eclipse of 1922, it was found that the sun's atmosphere was being driven away from the sun with a speed that increased steadily. Such an increase could be due only to an accelerating force constantly at work. This force was promptly recognized as light pressure. The same effect was observed when Halley's comet was seen to disrupt, a small portion of the head breaking off. The power momentum and smaller size of the detached particles caused them to be driven away from the sun relative to the head of the comet. Gravitation and the pressure of radiation are now recognized as jointly determining the architecture of stars and stellar systems.

Eddington estimates the density of interstellar matter at 10 hydrogen atoms, or 1.66×10^{-23} gram, per cubic centimeter as the upper limit. This gives a mean free path (assuming ions with average atomic weight 20) of 10^8 kilometers, with a year interval between collisions, and for electrons 5.2×10^8 kilometers with collision intervals of 10 days. This gives a Maxwellian distribution. The black-body temperature of a body in equilibrium with starlight is only 3.2° absolute. At 10,000°, condensation of matter begins to form a nebula; rise in density and temperature drop cause high opacity which holds the heat formed; at a certain stage, the density becomes high enough to enable radiation from sub-atomic processes to be scattered and this makes a further source of heat.

Michelson has obtained the first measure of the diameter of a star—alpha Orionis—the brightred star, Betelgeuse, of magnitude 0.7 in the constellation of Orion. The result is startling, for it gives a diameter 300 times that of the sun, or a volume 27,000,000 greater. He later found that alpha Scorpionis—Antares—had a diameter 500 times that of the sun or a volume 125,000,000 times greater. The principle is to admit the starlight by two parallel slits in the field of the telescope. The diffraction pattern formed depends upon the distance apart of the slits. For each size of star disc, there is a definite distance apart for the disc at which the diffraction pattern disappears owing to the optical interference effect in the waves forming the two sets of diffraction fringes. By adjusting the slits until this occurs and measuring the distance apart, the angular diameter of the star disc is computed simply by multiplying the wave length used by 1.22 and dividing the distance apart of the slits.

"Invisible sun-spots" were studied by Hale and Ellerman. Beginning with the theory that the normal type is the "twin bipolar," 970 spots showed the percentage of bipolar spots to be 61 per cent. In seeking companions for single spots, local magnetic fields were discovered near the spots. The first such field discovered had the polarity and position usual for the following component of a regular bipolar pair. In several cases, invisible fields gave rise to spots and, in cases where spots had disappeared, traces of magnetic field were still detected. If the vortices of a bipolar group penetrate deep enough, they must certainly unite to form a half-ring.

Astronomy and Physics. Astronomy in turn has gained, as well as given, in its contact with physics. Belot holds that of the forces which dominate attraction in the architecture of the universe, gravitation blends all into one mass. The dispersive forces prevent agglomeration, such as molecular attraction, gas pressure, radiation pressure, electrical and electromagnetic forces. Crystalline growth operates against gravity, as do many other forces of growth, but attraction does not produce the primitive dispersive impulse. Attraction ensures stability, but the architecture is the resultant of all the incident forces.

A large-scale example of light pressure observed by Bell is shown in Saturn's rings. These rings are thin strata of bodies of meteoric size, surrounded and permeated by dust invisible except through deep layers. This dust is wind driven by gravitation and the pressure of radiation which moves the particles back and forth through the sunlit side and may be seen below when light filters through. The acceleration due to solar radiation is, for particles of micron size, nearly 350 kilometers a day, a demonstration of Maxwell's theorem on a colossal scale. According to modern physics, the mass of all stars rests upon radiation pressure. For example, 95 per cent of the mass of sun is supported by the radiation pressure of the intense X-rays generated in the heart of the sun under gigantic gravitational pressures.

Solar Physics. Jeans computed that the sun loses 3.8×10^{33} ergs per second, losing mass at the rate of 4.2×10^{12} grams per second, such mass becoming radiant solar energy. It has been estimated, on this basis, that the sun's total radiant energy would give, at one cent per kilowatt hour for the sun's power output, a value of a billion dollars each billionth of a second. Words are rare to find as eloquent as those of Jeans before the meeting of the International Astronomical Union. Speaking of the physics of the sky he said, "We are realizing more and more that what the astronomer is really doing, to a large extent, is the carrying out of the study of physics and chemistry on an heroic scale. His laboratory is the open vault of heaven with dimensions to be measured in millions of light years. Hung up in that vault are millions of crucibles in which matter is maintained at temperatures ranging from a few thousands to many millions of degrees. In those crucibles, the solution of the problem of the ultimate structure of matter is demonstrated innumerable millions of times every second. There the dream of the alchemist comes true and the elements are transmuted one into another. Nature provides the apparatus and the materials and carries out the experiments; all we have to do is to record and interpret."

Structure of Matter. In 1919 an event of truly strategic importance in physics was Rutherford's success in breaking down the positive nucleus of the lighter atoms. Using the alpha particle (helium) from radium C, Rutherford had a projectile with a velocity of 19,000 kilometers per second; 20,000 times that of a rifle bullet. He had available in a single particle a stress-producing energy of 5 kilograms of weight at the closest approach to the nuclei encountered. The momentum at the high velocities is such that a gram of helium at such velocity would have a striking energy equal to that of a 300-ton projectile at a velocity of a kilometer a second.

With this projectile, he bombarded hydrogen atoms, and in some encounters between the alpha particles and the hydrogen, a head-on collision occurred, in which the momentum of the former was transferred to the latter, giving it a range four times that of the alpha particle. This was quite in accordance with theory. Unexpectedly, however, in pure nitrogen, the particle produced ranges as long as those produced in pure hydrogen. As the nitrogen atom has several times the weight of the helium atom, by control experiments, he eliminated all explanations except that the nucleus of the nitrogen atom had been broken up by the swift alpha particle and a hydrogen nucleus detached from the nitrogen nucleus.

The long-range atoms were detected by absorbing screens of metal which stopped the alpha particles but permitted the higher speed hydrogen atoms to pass to the scintillating screen. In any case, a new method of research has met with success and for the first time the positive nucleus has by intent and under control broken up. Other light atoms have yielded to similar bombardment.

Harkins and Shadduck discuss the synthesis and disintegration of atoms as revealed by their photographs of Wilson cloud tracks. Thirty-four thousand photographs (total atom paths exceeding 400,000) were made showing alpha tracks in nitrogen. Two-thirds were 8.6-centimeter, and the rest were 4.9-centimeter, ranges. Fast alpha particles from thorium C attach themselves to nitrogen nuclei, forming fluorine momentarily. The ejection of a hydrogen atom then changes the atom to oxygen—the three tracks, fluorine, oxygen, and hydrogen, all lie in one plane. Results of great interest were obtained by these and other experimenters. To catch the infinitesimal atomic nuclei on the wing, with bullets moving 12,000 miles a second and transmuting the elements by the impact, is surely a glimpse of a coming technique which will give new power to the physicist.

Rutherford finds that alpha particles (helium nuclei) may be captured by atomic nuclei in collisions which eject a proton. The length of path of the proton and of the recoil nucleus are in harmony with this view. The alpha particle would increase the nitrogen nuclear mass from 14 to 18, and its charge from 7 to 9, decreasing each by 1, leaving the mass 17 and the charge 8 (isotope of oxygen).

The positive-ray spectrograph of Thomson, Goldschmidt, Dempster, and Aston projects and deflects the positive parts of atoms or molecules after disruption, so that they leave traces on the photographic plate at distances which indicate their mass. This measures not only the masses of different elements, but the variant masses of atoms of the same element. Neon atoms of mass 20 and 22, in the ratio of 9 to 1, were detected. The elements have been studied and the isotopes of each weighed ballistically with an accuracy of 1 part in 15,000, disclosing the packing fractions for slight variation from whole-number atomic weights.

The first verification of Prout's hypothesis of a common building material, the whole-numbered multiples of which constitute the elemental atoms, was achieved in 1915, based upon the thoughts of Crookes, Soddy, and others, who had suggested that the usual atomic weights are not fractional, but average weights of variant atoms. Atoms of the same element which differ in mass are isotopes occupying the same place in the atomic system, and having the same identical behavior. Atoms of different elements may have the same weight and different behavior; for example, lead and bismuth atoms resulting from thorium (disintegration) have the same atomic weight, 208; but display their characteristic elemental behavior notwithstanding. Positive-ray analysis resulted also in the discovery of undissociated groups of atoms, radicals, and molecules unknown before. The method is a powerful research tool for the physicist.

Soddy has summarized transmutation in radioactive changes, the disintegration of radioactive material, ultimate products, radiations, average life, branch series, and chemically nonseparable elements. He concludes that radioactive changes are quite distinct from the usual chemical changes. Perrin notes that chemical reactions are accelerated by rise in temperature, being doubled in rate for each 10-degree rise. The reaction at this rate would be 10 billion times faster for each elevation of 300 degrees; but the radium disintegration remains absolutely unaffected by any such change of temperature. In spite of recent attempts, it appears to be impossible at present to affect the rate of radium disintegration. Heat, light, magnetic field, high concentration, or extreme dilution produce no effect on the rate. The alpha particle is ejected with prodigious speed, 20,000 kilometers per second from the radioactive atom. This particle is the nucleus of the helium atom (mass 4) but radon, the residual product, recoils with a velocity of several hundred kilometers per second. The alpha particle passes through 100,000 aluminum atoms before it is stopped. The initial energy of such a projectile is more than a hundred million times greater than that of a molecule in ordinary thermal agitation.

Atoms. Hundreds of notable names suggest themselves as adding to the steady stream of atomic knowledge which formed the atomic theory. Faraday discovered the law of electrolysis; Berzelius had developed his electrochemical theory; and Arrhenius, the theory of electrolytic dissociation. Then came Lenard, J. J. Thomson, Crookes, and others concerned in disclosing the electron itself as a discrete entity. Curie found radium from which electrons and helium nuclei were ejected and gave a dynamic example to the physicist of the disintegrating atoms. Soddy advanced the thought, foreshadowed by Crookes, that the atoms might vary in weight, even for the same element, and examples were afforded in radioactive transformations. Variant-weight atoms of the same element were called isotopes. Thomson and Aston perfected the means of studying them and the latter provided proof that the atoms, except hydrogen, usually had integral atomic weights.

At this juncture, Planck's quantum theory became, in 1900, an essential factor in the field of radiation. Balmer, Rydberg, and Ritz had given an equation for computing the spectral lines of the Balmer series. The outstanding question remained: Why were specially favored frequencies alone possible, say, in the Balmer series of hydrogen? On classical assumptions and electrodynamic theory, no explanation was forthcoming. Planck found complete agreement on the assumption that the energy of the vibrating electrons could not change continuously but always in whole numbers of what he called "energy-quanta." Thus, Planck's constant took its place as the factor which, multiplied by the frequency, gave the energy quantum. This latter relation was pointed out by Einstein, who based upon it his theory of the photoelectric effect. Not yet, however, was it possible to reconcile interference phenomena with the theory of quanta, and it is just such phenomena that reveal the meaning of the frequency thus computed.

Bjerrum's prediction, verified by Eva von Bahr, that rise in temperature would cause spectrum lines to split up into discrete components, became a vivid proof of the reality of the quantum. Then came Rutherford's development of Rankin's suggestion and Nagaoka's theory that the nucleus of the atom would be found to be positive, since the electrons were negative. We can fairly attribute the establishment of this fact to Rutherford in the year 1911.

In 1913, a young physicist at Copenhagen, Niels Bohr, attempted the final step of postulating certain conditions which might account for the stability of atomic structure and the properties of radiation from the atoms in accordance with the observed relations. The essence of this is that certain favored orbits alone could exist and that these bore such relation to each other that the radii are proportional to whole numbers. For simplicity, suppose these represented by circles. The favored series within which alone stability existed were circles having radii 1^2, 2^2, 3^2, . . . n^2. An electron might jump only by whole-number intervals. No radiation takes place while an electron is moving in one of these orbits. If an electron jumps from one of these to another, the difference in energy is equal to Planck's constant times the frequency.

Bohr borrowed from astronomy the concepts of orbits. He showed that for hydrogen the spectral series (Balmer, for example) could be computed from theory, assuming Coulomb's law and the discrete stable orbits (nonradiating). For example, the hydrogen alpha line of the Balmer series of hydrogen represents a release of energy equal to the difference between the energies of the third orbit and the second orbit having equivalent radii, respectively, 3^2 and 2^2, or equivalent ellipses of similar energy content. The characteristic of the Balmer series is that the orbit of arrival is No. 2, the orbits of departure being, respectively, 3, 4, 5, 6, . . . n . . . theoretically, on to infinity. Naturally, the electron fall from infinity to orbit No. 2 would give the maximum energy release—just equal to the ionization potential. The latter is the voltage required to give electron speeds sufficient to drive an electron from an atom permanently. The ionization potential becomes one of the great basic constants affecting not only spectroscopic theory, but all chemical reaction as well. If the ionization potential is divided by the Planck's constant (6.555×10^{-27} ergs.) the result is the frequency of the shortest wave emitted by the atom in the Balmer series. Such, very simply, was Bohr's theory. It has had much brilliant supporting evidence, notably the work of Sommerfeld, in accounting for the fine structure of the spectral lines in 1916.

In 1914, Lyman discovered the series in which the orbit of arrival was orbit No. 1. Paschen had long before found the spectral series, for which the orbit No. 3 was the orbit of arrival. In 1922, Brackett observed several lines of the series terminating in the fourth orbit. The simplicity of the theory may be stated thus: all emitted or absorbed radiation is produced by change of orbit. For hydrogen, the difference of the inverse squares of the orbit numbers gives the ratio of their frequencies. A falling electron emits, a departing one absorbs, energy. The mathematical treatment of the hydrogen orbits is now relatively simple. Such treatment of the helium orbits is still impossible, except for special cases of assumed structure. The problem of three bodies (hitherto insoluble) now assumes great importance in the further study of the atom and its spectra.

Epoch making for atomic physics of the year 1926 is the spinning electron. Pauli showed that each electron has four quantum numbers, no electron in a given atom having all four numbers like those of any other electron. Uhlenbeck and Goudsmit conceived the fourth degree of freedom might be rotation. The idea was a happy inspiration. In spite of difficulties, the spinning electron is now part of atomic theory. It seems to account for the ratios of magnetic moment to angular moment, optical and X-ray doublets, anomalous Zeeman effects, and so on. The last is a triumph of the new atomic mechanics. The fine structure of hydrogen, empirically proposed, is closely accounted for by internal spin. Not only points of accord, but those of divergence as well, lend strength to the new mechanics.

Three independent systems give illuminating insight into the quantum concept. Born, Heisenberg, and Jordan use the Hamiltonian system, in which the coördinates are matrices rather than series. Each element in a matrix is identified with a transition between two stationary states of the old theory, with an imaginary exponential factor determining the frequency, and the amplitude factor determining the probability of transition. Schrödinger's wave equation is the latest form seeming to be even more powerful than the matrix mechanics. He uses energy levels as the characteristic value in an equation which Eckhart shows accords with the matrix method, in which each element can be expressed as a volume integral. The new mechanics gives automatically details which were hypotheses in the old quantum theory. For example, the new dynamics incorporates logically and simultaneously both frequency and intensity. The Bohr frequency condition follows naturally from quantum conditions in the Hamiltonian form. It gives the quantum shift, spectroscopic stability, and the selection principle. The new mechanics gives different energy values only where the old were not in accord with experiment.

If a free electron is considered a fluid with a resonance frequency, this implies that the free electron is attended by a wave train going in the same direction as the electron with wave length dependent on its speed. An experimental discovery of the utmost significance is that of Davisson and Germer, who find that free electrons are actually found to behave like wave trains, diffrangible by crystals and carrying their electrons wherever they are diffracted. A suggestive analogy is the system of resonance of a vibrating box full of air. It may be recalled that Lodge long ago pointed out that the radial variation of the natural period frequency of a vibrating circular disc follows a law—the equation of which resembles and suggests the radial inverse frequency relations of the Bohr atom. Generalizing de Broglie's theory that corpuscles are accompanied by waves, G. P. Thomson also concluded that electrons should have a wave system. Thomson's experiments actually show that such waves produce diffraction rings when electrons pass through a gold film. Motions of pure point-charge electrons would not produce such waves. The electron behaves like a group of waves whose velocities and wave lengths depend on the speed and mass. For electrons falling through 25,000 volts, he computed the electron wave length as 0.75×10^{-9} centimeters, about that of hard X-rays. He obtained Laue crystal-lattice patterns from electrons sent thus through films of aluminium, gold, and platinum.

Crystals. The progress in crystal structure analysis has been remarkable. The beautiful X-ray patterns formed by the space lattices of crystals disclose the distribution of the atoms in the crystal. The significance of crystal-lattice methods today is that it is possible to study the fundamental fine structure of crystals as carefully as once we studied the external form. Amorphous solids have been likened to an orchestra at practice, each musician playing the same tune, but at different points in the piece; but in single crystals, the atoms, like the players, all play the same piece at the same place in the piece, so that at once the harmony and melody are apparent. Something like this is the view of the crystal gazer of today who allocates the ions and atoms in space configuration to form the geometrical figures characteristic of crystals.

The crystal structure appears to depend upon the number of outer electrons, the crystal-lattice pattern being of the same type for any given column of the periodic table. Crystal structure thus becomes a periodic function of the atomic number, as are the other properties of the elements. As a result of the determination of the intracrystal orientation of the atoms, the crystal forms arrived at suggest simple and natural explanations of certain physical properties of these substances. Aluminium and other face-centred cubic arrangement of atoms (an atom at each angle and at each face-centre) are soft and ductile. The reason is simple. There exist four planes in such cubes in which the atoms are so closely packed that one plane slips easily over the one below without elevating it, hence with minimum changes in the attractive distances between the atoms. Less ductile are the body-centred cubic metals (an atom at each angle and one at the cube-centre) since they are more fully interlocked and the intratomic attractive distance must change during gliding. This group includes such metals as iron and tungsten. The correlation of crystals is thus throwing new light on the behavior of the metals.

The hardness of the diamond is quite naturally attributable to the tetrahedral arrangement in which gliding is impossible since the atoms in this type are interlocked in the most stable manner. Shore has found that the diamond under good conditions can support a load of two million pounds per square inch. Hull states that simple cubic salts, such as lithium fluoride and sodium chloride, do not permit gliding since the atoms are bound electrostatically, each ion being surrounded by six opposite charges.

The study of lattice energies, both theoretically deduced and experimentally observed, is actively under way. Space-lattice studies have been made on the large organic structures such as cellulose, rubber, and the complex carbon group compounds. A notable study is the space-lattice and molecular chain model for ramie fibre structure (cellulose) in which Sponsler and Dore are enabled to give with the most minute detail the location of all the atoms, and account for the fibre structure itself as a natural outcome of the structural relations.

The methods developed for crystal analysis seem capable of disclosing the distribution of every atom, ion, or molecule—perhaps of the electrons themselves in solids. Laue patterns give us a means of studying such inner crystal structure just as the spectra have enabled us to analyze the detail structure of the atom.

Applied Physics. Applied physics is today well illustrated by Allen's achievement in giving the "versatile vacuum tube" the rôle of micrometer caliper and scale. The device on Whiddington's principle is a resonant circuit tuned by change of capacity of one or two condensers. It is used to control the thickness of manufactured paper. Varying amounts of material will change the electrostatic capacitance, and alter the current through the meters. The electric micrometer has become a useful research tool. Rotating shafts have shown by this means vibrations as small as one ten-thousandth inch. The U. S. Bureau of Standards built an improved electric linear micrometer sensitive to a motion of one-billionth of an inch.

Hardy devised a recording color analyzer which, with an integrating device, computes automatically the color-sensation values while the spectrophotometric curve is being traced.

The arrival of television for the people is signalized by the fact that essential elements for the reception of television are on the market at low prices and that several firms are broadcasting regular programmes. Laboratories are busy developing the new art which in 1928 reached the broadcasting stage. The first demonstration of perfected television by wire, developed under Dr. Ives and his chief, Dr. Jewett, was made between New York and Washington. See TELEVISION.

Quite as astonishing is the feat of applied acoustics displayed in Wensley's televocal system by which operatorless machinery is controlled by human voice, so that the spoken words, "Open sesame," and no other combination of sounds will cause a certain door to open by a system of selective sound-sensitive relays. It is possible thus, also, to start or stop machines, open or close switches, or perform any other operations at will. Limitless controls are thus made possible by "televox," which may fairly be called epoch making.

Coblentz has greatly improved the sensitiveness of his star-heat apparatus, which would respond to the heat of a candle at a distance of several hundred miles.

The New English *Journal of Scientific Instruments* is issued by the Institute of Physics in cooperation with the National Physical Laboratory. Science is recognizing the basic importance of instrument design and construction. Instruments make possible discoveries which otherwise could never be made. They accelerate, sometimes hundreds of times, the rate of gathering precise data. We may soon expect some physicist to do science the great service of writing a stimulating account of the place of the instrument in physics. This would doubtless inspire scientists and instrument makers alike in the production of new types of apparatus for experimental use. The *Journal of the Optical Society of America* has established an instrument section and added to its name the words *Scientific Instrument Review.* Hitherto. *Instrumentenkunde* has held the field unrivaled. America, now in the instrument field in full earnest, will surely take a high place in developing not merely new technical, but new scientific, instruments as well, designed and built upon the most advanced scientific data and theory. American ingenuity is already in evidence in the later catalogues. Examples may be found in almost every branch of physics and applications in almost every branch of industry. In fact, the present tendency toward the completely measured control of industrial processes is almost without a parallel. Accurate temperature and heat controls are now established in scores of industries. In many cases, high temperatures are maintained automatically at predetermined values. The combustion of fuel is now automatically regulated in modern steam plants by apparatus which continuously and automatically corrects the air supply, so that the CO_2 content in the flue gases is kept at an optimum percentage.

There are many examples of the instruments used by the physicist becoming tools of industry. Applied science is rapidly transferring the methods and principles and apparatus of the physicist into control instruments for the measured guidance of each part of the industrial process. In electricity, the advance from the laboratory to practical uses has been rapid and steadily increasing. Electrical devices in endless variety are being developed for regulating the production, distribution, and utilization of heat, light, and power. Light buoys are being electrically equipped with selenium cells so that, when the sky reaches a prescribed minimum brightness, the buoy is lit automatically. Automatic heat control and humidity control are being extended to almost all kinds of manufacturing operations. The indoor atmosphere of schools and theatres is being conditioned by devices first used in the conduct of physical research.

Airplane engines are tested in altitude chambers where the conditions of high altitudes are duplicated. Testing laboratories are equipped with standard rooms having prescribed humidity and temperature, so that the results may be comparable and standard. The vacuum tube has developed into a powerful engineering tool capable of sending messages to all parts of the world. In short, the variety of scientific devices developed by the physicist and transplanted to the industries is too great to enumerate. The scientific journals and the latest instrument catalogues must be consulted for details which cannot be touched in this general survey.

Sound. The faintness of radiotelephone sounds even at moderate distances led to the development of amplifying electron tubes. The uses of electron tubes are unique in the annals of invention and are in a state of rapid development at this moment. Their design and construction command exacting theoretical and experimental physics. Research engineers have developed the amplifier which can magnify sound trillions of times. In fact, to the point where their volume cannot be endured and where structural materials would collapse if the sound were continued. Ives radio-vision transmission required 5000 million million fold amplification. The microphone is now supersensitized and, connected to an amplifier, permits the human heartbeat to be heard across the ocean.

Jewett has announced that it is possible both to transmit and to amplify by radio without distortion. There remained the final step, now being taken, to perfect the reproduction of sounds at the receiving end without distortion. The amplification of the inaudible sounds of the insect world, too faint or of too high a frequency to be normally heard, opens up the dramatic possibility of vastly extending aural perception much as the microscope and telescope and camera have extended our vision to the infinitesimal, and the infinitely remote.

The study of "sound spectra" of musical instruments awakened an interest which should soon be fruitful in practical application. This analysis gives the respective wave lengths and relative intensities of the simple sounds component of any musical note revealing quantitatively the causes of the characteristic quality of the sounds of musical instruments.

Hearing in three dimensions, by analogy with binocular vision, has excited scientific experimenters in radio. By broadcasting on 68 meters for one ear, and on 237 meters for the other ear, using properly placed microphones and ear phones, a remarkable effect is produced as of hearing with both ears in a room, orienting to the perception the sound sources in all directions. If the transmitting microphones are six or seven inches apart, like the ear of the listener, normal impressions of space orientation of the source result.

Loomis and Hubbard, using super-sonic waves and a sonic interferometer, determined sound velocity through liquids, finding, for example, that sound waves travel through pure water at 60° F. at a speed of 4850 feet per second. The production of high-frequency untra-sonic waves has awakened recent interest through the work of Wente on the electrostatic transmitter, of Hewlitt and his electrodynamic oscillator, and Hartmann and his air-jet oscillator. Woods and Loomis produce such rays by use of a quartz oscillator. Loomis and Harvey show that supersonic waves may be studied under the high-powered microscope.

Interesting effects of high-frequency supersonants are reported, some of them attributed to heat effects. Burns are caused when the vibrating glass thread is held between the fingers. Small organisms like frogs and paramecia are killed; benzol is atomized into a fine mist; emulsions otherwise impossible may be produced; and dust figures of great delicacy and beauty are formed. Exploratory researches are planned for possible practical uses of short-wave supersonants, in both science and industry.

Applied acoustics had great opportunities in the World War. It was active notably in the production, transmission, and reproduction of sound, exemplified notably in the use of acoustical devices for detecting enemy planes, locating enemy batteries, and discovering sappers at work underground. Huge parabolas used as reflectors with sensitive sound receivers detected planes approaching Paris 30 miles away. Apparatus was promptly devised to locate enemy batteries with high precision. Sensitive geophones effectively disclosed enemy mining, and sound ranging was developed to a point where the length of the type of gun had to be taken into account, so accurate was the location of enemy batteries by sound-wave triangulation. Battle firing permitted the study of sectors of sound, and speeds of concussive sounds were measured as high as three kilometers per second and pressures as great as 300 atmospheres. The gradient was so steep that, 30 meters from the sound source, the speed dropped to 400 meters and the pressure to two or three atmospheres.

At Munich, the technical physicist is already studying vibrations in connection with mechanism with a view to enhance efficiency in the transmission and use of mechanical power. The possibilities of utilizing resonance are just beginning to be adumbrated. Every object, every cavity has its natural period of resonance-wave forms. Such forms may be complex. Atomic physics is largely the study of rhythms and resonances. In fact, the new wave atom may almost be described as a bundle of rhythms and resonances.

As yet, the entire field, from earthquakes to the still imperceptible oscillations of the insect world, are in an empirical, even legendary state. With the supermicrophone and amplifier, the study of the sound spectrum of a given object or cavity set in vibration or resonance becomes possible. Any characteristic tone is thus reproducible by giving the harmonics their proper relative intensities. The field is thus wide open for the creation of a harmonic synthesizer capable of reproducing sounds of any possible tone quality or frequency.

Physical research has perfected the phonograph to the point where the distinction between the original rendering and the reproduction from the shellac disc is difficult or impossible. Astounding developments in this field have resulted from the application of acoustical physics, theoretical and experimental, to radio. The talking-film is another triumph of applied acoustical physics.

Electricity. Sheppard announces a process for electroplating rubber direct from the latex on a suitable material, such as wire, cloth, wool, or sheet metal. Ammonia is added with the ingredients needed to make the rubber usable. The ammonia adds negative charges to the colloidal rubber of the latex. The particles readily absorb the needed ingredients, so that milling is entirely eliminated and a better product results. The rubber particles have a negative contact potential of .035 volt and a mobility of 2.7 microns per second. Thick deposits may be built up, since they are permeable. and fillers, added as colloidal suspensions to the latex, may be deposited with the rubber.

The diffusion of physical methods is revolutionizing the sciences, as well as the industries. Some examples will illustrate. The photoelectric cell is already in widespread use—classifying products by color, recording sound waves without distortion, translating the printed page directly into musical chords identifiable by the blind, transmitting pictures by radio and by wire, measuring the light of the stars and planets, and making television possible. By a polarization method, Johnsrud measures films of metal rubidium as thin as one atom to ascertain at which thickness the photoelectric current produced was a maximum. The purpose is to construct photoelectric cells of the utmost responsiveness. The maximum effect was found with films one atom thick.

Feussner, showing the relation between atomic number and electrical conductivity, points out that the alkali metals show a maximum conductivity notably in cæsium and rubidium, in which one electron circulates in the orbit group just formed. There are also maxima for Cu, Ag, and Au. Copper and nickel have identical electronic structure except that, in copper, one electron has been added in a new 4_1 orbit system.

A theory of ferromagnetism based on atomic magnetostriction confirms the ideal quality of permalloy. Magnetization is found to alter the size of a specimen by a few parts in a hundred thousand, heating the metal, wasting energy as hysteresis loss. Iron lengthens, while nickel shortens, in the direction of the magnetic axis, so that a rightly proportioned alloy should show no magnetostriction. So it proves. The easy magnetization of permalloy seems due to the conspiring of iron and nickel atoms to make their magnetic changes in harmony, avoiding shock and energy loss, to which iron and nickel are separately subject.

Honda holds that ferromagnetism is caused by high-speed electronic revolutions in the nucleus of the atom. Radioactivity shows that such intranuclear electrons exist, revolving with nearly the speed of light. His computed values for the magnetic moments of the iron atom, 2.4×10^{-20}, is close to the observed value and the observed facts of ferro-, para-, and dia-magnetism follow from his theory.

Breit and others in Washington secured (1925) excellent photographs of received "radio echoes" from the Kennelly-Heaviside layer. Discrete radio impulses were sent and recorded a few miles away. The recorded trace is accompanied by a follower satellite trace of each impulse. The satellites are the reflections from the Kennelly-Heaviside layer, 100 miles up, as confirmed by the fact that the follower satellite trace was .001 second after the main impulse was received.

A new cathode-ray high-speed camera automatically records lightning flashes, the surges of which reach a maximum in 10 millionths of a second. Boys shows that a lightning discharge may start from ground and cloud at the same time, meeting in mid-air.

Breit and Tuve, using a Tesla oscillator in oil under high pressure, have produced 5,200,000 volts for research on the atomic nucleus and high-frequency radiation in the hard X-ray and gamma-ray range. The production of 5,000,000 volts, the maximum at this writing, foreshadows the attainment of artificially produced voltages equal to those of natural lightning. Model villages are now being experimentally struck by artificial lightning under measured control to study protection from lightning. In General Electric researches, artificial lightning has been produced at a tension of 3,500,000 volts.

Before the National Academy of Sciences in 1928, Crile gave his experimental results on excitation, exhaustion, and death in terms of physical constants, showing that when the cell potential difference becomes zero, death ensues. This is an extension of his remarkable work in support of his bipolar theory of living processes, which applies equally well to the potential difference between the positive-atom nucleus and the negative electrons around it, to the positive-cell nucleus and the negative cytoplasm around it, and to the potential difference between bodily organs.

The epoch-making achievement in 1924 was the closing of the gap in the continuity of the gamut of electromagnetic waves from two billionths centimeter (gamma wave lengths) to 60 kilometers (radio wave lengths) and over. This was done most ingeniously by Nichols and Tear, who produced electric waves a millimeter in length. Glagolewa-Arkadiewa of Moscow, with a unique device, produces waves one-fifth millimeter long.

Light. Ives revived interest in the firefly, stating that if the light of the firefly were spread over the entire visible spectrum, it would still excel many times the efficiency of an artificial light source. It will be recalled that Coblentz found that the luminous equivalent of radiant energy was about 50 candles per watt. The "least mechanical equivalent of light," as determined in 1915 was .00163 watts per lumen for the monochromatic green radiation of the mercury arc (wave length, 6461). Ives later found the value .001605 watt/lumen. Colorimetry, for which physicists such as Priest, Gibson, Ives, and others are laying basic principles, is fast taking a high place as an exact science.

Harvey has completed the first big step toward the production of artificial light from organic materials after the manner of animal light production. He obtained one candle power from 30 square inches of luminous solution of luciferine. Dubois and Harvey have extracted "luciferose and luciferine," two substances supposed to cause animal light. Luciferine emits no light on agitation, but luciferose bursts into a momentary brilliancy if shaken. When mixed, the two substances emit continuous light, apparently requiring oxygen or moisture.

Waidner and Burgess proposed that the unit of light be defined in terms of blackbody radiation at the temperature of melting platinum. Ives found this value to be 55.4 candles per square centimeter, believed to be accurate to within ¼ per cent. The U. S. Bureau of Standards is now engaged on the problem of realizing this unit with high accuracy.

The modified scattering effect is a notable recent discovery. Monochromatic light impinging on a gas, fluid, or certain solids, gives rise, viewed transversely, to polarized wave lengths not in the incident beam but spaced symmetrically on both sides of the spectral exciting line. Many have studied the effect. Ramsden found the effect in ether vapor; Langer, in water; Brickwedde and Peters, in carbon tetrachloride. Raman found that the modified spectrum of monochromatic light diffused by fluids is a powerful and precise method for exploring molecular spectra in the infra-red. For example, the mercury-4358 line gives in carbon tetrachloride three new frequencies corresponding to three computed (but previously unknown) infra-red lines in the carbon-tetrachloride spectra.

It appears that Landsberg and Mandelstan had detected changes in wave length when light is scattered by some transparent media, anticipating the first note by Raman on the subject. German workers report that the characteristic basic vibration of the C-H group at 3.3 microns can be found superposed on the incident light by all compounds tested. Not all infra-red rays give rise to modified scattering, but all such modified lines from organic liquids can be referred to known infra-red vibrations. Venkateswaren's results on modified scattering show that the transformation of monochromatic rays into general or white radiation is caused by the special state of molecular aggregation giving high viscosity. Morton adds that a wide glycerin band suggests that the broadening out of the modified lines to bands is caused by the OH group.

The continuous spectrum of the zodiacal light was photographed by Ramdas and showed prominently the 4227A absorption line of calcium. He obtained no record beyond 5000A suggesting that the scattering is from matter in atomic or molecular state, and believes that the Raman modification of the light may account for the apparently weak polarization and special character of the zodiacal light.

Cosmic rays have been studied for 15 years, at first by Hess, then by Kolhorster, later by Millikan. Jouncey and Hughes recompute the range of wave lengths to be between 2.4 and 3.2 milliangstroms. After extensive observations and computations, using Einstein's mass-energy equation, Dirac's absorption equation, and Aston's positive-ray measurements, Millikan and Cameron conclude that cosmic rays seem to result from the creation from hydrogen "in a single step" of such elements as helium, oxygen, silicon, and perhaps iron, in interstellar space. Their observations in the Andes show that cosmic rays are independent of geographical position.

At sea level, thunder storms did not affect the cosmic-ray action, namely the production of 1.4 ions per centimeter per second. No excess was observed from the Milky Way, as compared with the plane perpendicular to it. Using Compton's formula, the wave length varies from .525 to .32 milliangstroms.

Rutherford points out that X-rays from radium have a quantum equivalent of 4,000,000 electron volts; that the total quantum from the helium-hydrogen transformation is 27,000,000 electron volts, and the proton itself represents an equivalent of 940,000,000 electron volts. The absorption coefficient of the most penetrating rays, deduced by Millikan and Cameron, agrees with the Klein-Nishina relativistic form of wave mechanics for a quantum of 940,000,000-volt energy dissipated from the transformation of the internal energy of the proton into radiation. A billion-volt transformation would thus account for the highest frequency ultra-penetrating rays observed.

Meggers, Kiess, Catalan, Sommerfeld, Russell, and others have aided in unraveling the secret of atomic structure through furnishing the metrics of energy levels and transitions. Each spectrum line represents the transition of one electron from one energy level to another. The energy difference of the two is the energy quantum of the spectrum line.

Bohr himself, on the basis of spectra and other considerations, published a summary of the electronic distributions in each atom of the periodic system. Later, Stoner and Mainsmith gave a revised distribution similar to Bohr's, but in closer agreement with experiment. Kossel in 1916 developed the idea, and G. N. Lewis and Langmuir postulated statical equilibria, of the tetrahedral atoms of column IV, and cubic configuration for those of column VIII, of the periodic system. Valency on this view is positive, and negative for each atom, the sum being 8, and is the number of electrons either furnished or needed to complete the outer electron octet.

The astonishing linearity of the X-radiations of the K and L orders enabled the prediction of the existence of Atom 72, and its subsequent discovery in zirconium and titanium ores, and its isolation in quantity. This new element was named by its discoverers "Hafnium" after the ancient name for Copenhagen (Copenhafn). Workers in the atomic field are many, and the detailed works are found in the physical journals, for the subject is of outstanding interest in science, full of promise for epoch-making discoveries.

Birge states that "the energy levels associated with the valence electrons of molecules agree in all respects with those associated with the valence electrons of atoms," thus clearing the way for the great field of molecular spectra with its evident possibilities. That the problem is not easy is evidenced by the fact that the neutral nitrogen molecule has more than 50,000 lines in its known band spectra. Spectra, then, are a potent tool in the study of the energy and structure of atoms and molecules. The eccentricities of the elliptical orbits appear to give rise to the so-called principal, diffuse, sharp, and fundamental series in conjunction with the principal quantum number (row number of the periodic system). The work of Catalan, Meggers, Walters, Kiess, and Russell, and many others carried the analysis of special frequencies and frequency relations into the most difficult elements of the period system—the so-called long periods.

The impact of electrons at controlled speeds has become a means of throwing light on the energy required to change the state of energy of the atom and experimentally checking up the magnitude of the spectral terms. Frank, Foote, Mohler, and others have done notable work in this direction.

In 1914 Stark discovered a remarkable splitting up of the hydrogen lines when subjected to an electric field. Two years later, Schwarzschild and Epstein accounted for this effect and in 1917 Sommerfeld and Debye worked out the explanation and details of the Zeeman effect on the basis of Bohr's theory of atomic orbits. In 1922 Stern and Gerlach split a stream of atomic silver by a magnet into two streams, showing that the single outer electron of the silver atom in its rotation makes each atom an electromagnet and, when passing a sharp-edged magnetic pole, it is repelled by like pole or attracted by the unlike pole, making the two streams as graphic demonstrations of the Bohr theory. Later, the newer mathematical attacks upon the atomic problem assumed the central position to supplement the Bohr picture and give mathematical solutions where it permitted none on account of the limitations imposed on the solutions of orbital systems of three or more bodies. At this writing, like the wave and quantum theories of light, the wave and planetary theories of the atom are in the field, one useful for its ease of mathematical handling, the other for its graphic picture.

The importance of "available energy" is stressed by Lotka in a study of the energetics of evolution. He refers to Boltzmann's principle that the fundamental objective contention in the life struggle in the evolution of the organic world is available energy. The advantage in the struggle goes to those whose energy-capturing devices are most efficient in directing available energy into channels favorable to the preservation of the species. Intra-atomic energy, now well measured and vast, is accepted by physics as a fact of profound significance for future experiment. Four grams of hydrogen atoms exceed by three centigrams the helium produced, corresponding, according to Einstein's formula, to the liberation of 7×10^{12} calories. It is wise to face the possibility of the synthesis by inciting exothermic combination of hydrogen atoms into helium atoms. Young experimenters, who tomorrow will hold the field, may be stimulated by the possibilities which this and other atomic reactions present.

Physics has been so productive in the period under review that only a few of the more important researches can be even named. It could be spoken of as almost the golden age of the physicist with super forces and mechanisms at his command. The immediate future presages discoveries of far-reaching kinds. Fortunate is that physicist who sees the inspiriting view of the re-creation of the world by the sciences touching the cosmic essence we call energy, the tangible aspect of which we call matter.

The literature on the new physics is growing so rapidly that any list would be out of date before reaching the reader. The journals report advances and are reviewed more thoroughly by *Chemical Abstracts*, *Science Abstracts* (physics), and the various technical indexes. For the latest books in this prolific field, consult current numbers of *Science*, *Nature*, and *Science Progress*. See CHEMISTRY.

PHYSIOLOGICAL CHEMISTRY. See BIOCHEMISTRY; FOOD AND NUTRITION.

PICARDY, BATTLES IN. See WORLD WAR, *Western Front.*

PICASSO, pē-käs'sō, PABLO (1881–). A Spanish figure and genre painter who resides in Paris (see VOL. XVIII). Regarded as the leader of French Cubists, his work after 1917 became increasingly neo-classical, stressing form rather than motif. Outstanding among his later works were *La famille au singe; La Mort de l'arlequin*, and *Femme et enfant.* See PAINTING, under *France.*

PICCIRILLI, pēt'chē-rēl'ē', ATTILIO (1866–). An Italian sculptor residing in the United States (see VOL. XVIII). He designed one of the pediments of the State Capitol at Madison, Wis., and the war memorial for the city of Albany, 1923. He was awarded a gold medal at the Panama-Pacific Exposition in 1915; the Widener Gold Medal of the Pennsylvania Academy of Fine Arts, 1917; the Saltus Gold Medal of the National Academy of Design, 1926; and the Ellin P. Speyer Memorial Prize of the National Academy of Design for his "Seal" in 1929. His brother, FURIO (1868–) (see VOL. XVIII), in 1920 executed the entire sculptural decoration of the Parliament House at Winnipeg, Canada.

PICKETING. In 1914, the Congress of the United States passed the Clayton Act which, among other things, provided that no restraining order may be granted by any Federal court or judge to prohibit labor, singly or in concert, from peacefully persuading others to work or to stop work or from attending any place where they may lawfully be. Labor regarded this as the opening of a new era in which the right of peaceful picketing would become generally recognized and accepted.

Prior to 1914, there were laws in only two States—Alabama and Colorado—making picketing a misdemeanor. Beginning with 1915, however, several States took vigorous action. Washington enacted a law making picketing a misdemeanor. Texas followed with a sweeping act which provided that anyone who in conversation or otherwise with a person engaged in transport and commerce, or with any member of his family, at work or at home, attempts to cause him to desist from work through fear of violence is deemed guilty of intimidation. A Nebraska law made practically any form of picketing unlawful, including persistent communication with a man's family. Hawaii also enacted a strict law against picketing. Utah, in 1923, passed a law against use of force, threats, intimidation or violence, but an earlier law of 1917 limiting injunctions, forbids any injunction from interfering with peaceful persuasion. Wisconsin, in 1923, liberalized a law against picketing, which involved intimidation, by specifically allowing peaceful persuasion to be carried on outside the working premises during the strike or lockout.

Meanwhile, picketing cases found their way frequently into the courts. In some States, all picketing was condemned, as in Oregon and Washington decisions of 1917. In other States, the right of peaceful picketing was held to be lawful, as in Arizona, Indiana, Minnesota, and Montana decisions of 1916 and 1917. However, not only in directly deciding against picketing but also in indirectly limiting its practice through definition, the courts have, as a general thing, rendered decisions against labor.

In 1922, the United States Supreme Court, in American Steel Foundry *v.* Tri-City Central Trades Council, upheld the provisions of the Clayton Act permitting peaceful persuasion but attempted to draw the line between legal and illegal acts in a way that would considerably limit picketing. The American Steel Foundry decision has been generally held as authority for the proposition that peaceful picketing may be lawful and that it is the duty of the court to examine all the facts in each case and determine and definitely prescribe what conduct is permissible under the particular circumstances presented.

One of the most sweeping blows that was struck at picketing was the injunction secured in 1922, and made permanent in 1923 by the Federal court in Chicago, against the Railway Shop Crafts strike. The attorney general brought this action on behalf of the United States on the ground of protecting the United States mails and interstate commerce. Although the Clayton Act authorizes peaceful persuasion, nevertheless this injunction, in addition to the customary prohibition of violence, intimidation, and unlawful picketing, restrains peaceful picketing and persuasion, argument and entreaties, newspaper interviews and the use of union funds "in aid of or to promote or encourage the doing of any of the matters or things hereinbefore restrained and enjoined." The terms of this injunction against picketing, however, drew vigorous criticisms in decisions of other Federal courts in cases arising out of the railway shopmen's strike, particularly in Montana and North Dakota, where the full right of peaceful persuasion was reaffirmed.

Wholesale arrests of pickets at factory gates continue from year to year. Legislation to curb the employers' use of the police and courts in this connection is frequently proposed. Dramatic instances of violence in connection with picketing shocked the public during the textile strikes in North Carolina in 1929.

PICKFORD, MARY (MRS. DOUGLAS FAIRBANKS) (1893–). An American actress, born in Toronto, Canada. She made her stage début at the age of five and her first marked moving-picture success in *Hearts Adrift.* She returned to the stage in *A Good Little Devil* and then devoted herself to the screen. Among her successes are *Tess of the Storm Country*; *Cinderella*; *Fanchon-Cricket*; *Madame Butterfly*; *The Bishop's Carriage*; *Rosita*; *Pollyanna*; *Rebecca of Sunnybrook Farm*; *Poor Little Rich Girl*; and *Little Lord Fauntleroy.* In the later "talkies," she made her début in *Coquette.* She has been one of the most popular screen actresses in the United States.

PICK-MANGIAGALLI, RICCARDO (1882–). An Italian composer, born at Strakowitz, Bohemia. He was trained at the Milan Conservatory under Appiani (piano) and Ferroni (composition). His earliest works were written under the influence of Wagner and Strauss, especially in regard to the handling of the orchestra. Later, the influence of the French impressionists made itself felt. His most important works are the ballets, *Il Salice d'Oro* (Milan, 1914); *Il Carillon Magico* (ib., 1918; New York, 1920); *Mahit* (ib., 1923); *Sumitra*, and *Casanova a Venezia* (Milan, 1928); a symphonic poem, *Sortilegi*; *Preludio e Rondo Fan-*

tastico; two preludes for orchestra; a string quartet; and several pieces for piano. An opera, *Basi e Bote*, was produced in Rome (1927).

PICRIC ACID EXPLOSIVES. See EXPLOSIVES.

PIERCE, GEORGE WASHINGTON (1872–). An American physicist, born at Webberville, Tex., and educated at the University of Texas, Harvard and Leipzig. In 1903 he became instructor in physics at Harvard, in 1917 full professor of physics and director of the Cruft Laboratory there and in 1927 chairman of the division of physical science. During the World War, he conducted experiments at the Naval Experimental Station at New London, Conn. Among his more important researches were his experiments in resonance in wireless telegraph circuits and crystal rectifiers for electric currents and electric oscillations. In addition to many papers contributed to various scientific publications, he is author of *The Principles of Wireless Telegraphy* (1910) and *Electric Oscillations and Electric Waves* (1919). He is a member of the National Academy of Sciences and other learned societies.

PIEZO-ELECTRIC OSCILLATORS. See RADIO TELEGRAPHY.

PIGMENTS. See LEAD.

PIGOU, ARTHUR CECIL (1877–). A British economist, educated at Harrow and King's College, Cambridge. He lectured in economics at University College, London (1903–04) and at Cambridge (1904–07) and became professor of political economy at Cambridge in 1908. He was a member of the committee on currency and foreign exchange (1918) and of the Royal Commission on Income Tax (1919). In 1927 he was made a fellow of the British Academy. His works include *The Riddle of the Tariff*; *The Principles and Methods of Industrial Peace*; *Protective and Preferential Import Duties*; *The Policy of Land Taxation*; *Wealth and Welfare*; *Unemployment*; *The Economy and Finance of the War*; *Industrial Fluctuations* (1926); and *A Study in Public Finance* (1928).

PILES, SAMUEL HENRY (1858–). An American diplomat. He was born in Livingston County, Ky., and trained in private schools at Smithland, Ky. In 1883 he began the practice of law at Snohomish City, Washington Territory, removing to Seattle, Wash., three years later. He was city attorney of Seattle and assistant district attorney for the counties of King, Kitsap, and Snohomish, Wash. He served a term as United States Senator from the State of Washington (1905–11). Since 1922 he has been Minister to Colombia and he was special ambassador for the Colombian presidential inauguration of 1926.

PILES. See FOUNDATIONS.

PILOT CABLE. See NAVIGATION.

PILSUDSKI, JOSEPH (1867–). A Polish general and administrator, first Marshall of Poland (1920), who was born in Zulow of Lithuanian parents and educated at Kharkov University. In 1888, because of accusation of complicity in a plot against Alexander III, he was banished to Siberia, and on his return to Poland in 1892 he joined the Social-Democratic Party. In the World War, he commanded the 1st Polish Legion against Russia, resigning in 1916 because of trouble with the Austrian commanders. Later he was arrested by the Germans and imprisoned at Magdeburg. When he returned to Poland in 1918, he found the Government weak. November 14, the Council of Regency abdicated, and Pilsudski, backed by his army, then held supreme power, being President of the new Polish State from November, 1918, until December, 1922. During 1919 Paderewski was Premier and Pilsudski was engaged in wars with the Ukrainians, the Czechoslovaks, and the Bolsheviks. The next two years were stormy, and after he was forced out of the Presidency he was chief of the General Staff for a short time. On May 12, 1926, a *coup d'état*, after several days fighting, made him virtual Dictator of Poland. He refused to accept his election as President, but became Minister of War, and in October also Premier, ruling Poland for two years. During a severe illness in May, 1928, he lost his majority block in Parliament, and on attacking his cabinet for permitting this, most of its members resigned. He followed their example on the following day (June). He then became Minister of War in the cabinet of Bartel. See POLAND, *History*.

PILTDOWN MAN. See MAN, PREHISTORIC RACES OF.

PINCHOT, GIFFORD (1865–). An American forester and public official (see VOL. XVIII). In 1920 he was appointed Commissioner of Forestry of Pennsylvania. He was nominated for governor in May, 1922, by the Progressive wing of the Republican Party in the State and was elected in the following November, serving until 1927. During the threatened anthracite coal-miners' strike in 1923, Governor Pinchot drew up a plan of settlement which was accepted by both miners and employers. During the early part of 1923, he took an aggressive stand in regard to prohibition enforcement and severely criticized President Coolidge and the administration for alleged laxity in the enforcement of the law. He was defeated as delegate to the Republican National Convention in May, 1924, and as candidate for the Republican nomination for United States Senator in 1926.

PINE BLISTER RUST. See PLANTS, DISEASES OF; FORESTRY.

PINE SHOOT MOTH. See ENTOMOLOGY, ECONOMIC.

PINERO, pĭ-nâr'ō, SIR ARTHUR WING (1855–). A British dramatist (see VOL. XVIII). Throughout the World War, he was chairman of the United Arts Rifles. His later plays include *The Big Drum* (1915); *Mr. Livermore's Dream* (1917); *The Freak: an Idyll of Suburbia* (1918); *A Seat in the Park* (1922); *The Widow of Wasdale Head* (1924); and *A Private Room* (1928). Clayton Hamilton edited *The Social Plays of Arthur Wing Pinero* (4 vols., 1917–22).

PINK BOLLWORM. See ENTOMOLOGY, ECONOMIC.

PINTNER, RUDOLF (1884–). An American psychologist, born at Lytham, England, and educated at the Edinburgh University and the University of Leipzig. In 1912 he removed to the United States and was for several years on the faculty of the Ohio State University. In 1921 he became professor of education at Teachers College, Columbia University. He was the author of several books on psychology, including *The Picture Completion Test* (1917); *A Mental Survey* (1918); and *Intelligence Testing* (1923). He also translated several books on psychology.

PIRANDELLO, LUIGI (1867–). An Italian author and dramatist, born in Girgenti. In the United States, he was best known by *Six Characters in Search of an Author*, played in New York in 1922, where *Florian's Wife* was staged the following year. Other plays include *Liola* (1917); *Così e' Asc vi pare)* (1918, trans. 1922); *Tutto per bene* (1920); *L'Innesto* (1921, trans. 1923); *Enrico IV* (1922, trans. 1922); *Vestire gli ignudi* (1923, trans. 1923); *La vita che ti diedi* (1924); *La nuova colonia* (1925), and *L'amica delle moglie* (1927). In 1928 translations of *The One-Act Plays of Luigi Pirandello*, edited by A. Livingston, appeared, and a new Italian edition of his many short stories was begun in 1921, 12 volumes having been published by 1928. He also wrote the novels *L'Esclusa* (1901); *Il fu Mattia Pascal* (1905, trans. 1923); *I Vecchi e i giovani* (1923, trans. 1928); *Si Gira* (1916, trans., 1927), and *Uno, nessuno e centomila* (1919). His few volumes of poetry include *Mal Giocondo* (1889) and *Fuori di chiavi* (1912). His critical work, *L'umorismo*, appeared in 1915. Consult *Italian Silhouettes*, by Ruth S. Philips (1924) and *Luigi Pirandello*, by Walter Starkie (1926) and F. Pasini, in Italian (1927).

PIRQUET, pĕr'kā', CLEMENS, BARON VON (1874–1929). An Austrian pediatrist (see VOL. XVIII). During the World War, von Pirquet devised a new notation for nutrition, intended to improve on the calory. The unit is termed the *nem*, representing a cubic centimeter of mother's milk. He published *System der Ernährung* in 1917, with an addendum in 1920, devoted to this idea. He assisted the American Relief Administration in the work of feeding starving Austrian children during post-war years. His nutrition unit facilitated the utilization of the food supplied by the relief organization. In 1922 appeared in English *An Outline of the Pirquet System of Nutrition*. His death was self-inflicted.

PIRRIE, pĭr'ĭ, WILLIAM JAMES, FIRST BARON (1847–1924). An Irish shipbuilder (see VOL. XVIII). During the World War, he was of valuable service to the British government as commercial adviser to Lord Derby, and in March, 1918, he was appointed Controller General of Merchant Shipping. When the North of Ireland was separated from the new Irish Free State, he was one of the first senators elected to the Parliament at Belfast (1922). Lord Pirrie was created a viscount in 1921.

PISTOLS. See SMALL ARMS.

PITCHBLENDE. See RADIUM.

PITHECANTHROPUS ERECTUS. See ANTHROPOLOGY.

PITT, PERCY (1870–). An English conductor and composer, born in London. He studied under Reinecke and Jadassohn at the Leipzig Conservatory (1886–88) and under Rheinberger at the Akademie der Tonkunst in Munich. In 1896 he was appointed organist at Queen's Hall; in 1902, coach at Covent Garden; in 1906, assistant conductor; and after Messager's resignation (1907), principal conductor, a post which he filled until 1914. In 1920 he became principal conductor of the British National Opera Company. In 1927 he was appointed musical director of the British Broadcasting Corporation. His works include a symphony; *Le Sang des Crépuscles*, symphonic poem; *Anactoria*, a symphonic poem for viola and orchestra; *Ballade*, for violin and orchestra; an overture, *The Taming of the Shrew*; *English Rhapsody, Oriental Rhapsody, Fêtes Galantes, Cinderella, Dance Rhythms, Coronation March*, for orchestra; incidental music to Phillips' *Paolo and Francesca*, Austin's *Flodden Field*, and Shakespeare's *Richard II; Hohenlinden*, ballad for male chorus and orchestra; *Swerting the Saxon*, cantata; *Sakura*, ballet-pantomime; and chamber music, piano pieces and songs.

PITTMAN, KEY (1872–). A United States Senator (see VOL. XVIII). He was reelected to the Senate from Nevada in 1916, 1922, and 1928. In that body, he has been a member of the committees on foreign relations, interstate commerce, irrigation and reclamation, mines and mining, public lands, and territories and insular possessions. He was Democratic caucus candidate for President pro tempore of the Senate for four successive Congresses. In the Democratic National Convention of 1924, Senator Pittman was secretary of the platform committee and in the convention of 1928, he was chairman of that committee.

PITTMAN ACT. See SILVER.

PITTSBURGH. A city of Pennsylvania. The population increased from 533,905 in 1910 to 594,297 in 1920 and to 673,800 in 1928, by estimate of the Bureau of the Census. The population of the metropolitan district of Pittsburgh, or Allegheny County, was estimated in 1926 to be 1,297,800. The area of the city was increased by the annexation of Spring Garden in 1920 and Chartiers in 1921; a zoning ordinance was adopted in 1923. In June, 1929, a referendum on the adoption of the metropolitan-charter plan, whereby the surrounding boroughs and townships of Pittsburgh would become part of a municipality covering 725 square miles, was defeated. In 1919, $21,996,000 was voted for municipal improvemenets, as follows: highways, including the Boulevard of the Allies overlooking the Monongahela River, $9,579,000; subway, $6,000,000; parks and recreation grounds, $1,815,000; water works, $1,401,000; sewerage systems, $1,314,000; public health, safety, and charities, $1,110,000; highway bridges, $750,000. Between 1919 and 1926, four of the bridges across the Allegheny River were rebuilt in accordance with the order of the U. S. War Department that they be altered to afford greater underclearing for navigation.

Two subway projects were also undertaken on the recommendation of the city transit commissioner. One was to connect the South Side district with the East End, chiefly by elevated tracks, a distance of 7.28 miles, at an estimated cost of about $7,000,000; the other was to connect the North Side with the East End, mostly by subway and tunnel, at a cost of about $11,000,000. In 1923 the Liberty Tunnel, a twin vehicular tunnel 5715 feet long extending under Mt. Washington and connecting the South Hills district with the business section, was completed at a cost of nearly $6,000,000. In 1928 a bond issue of $1,500,000 was approved for the construction of a municipal airport.

The school properties of Pittsburgh are valued at more than $38,000,000. The large high-school buildings erected since 1916 include the Schenley, Langley, South Hills and Westinghouse high schools. A new administration building for the Board of Education was constructed in 1928 at a cost of $960,000. In 1927 the city of Pittsburgh had 1620 industrial establishments employing 78,138 persons; the value of products manufactured was $513,425,500. The same year, Allegheny County had 2577 industrial establishments employing 197,231 persons; the value of products manufactured was $1,519,478,900. Building permits issued in 1928 were valued at $40,254,060, an increase of 8.3 per cent over 1927. Among Pittsburgh's notable new buildings are the Rowland & Clark Office Building, Plaza Office Building, Grant Building, Law and Finance Building, Koppers Building, American State Bank Building, Montefiore Hospital, Presbyterian Hospital, Pittsburgher Hotel, Roosevelt Hotel, Pittsburgh Press Building, and the Cathedral of Learning of the University of Pittsburgh. The clearings of Pittsburgh's 79 banks in 1928 amounted to $9,452,672,000. The assessed valuation of property in 1927 was $1,108,842,000; the net debt was $116,470,000.

PITTSBURGH, University of. A nonsectarian coeducational institution of higher learning at Pittsburgh, Pa., founded in 1787. The university increased its enrollment with great rapidity between 1914 and 1928, from 2830 in the former year to 9960 in the latter. The faculty was increased in the same period from 329 to 851 members and the library from 20,000 to about 115,000 volumes. Productive endowment in 1928 amounted to $1,708,402. The annual budget in the same year was $3,622,768, while income from the legislature of Pennsylvania was $414,799. Alumni Hall was built through gifts of the alumni in 1920. In 1925–26 a five-year college-dental-school course was opened, the length of the course for the Ph.G. degree in the College of Pharmacy was increased from two to three years, the department of economics was transferred from the college to the school of business administration, and the department of geology from the school of mines to the college. During 1924–25, $6,303,399 was given for the "Cathedral of Learning," a skyscraper building to contain all the university's departments; by bequests from Mary O'Hara Darlington, income amounting approximately to $1,000,000 was made available for a Darlington Memorial Library to house the general university library and the Darlington Collection. The children's hospital, the first unit in the medical centre, was completed, at a cost of $1,500,000; and an athletic stadium costing $2,100,000 was dedicated. In 1926–27 a department of fine arts was established; the division of research in higher education was organized; a total of $2,600,000 was subscribed for the Presbyterian Hospital Unit of the medical centre; and the establishment of a junior college at Johnstown, Pa., was effected. In 1928, various other extension centres were organized; $750,000 was received for the Falk Clinic: $50,000 from Elbert H. Gary to establish a scholarship; $210,000 for building purposes from Gardiner Steel, and $90,000 for general endowment from David L. Gillespie. Chancellor, John Gabbert Bowman, LL.D.

PIUS XI (Achille Ratti), Pope (1857–). He was born in Desio, Italy, and studied at the diocesan seminary and at the Lombard College of Rome, where he obtained a doctor's degree in theosophy, theology, and common law. He was ordained priest in 1879 and was professor of dogmatic theology and sacred eloquence in the seminary of Milan from 1882 to 1888, when he joined the staff of the Ambrosian Library, of which he became head in 1907. In 1914 he was appointed prefect of the Vatican Library. He went to Poland as Apostolic Visitor in 1918, in the following year became Papal Nuncio, and titular Archbishop of Lepanto, and in 1921 Cardinal Archbishop of Milan. In 1922 he succeeded Benedict XV as Pope. He made concordats with Latvia (1922), Bavaria (1924), Poland (1925), and Lithuania (1927). In 1925 he received daily the many pilgrims brought to Rome by the 220th Jubilee year, and in the same year, he proclaimed the Feast of the Kingdom of Christ for the last Sunday in October. By far the most important event was the signing on Feb. 11, 1929, after over two years of negotiations, of a treaty with Italy, which was part of a larger Concordat, ending the 59-year imprisonment of the Pope, and making him temporal Sovereign in "Vatican City." See Italy, *History*, and Roman Catholic Church.

PIZZETTI, Ildebrando (1880–). An Italian composer, born at Parma, Italy. After receiving his first instruction from his father, he entered the Parma Conservatory in 1895 and graduated with honors in 1901. In 1909–18 he taught composition at the Instituto Musicale in Florence, when he succeeded Tacchinardi as director. In 1924 he was called to succeed Gallignani as director of the Milan Conservatory. He wrote the operas, *Giulietta e Romeo, Le Cid, Debora e Jaële* (Milan, 1922), *Fra Gherardo* (Milan, 1928; New York, 1929); incidental music to Sophocles's *Edipo Rè* and d'Annunzio's *La Nave, Fedra,* and *La Pisanella; Requiem,* in memory of King Humbert; *Poema Emiliano*; *Overtura per una Farsa Tragica*; *Sinfonia del Fuoco*; *Lamento,* for tenor and orchestra; a violin sonata, a 'cello sonata, and a string quartet; and piano pieces and songs. He also wrote many essays for various periodicals, a biography of Bellini (1916), and *Intermezzi Critichi* (1921).

PLAGUE. See Bubonic Plague; Influenza.

PLANCK, plänk, Max (1858–). A German physicist (see Vol. XVIII). He was professor at the University of Berlin from 1889 to 1923 and director of the Institute for Theoretical Physics there. He received the Nobel Prize for physics in 1919 and the Copley Medal in 1929. His later publications include *Die Entstehung und bisherige Entwicklung der Quantentheorie* (1920); *Vorlesungen über die Theorie der Wärmestrahlung* (1921), and *Einführung in die theoretische Physik* (1921–26). See Physics.

PLANETS. See Astronomy.

PLANT BREEDING. See Botany.

PLANT PHYSIOLOGY. See Botany.

PLANT QUARANTINE. See Entomology, Economic; Horticulture.

PLANTS, Diseases of. An annual plant-disease survey of the United States was initiated in 1917. This survey was authorized by Congress and is carried on by the U. S. Department of Agriculture in coöperation with agricultural colleges, experiment stations, and various specialists in plant diseases, and it brought to light many new diseases, as well as old parasites on new hosts. There was also much study of the causes of diseases of plants and of means for their control. Among the diseases of great economic importance reported in the United States are blister rust of white pine and related species; leaf and stem rusts and smuts of wheat; rusts and smuts of oats; stripe, rusts, and smuts of barley; ear and root rots of corn; mosaic, leaf roll, and late blight of potatoes; anthracnose, leaf spot, and wilt of cotton; and bitter rot, blotch, and scab of apples. The losses attributed to plant diseases in the United States were very great. According to estimates made by the Plant Disease Survey, the losses of a few of the leading crops in 1926 were: wheat, 63,840,000 bushels; barley, 12,153,000; oats, 144,123,000; corn, 388,199,000; apples, 27,089,000; peaches, 4,720,000, and cotton, 3,256,000 bales. The value of the crops destroyed was well over half a billion dollars.

The chestnut blight due to *Endothia parasitica*, which made its appearance in the vicinity of New York City about 1904, was probably introduced from Asia. It spread with great rapidity, and at the end of 1923 practically all the native chestnut trees in New England, eastern New York, New Jersey, Pennsylvania, and Maryland had been destroyed, and the disease is spreading toward the South and West where it is expected all the native chestnut trees will be destroyed by 1940 or sooner.

Citrus canker caused by *Bacterium citri* was discovered in Florida and other Gulf States in 1916. This disease was believed to have been introduced from Japan, where it does comparatively little damage except to navel oranges. In the Gulf States, it soon became very destructive, especially to oranges and grapefruit. Congress appropriated more than $1,850,000 for studies of this disease and means for its control. This sum was supplemented by State and other contributions, and the work on control was carried on coöperatively with the States where the disease occurred. Florida was most severely affected and many thousands of trees were burned. As a result, citrus canker appeared to have been eradicated from the State, for no new infestations have been reported since 1927. The same disease was reported in South Africa, where similar methods of control were applied with gratifying success.

The Plant Disease Survey found the blackwart disease of potatoes caused by *Chrysophlyctis endobiotica* in Pennsylvania in 1917. Later, it was discovered in a few localities in Maryland and West Virginia. This disease is believed to have been brought from Europe, where it is considered a serious trouble. All the localities where it was found in the United States are mining communities which are not important producing centres. Strict quarantines were established about them, and by the growing of immune varieties of potatoes, the disease has been practically stamped out.

The white pine blister rust continued to be a subject of much concern not only to plant pathologists but to important industries dependent on the white pine and related species for timber. The fungus, *Peridermium strobi*, which causes this disease, has a complex life cycle. It spends different phases of its existence on the white pine and on currants and gooseberries. This parasite, probably introduced from Europe on white pine seedlings, was first reported in the United States about 1906. All the five-needle pines and most species of currants and gooseberries are subject to attack. The blister rust occurs quite generally throughout parts of New England and southern Ontario, and in parts of Minnesota and Wisconsin, with scattered infections on either white pines or currants in New York, Pennsylvania, and Michigan. It was reported in Washington and British Columbia in 1922 and it had spread to Idaho, Montana, and Oregon in 1928.

The fungus cannot infect pine trees from other pines but must pass through its alternate hosts, wild or cultivated species of *Ribes*. Advantage has been taken of this fact and control measures are based on the destruction of all species of *Ribes* occurring in the vicinity of white pines, and in the northeastern part of the United States about one-third of the white pine area has been cleared of currants and gooseberries at a cost of only about $.30 an acre. This method of control appears entirely practicable, and the cost is insignificant as compared with the value of the white-pine timber of the country. Since 1916 Congress has appropriated about $3,500,000 for coöperative work with the States in attempting to control the spread of blister rust.

Another disease of great agricultural importance, in the control of which some progress has been made, is the stem rust of wheat due to *Puccinia graminis*. The relation of this fungus to the common barberry has long been known, and in some European countries attempts have been made to control the rust on wheat by the destruction of barberries in the vicinity. About 1918 an active campaign was begun in the United States for the destruction of all common barberry bushes in a number of the leading wheat-producing States. Since then, Congress appropriated more than $3,200,000 toward the expense of eradicating barberries in 13 of the North Central States, the work being carried on coöperatively with State officers. The bushes were grubbed out of the ground or destroyed by the application of coarse salt or arsenates about them. In this way, many millions of barberry bushes were destroyed in the hope that by the removal of one of the alternate hosts, epidemics of rust infection would be avoided. Whether this will be entirely successful over wide areas is problematical, for recently spores of the form capable of infecting wheat were caught in spore traps exposed on airplanes at 7000 feet elevation, indicating the possibility of infection from regions where the uredospores retain viability throughout the winter. Several local infections have been avoided in many regions through the destruction of the barberry bushes. In connection with studies of the wheat-rust problem, varieties of wheat have been found that are immune to the stem rust, and reliance on them seems to offer a means of control.

The so-called virus or mosaic diseases of plants took on importance, not only on account of their wide distribution and destructive effect but through the various hypotheses presented regarding their origin. These diseases are characterized by a certain dwarfing of the plants, abnormal coloring and blotching of the foliage, and in some cases marked changes in the form and texture of the leaves. A considerable number of important crop plants are subject to attacks of this character, among them sugar beets, sugar cane, maize, tobacco, tomatoes, potatoes, beans, etc. In the case of the potato, the disease manifests itself in a number of ways that have given rise to special names, such as mosaic, leaf roll, crinkle, streak, spindling sprout, etc. They are also called degeneration diseases from their effect on subsequent generations of infected plants. On some plants, there is a distinct yellowing of the foliage, as in the peach, or a mottling, as in the leaves of sugar cane, corn, tobacco, beans, cucurbits, etc. In the sugar beet, the disease causes a curling and mottling of the leaves which produces a condition known as curly top. The cause, or causes, of mosaic diseases were not definitely determined. By some investigators, they were called virus diseases, since the causal agent readily passes through a porcelain filter and sound plants may be infected by the introduction of the filtrate into their tissues. Others considered them to be due to organisms so minute as to escape detection by the best microscopes. Still others claimed they were due to protozoan parasites, and a number of investigators, following Lafont, who was the first to find protozoa in living plants, reported the presence of flagellates and similar bodies in diseased tissues, and causal relations were attributed to them. Quite a number of investigators have reported the presence of definite bodies in diseased cells, but their relationship to the incidence of the disease was not established.

Nelson reported in 1922 the discovery of protozoa-like bodies in plants affected with mosaic diseases. The accuracy of the determination was questioned, but in 1923 McKinney and his coworkers reported the occurrence of intracellular bodies in wheat plants affected with mosaic which are claimed to be stages in the life of some organism. Iwanowski reported such bodies in 1903, but did not associate them with mosaic, and Palm in 1922 considered them as possible causes of tobacco mosaic. In 1924 Kunkel added further evidence to their probable causal relations. He considered that at certain stages they may pass through a filter. So far as was known, there had been no disease successfully produced with cultures of these organisms, with the possible exception of that reported by McWhorter, who claimed to have produced the Fiji disease of sugar cane by the introduction of cultures of amœba. Olitsky claimed he had grown the causal agency of tobacco and tomato mosaic in culture media, but Purdy, Mulvania, and others found no evidence to substantiate the claim.

The means by which mosaic diseases are transmitted from plant to plant are quite varied. Perhaps the most are distributed by insects, mostly aphids, which act as mechanical carriers of the infection, but in the case of curly top of sugar beets the infective material must remain for a definite period in the body of a leaf hopper, *Eutettix tenella*. Some of these diseases are not limited to a single host plant but pass readily to unrelated species. A number are known to winter over on perennial weeds and infect crops the next season. Some are carried from crop to crop in the seed, while, in the potato, some forms of mosaic are undoubtedly carried in the tubers used for planting. The active principle is known to remain effective in dry tobacco leaves for 24 years. Avoiding the use of infected material for planting, the growing of resistant varieties, of which there are many, and combating the insects that act as carriers are the most hopeful methods of controlling mosaic diseases of plants.

The number of diseases of plants caused by bacteria has greatly increased and there are probably a hundred species of bacteria known to cause such diseases, and as some of them are capable of infecting a large range of plants, the total number of affected species is considerable.

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PLATINUM. Inasmuch as Russia was the chief source of the world's supply of platinum previous to the World War, it was inevitable that many changes should develop in the mining and refining of this essential metal, which already had become more valuable than gold, as well as in its marketing. In 1912 the world's production of platinum was estimated at 313,529 ounces, of which amount 300,000 ounces was credited to Russia. At this time, Colombia, which was destined to become an important source of production, produced 12,000 ounces, while between 700 and 800 ounces of crude platinum were produced in New South Wales and Tasmania and in the United States, respectively. In the period following, there was an increased demand for platinum in jewelry and, during the War, for use in the chemical industries. As early as 1914, an embargo was placed on platinum in Russia, and from that time the production declined, dropping from 202,000 ounces in 1914 to 53,000 ounces in 1916, and to probably about 5,500 ounces in 1921. The effect of this shrinkage was to reduce the world's production in 1921 to less than 60,000 ounces, which probably marked the lowest ebb in the production of this valuable mineral.

With the decline in production in Russia, there was an increase in the output from Colombia which was 34,000 troy ounces in 1921 and 55,000 in 1926. About 1921, an international platinum syndicate was formed, consisting of strong financial organizations in New York, London, Paris, and Hanau. This syndicate agreed to take from the Soviet Government of Russia 60,000-70,000 ounces a year on the condition that no Russian platinum be sold directly; but when the Russian production in 1925 and 1926 materially exceeded this amount, the Soviet representatives desired a larger allotment, whereas the syndicate desired to reduce the Russian quota because of increased production elsewhere. As a result, the agreement was not renewed upon its expiration in March, 1927, and the Soviet output was put on the market directly in competition with that of the syndicate. Demoralization of the market followed and the average price declined from $119.09 per ounce in 1925 to $78.58 in 1928. Early in 1929, numerous unofficial reports were given publicity to the effect that the Soviet representatives were making overtures for re-admission to the syndicate, but verification of these rumors was lacking.

Production of platinum in Canada and in South Africa has increased rapidly in recent years. Virtually all of Canada's production is obtained from the treatment of the Sudbury nickel ores. In 1928 Canada produced 24,139 ounces of platinum, palladium, iridium, rhodium, and ruthenium, valued at $1,336,742. The first direct production of platinum in South Africa was early in 1926, and in 1927 the output totaled 10,431 ounces. Metallurgical problems in the treatment of platinum norite ores of the Transvaal, of which there is reported to be a tremendous tonnage available, are being solved in the laboratory and, when application of the process evolved is made on a commercial scale, the amount of platinum available from South Africa should be considerable and will add to the complexity of the present marketing situation.

The demand for platinum in the jewelry trade was reported to have slackened considerably with the recent lowering in prices, and inasmuch as the consumption of platinum in the jewelry trade is more than 70 per cent of the total, as is indicated in the accompanying table of industrial consumption, the importance of this trend becomes readily apparent.

The average prices of platinum in the New York market from 1914 to 1928 are summarized in the table following:

AVERAGE MONTHLY PRICES OF PLATINUM, NEW YORK MARKET[a]

Year	Price	Year	Price
1914	$ 45.14	1922	$ 97.618
1915	47.13	1923	116.537
1916	83.40	1924	118.817
1917	102.82	1925	119.093
1918	105.95	1926	113.269
1919	114.61	1927	84.636
1920	110.90[b]	1928	78.580
1921	75.033[c]		

[a] From *Engineering and Mining Journal*.
[b] Maximum monthly average $154.23.
[c] Minimum monthly average $70.227.

NEW PLATINUM METALS RECOVERED BY REFINERS IN THE UNITED STATES, IN TROY OUNCES

Year	Platinum	Palladium	Iridium	Osmiridium	Others	Total
1919	40,220	3,807	401	402	279	45,109
1920	36,015	4,309	418	409	393	41,544
1921	51,791	2,686	286	581	1,026	56,370
1922	54,142	1,943	210	1,301	122	57,718
1923	46,780	1,934	280	787	16	49,797
1924	57,827	6,065	680	1,261	174	66,007
1925	41,300	7,358	283	648	54	49,643
1926	76,154	6,437	234	2,113	43	84,981
1927	41,121	3,879	256	631	163	46,050
1928	51,427	5,148	1,658	458	348	59,039

The platinum refiners of the United States in 1928 purchased 365 ounces of crude placer platinum of domestic origin and 57,962 ounces of foreign crude platinum, according to the U. S. Bureau of Mines. In 1927 these refiners purchased 236 ounces of domestic crude platinum and 48,907 ounces of foreign crude platinum. Domestic material purchased in 1928 included 299 ounces from California and 66 ounces from Oregon. Purchases of foreign crude platinum in 1928 were: Australia, 1086 ounces; Canada, 14 ounces; Colombia, 53,744 ounces; and from other countries not specified, 3118 ounces. Refined platinum metals recovered in 1928 from crude platinum, from ore and concentrates, and from gold and copper refining amounted to 59,039 ounces, of which 321 ounces was reported to have come from domestic materials.

SECONDARY PLATINUM METALS RECOVERED IN THE UNITED STATES, IN TROY OUNCES

Year	Platinum	Palladium	Iridium	Others	Total
1919	54,545	3,467	3,504	...	61,516
1920	51,255	3,100	3,355	...	57,710
1921	39,131	4,887	1,776	229	46,023
1922	40,062	4,193	1,937	496	46,688
1923	39,152	6,246	2,021	453	47,872
1924	45,474	5,784	2,200	1,013	54,471
1925	35,578	4,680	1,827	1,189	43,274
1926	38,795	5,647	1,478	217	46,137
1927	46,127	4,244	1,810	891	53,072
1928	47,157	4,156	2,090	2,428	55,831

In the United States, the considerable consumption of platinum has to be met by extensive imports, though some is obtained from the refining of gold, copper, and nickel ores (see accompanying tables).

IMPORTS OF THE PLATINUM GROUP METALS INTO THE UNITED STATES
(From *Mineral Industry*)

Metal	1926		1927		1928	
	Troy ounces	Value	Troy ounces	Value	Troy ounces	Value
Platinum	114,968	$11,803,609	128,544	$11,187,931	108.447	$7,696,599
Iridium	3,305	411,646	4,633	520,202	4,212	672,384
Osmiridium	6,141	658,756	7,506	397,408	5,785	418,829
Osmium			6	277	310	20,337
Palladium	8,258	460,015	6,251	222,878	13,463	407,826
Rholium	2,120	117,163	1,308	59,940	1,887	102,120
Ruthenium			484	19,046	1,090	36,496
	134,792	$13,451,189	148,732	$12,407,682	135,194	$9,354,591

CONSUMPTION OF PLATINUM METALS IN THE UNITED STATES IN 1928 BY INDUSTRIES
(In Troy ounces)
(From *Mineral Industry*)

Industry	Platinum	Iridium	Palladium	Others	Total	Percentage of total
Chemical	18,529	113	1,252	135	20,029	11
Electrical	21,316	1,525	9,150	2	31,993	17
Dental	10,993	167	12,270	10	23,377	12
Jewelry	93,468	3,260	4,965	815	102,508	55
Miscellaneous	5,431	963	2,136	850	9,380	5
	149,674	6,028	29,773	1,812	187,287	100

PLATONISM. See PHILOSOPHY.

PLATOON SCHOOL ORGANIZATION. See EDUCATION IN THE UNITED STATES.

PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA. An organization founded in Washington, D. C., in 1906. Its work for the development and improvement of playgrounds and neighborhood recreation schools was continued actively throughout the period after 1914. Through the employment department of the association, many officials were enabled to select workers with training and experience. During the War, the association sent community organizers into each of the cities near the training camps to organize social and recreational life for the benefit of the soldiers in their free time. This was known as the War Camp Community Service, and over 400 community organizers were engaged in the work. The result of this service was that men in the service were given home hospitality, community singing, athletic activities, and other forms of amusement. During 1919 the association sent field workers to the communities desiring their services, to help plan their work and to secure municipal appropriations. In the same year, the National Physical Educational Service was inaugurated to assist states in securing adequate compulsory physical education laws; this department was still in existence in 1929, and as a result legislation and appropriations had been secured in many states and cities for recreational purposes.

Special effort was made in 1921 for the passage of a Federal physical education bill; a continuation service, established in 1921, and continued in 1922 and 1923, proved itself of value by giving help and advice on recreation problems to many cities already having recreational systems. During 1923 the association aided approximately 200 communities by conducting summer playgrounds and municipal year-round systems through the service of its continuation field secretaries. It gave further service by helping to secure, in five States, home-rule bills giving cities power to establish year-round recreation systems. In 1924 the association compiled *21 Fundamentals in Community Recreation* and published in a manual the results of a summer camp study; in 1925 appeared its *Normal Course in Play*, useful to educational institutions in the training of recreation workers; and among the publications distributed in 1926 were the *Community Drama Handbook*, *Community Music Handbook*, *The Christmas Book*, and programmes for the celebration of holidays and special days.

In 1926 the association established the National Recreation School, which conducts a graduate course in professional recreation training. The outstanding publications of the association in 1927, in addition to its regular monthly publication, were, *A Nature Almanac*, and *88 Successful Play Activities*. During 1928 a full time worker was assigned, in coöperation with the U. S. Department of Agriculture, to help in the training of rural leaders for recreation. *A Manual of Municipal and County Parks*, begun in 1927, was issued during 1928; also *Play Areas—Their Design and Equipment*, and a game book, *Recreation Games and Programs*. The 1928 recreation congress, which was the fifteenth annual meeting of the association, was held at Atlantic City, N. J., in October. The officers for 1928 were: President, Joseph Lee; treasurer, Gustavus T. Kirby; and secretary, Howard S. Braucher. Headquarters of the association were at 315 Fourth Avenue, New York.

PLIEKSANS, JANIS. See RAINIS, JANIS.

PLOWING. See TRACTOR.

PLUMB PLAN. See INDUSTRIAL DEMOCRACY.

PLUMER, HERBERT CHARLES ONSLOW, FIRST VISCOUNT OF MESSINES AND OF BILTON (1857–). A British soldier. He entered the army in 1876 and served in the Sudan and in South Africa, where he commanded a corps of mounted rifles, and took part in the South African War (1899 to 1902), in the latter year being promoted to major general. He became lieutenant general in 1908 and was in charge of the Northern command from 1911 to 1914. In 1915 he was made commander of the 5th Army Corps in France and from 1915 to 1917, of the 2d Army. He was promoted as general in 1916. From November, 1917, to March, 1918, he commanded the Italian Expeditionary Force, returning in the latter year to France to resume his position at the head of the 2d Army, which he led until the close of the World War. He was credited with the defeat of the army under Prince Rupprecht of Bavaria. After being commander of the Army of the Rhine, in 1919 he was appointed Governor and Commander-in-Chief of Malta (resigned 1924), was made field marshal and created first Baron of Plumer. He was High Commissioner for Palestine (1925–28) and in 1929 was made a viscount. He received many decorations from Great Britain and foreign governments.

PLUNKETT, GEORGE NOBLE, COUNT (1851–). An Irish poet and writer on art and antiquities, who was born in Dublin and educated at Nice, Clongowes College, and Dublin University. He was director of the National Museum of Science and Art in Dublin (1907–16), was a member of Parliament from 1917–27, and served as Minister of Foreign Affairs and of Fine Arts in the Free State Government. Pope Leo XIII created him Count of Rome. His writings include many scattered poems, *Sandro Botticelli* (1900); *Pinelli* (1904); *Architecture of Dublin* (1908); *Arrows* (1921); and *Echoes* (1928). He edited *Hibernia*, a literary and artistic review (1882–83), and Stokes's *Early Christian Art in Ireland* (1911–15).

PLUNKETT, RT. HON. SIR HORACE (CURZON) (1854–). An Irish public official and writer (see Vol. XVIII). During the agitation in Ireland following the rebellion of 1916, he tried to bring about an understanding with the British government. In 1917–18 he was chairman of the Irish Convention which attempted to find a peaceful solution of the Irish Question. Always interested in the agricultural problem of Ireland, he created and endowed the Horace Plunkett Foundation, a trust for the promotion of agricultural development, in 1919. He was Senator of the Irish Free State (1922–23), and in 1923 visited the United States in the interests of his Government. During his absence, his home was burned by an Irish republican mob. He wrote *Tendencies of Modern Medicine* (1913); *A Better Way: An Appeal to Ulster not to Desert Ireland* (1914); *Home Rule and Conscription* (1918); and *Oxford and the Rural Problem* (Sidney Ball Memorial Lecture, 1920). Consult *Sir Horace Plunkett and His Place in the Irish Nation*, by Edward E. Lysaght.

PNEUMONIA. Ordinary seasonal pneumonia, which attacks the young and middle-aged, as well as the old, has been studied intensively in the Rockefeller Institute and it has been found that the fatal outcome is due largely to a specially deadly strain of the pneumococcus, while other strains have a considerably lower mortality or are more amenable to treatment. For the pneumonic complications of the pandemic of influenza, see INFLUENZA.

In May, 1924, Dr. L. D. Felton, working in a Harvard University laboratory under the auspices of the Metropolitan Life Insurance Company, announced the discovery of a serum, which had been freely tested in various types of pneumonia with an apparent reduction of mortality of from 25 to 50 per cent of those treated. Unlike various similar announcements made from time to time, this one had the indorsement of several conservative pathologists and health officers. It is of special significance because such a serum can be applied in any pneumonia without awaiting a bacteriological diagnosis.

One of the oldest drug remedies for pneumonia—quinine or its synthetic derivatives—still retains its position and Dr. John, a German physician, with other well-known practitioners, insists that it has all the force of a specific in pneumococcus cases, although they do not wait for a bacteriological test, at once administering quinine hypodermically. John claims that he does not require the usual heart stimulants for his patients under the quinine treatment. For the past few years, physicians in different parts of the world have claimed remarkable results for the diathermic high-frequency circuit in pneumonia cases, the method having originated with Dr. H. E. Stewart, of the U. S. Marine Hospital Service. Naturally, it can be carried out only by skilled hospital attendants.

POFFENBERGER, ALBERT THEODORE (1885–). An American psychologist, born at Dauphin, Pa., and educated at Bucknell and Columbia universities. He joined the faculty of Columbia as instructor in psychology in 1912 and became professor in that subject in 1927. He wrote *Experimental Psychology*, a laboratory manual (1916); *The Sense of Taste* (1917); *Applied Psychology* (1917, rev., 1923); *Psychology in Advertising* (1925); and *Applied Psychology—Its Principles and Methods* (1927).

POINCARÉ, pwăN′kȧ′rā′, RAYMOND (1860–). A French statesman (see VOL. XVIII). He was President of the French Republic from 1913 to 1920. In August, 1914, at the outbreak of the World War, President Poincaré, by a speech appealing to the patriotism of the French lawmakers, brought about the formation of a political *union sacrée* which maintained the Viviani cabinet in power for over a year, until accumulation of the country's misfortunes and discontent with the prosecution of the War defeated it, and Viviani gave place to Briand. Poincaré at all times urged vigorous prosecution of the War, and after the Armistice, he insisted that there should be no relaxation of the terms of the Treaty of Versailles for Germany. On his retirement from the Presidency in 1920, he was elected to the Senate, and in January, 1922, he formed another cabinet, taking the portfolio of Foreign Affairs. To insure the payment of reparations, he ordered the French military occupation of the Ruhr, Germany's most important industrial area, in 1923. After the fall of his ministry in June, 1924, he remained comparatively inactive until he again became Premier and Minister of Finance on July 23, 1926, when the franc was so low in value that national bankruptcy was threatened. With firmness and insight, he stabilized the currency and ably led the country to financial recovery. Weakened in health, he resigned on July 26, 1929, after securing ratification of the Mellon-Bérenger and Caillaux-Churchill debt agreements. His later writings include *Messages, discours, allocutions, lettres, et télégrammes* (3 vols., 1919-21); *Histoire politique* (4 vols., 1920–22); *La victoire et la paix* (1921); *Les origines de la guerre* (1921; trans. 1922); *Au service de la France, 1912–1921* (4 vols., 1926–27; 3 vols. trans. as *The Memoirs of Raymond Poincaré*, 1926–29); and *Paroles françaises* (1927).

POINDEXTER, MILES (1868–). An American legislator and diplomat (see VOL. XVIII). He served in the United States Senate from Washington from 1911 to 1923, but was defeated for reëlection in 1922. From 1923 to 1928, he was United States Minister to Peru.

POLAC′CO, GIORGIO (1875–). A distinguished Italian operatic conductor (see VOL. XVIII). In 1918 he became principal conductor of the Chicago Opera Company, and after its reorganization as the Chicago Civic Opera Company, in 1922, he also was made artistic director. In 1919 he married the dramatic soprano, Edith Mason, from whom he was divorced in 1929.

POLAND. A European republic erected by the Treaty of Versailles in 1919. Poland has an area of 149,958 square miles, the principal sections being Congress Poland (formerly Russian Poland), Posen, Pomerania, Galicia, Upper Silesia, and Vilna, and a population of 30,213,000 (Jan. 1, 1928), of which 65 per cent was engaged in agriculture, 14 per cent in mining, and the balance either in trade or other pursuits. As for religion, the population is preponderantly Roman Catholic, other religions being the Greek Catholic, Jewish, Russian Orthodox, and Protestant. The Polish language is spoken universally. The principal towns, with their populations in 1927, are: Warsaw, 1,028,982; Lodz, 578,069; Lemberg, 233,596; Crakow, 191,385; Poznan, 226,827; and Vilna, 200,000. Emigration in 1927 totaled 147,614, the principal countries of destination being Germany (68,779), Canada (22,031), Argentina (20,189), and France (16,211). In 1928 there were 26,642 elementary schools with 70,585 teachers and 3,379,967 pupils; 796 secondary schools with 14,808 teachers and 215,470 pupils; 204 colleges for teachers with 1931 teachers and 37,420 pupils; and 850 technical and professional schools with 110,000 pupils. The universities and institutions of university rank numbered 16 with 950 professors and 36,590 students in 1926.

Agriculture. In 1926 there were reported 45,239,000 acres of arable land, or 47 per cent of the total area. The principal crops, based on a five-year pre-war average from 1909 to 1913, and for 1922 and 1927, are shown in the table, on page 1266, with figures in thousands.

Poland is self-sufficient in major food products, and exports considerable quantities of grain, potatoes, sugar, alcohol, and eggs. There were many large land holdings in the country, but these are gradually being broken up into small farms through the agrarian reform law of July 6, 1920, limiting the size of estates, and through high taxation. The live-stock census for 1928 showed: horses, 4,128,000; cattle, 8,571,000; sheep, 1,917,000; hogs, 6,397,000. About 25 per cent of Polish territory is covered by forests, or 22,323,630 acres. The biggest and finest forests are in the eastern part of Poland. There is also the famous Bialowiez reservation, which covers about 600,000 acres. The Government itself owns several million acres of forest lands, with an approximate value of one-half billion dollars, which is more than the combined internal and external debt. There are also large forests in the Carpathian Mountains, in some districts covering more than half of the total area. The principal varieties of trees found are oak, ash, pine, spruce, and pitch pine.

	Sowing Area in hectares			Crops Metrics tons		
	1909–13 average	1922	1927	1909–13 average	1922	1927
Wheat	1,353	1,046	1,087	1,704	1,160	1,678
Rye	5,087	4,578	4,773	5,749	5,066	5,711
Bread grains	6,440	5,623	....	7,433	6,226	....
Barley	1,265	1,147	1,225	1,517	1,304	1,489
Oats	2,749	2,404	2,558	2,051	2,548	2,814
Potatoes	2,644	2,234	2,379	25,300	33,754	24,790
Sugar beets	178	109	199	4,828	2,671	4,113

Mining. Through the acquisition of Upper Silesia in 1922, Poland became the possessor of one of the richest mining sections of Europe and from an importer of coal became an exporter. The estimated reserve was put at 63,000,000,000 metric tons. Coal production for 1928 was estimated at 40,800,000 metric tons and the output for 1927 was 38,152,550 metric tons, including 78,464 tons of lignite, of which 10,919,000 metric tons were exported. Of iron ore, there is an estimated reserve of 300,000,000 tons of 27 to 32 per cent ore, located principally in Silesia. The output in 1928 totaled 690,000 metric tons and in 1927, 618,203 metric tons. There are also large areas of zinc and lead in Polish Silesia, the country ranking sixth in the world production of these minerals. The principal salt mines are located in Galicia and the reserves of this commodity are considered inexhaustible. Salt production totaled 396,000 metric tons in 1928 and 378,261 in 1927; potash, 343,200 metric tons in 1928 and 276,062 in 1927.

Industry. The section of Poland formerly belonging to Russia was one of the principal manufacturing sections of that empire. The principal industries in approximate order are textile, heavy iron and steel, petroleum refining, zinc, lumber, machinery, chemicals, sugar, glass, cement, leather, alcohol, paper, and starch. The city of Lodz is the centre of the textile industry, with an estimated annual capacity at normal operation of 80,347 tons of cotton yarn, 82,000 tons of wool yarn, 78,740 tons of cotton fabric, and 27,300 tons of wool fabrics. The metallurgical industry production for 1928 was: pig iron, 678,000 metric tons; steel, 1,437,600 metric tons; rolled materials, 1, 521,600 metric tons; zinc, 162,000 metric tons. Production for 1927 was: pig iron, 624,000 metric tons; steel works, 1,248,000 metric tons; rolling mills, 936,000 metric tons; zinc, 156,000 metric tons. Poland is one of the principal petroleum-producing countries of Europe, the oil-bearing land being located in the province of Galicia. The industry fell off considerably after the World War, refinery for 1923 being 603,190 tons. Total petroleum production for 1927 was 720,000 metric tons, and for 1928 742,800 metric tons, as compared with 1,114,000 tons in 1914. Reserves of petroleum are estimated at 200,000,000 tons.

Communications. Poland possesses a very well-developed railway system. Nearly all lines are state owned and operated. Total of standard trackage in Poland in 1929 was 16,726 miles. In 1928 there were 5333 locomotives, 11,685 passenger cars, 138,974 freight cars. Poland had a merchant marine of 21 vessels with a gross tonnage of 47,000 on Jan. 1, 1929, and was largely dependent for port facilities upon the Free City of Danzig, on the Vistula. The vessel tonnage entering Danzig in 1928 was 4,045,000; cleared, 4,027,000. In 1927–29 Poland was pushing the development of an all-Polish port at Gdynia, which had entrances of 985,000 tons in 1928 and clearances of 974,000 tons. The Polish port of Tezew was also being developed. One-half of the total area of Poland is located in the drainage basin of the Vistula River, which is one of the most important waterways in Europe. Rising in the Carpathian Mountains, in the extreme south of Poland, this river flows through the great Polish plain and into the Baltic Sea. Approximately 650 miles in length, the Vistula drains over 75,000 square miles of territory. With but two exceptions, the larger cities of Poland are situated on the Vistula River and its tributaries. River transportation, however, fell off considerably after 1919. The water-power resources of Poland are very great. It is estimated that 1,000,000 horse power could be developed. Sixty per cent of this is in the Province of Galicia. In 1928 Poland had 26,458 miles of telegraph line and 68,824 miles of telephone wire, with 210,255 instruments.

Finance. In 1927–28 state revenues and expenditures reached a record of $310,555,000 and $280,927,000, respectively, leaving a surplus of nearly $30,000,000. Receipts and disbursements exceeded by 39 and 26 per cent, respectively, the revised budgetary estimates for the year. The budget for 1928–29 provided for revenues of $283,669,000 and expenditures of $297,892,122. Actual receipts were $337,457,544 and actual expenditures $315,109,548 (figures for last 2 months of fiscal year subject to slight correction). The budget for 1929–30, as adopted by Parliament, carried a total of 2,954,967 zlotys of anticipated revenues, and 2,787,778,000 zlotys of proposed expenditures. The total public debt on July 31, 1928, was $460,533,090, of which $427,856,523 was external. On the same date, obligations due to the execution of the Protocol of Innsbruck totaled $36,485,873. The unit of currency is the zloty, established in June, 1924, with a par value of $0.1930, but revalorized on Oct. 13, 1927, at $0.1122. In the stabilization plan put into effect in 1927, provision was made for an American financial adviser.

Commerce. Statistics on Polish foreign trade, prior to 1922, were not available and, even though they were, would not form a correct basis of comparison for data from that date on, due to the acquisition of Upper Silesia in that year, with its pronounced effect on the foreign trade of the country. The outstanding feature of the Polish foreign trade of 1928 was the adverse balance of $95,838,322 as compared with a favorable balance of $78,659,000 in 1926. In 1927 the adverse balance was $42,707,000. The favorable balance in 1926 had been the result of drastic restriction of imports and reduced buying power on the one hand, and of exceptionally large exports of coal during the British coal stoppage on the other. The sharp adverse turn in 1927–28 was caused by the increase of imports, which more than doubled, while exports increased by only 11.7 per cent in 1927 and dropped slightly in 1928. The five leading imports in 1928 were: raw cotton ($36,538,266); machinery ($35,908,488); chemicals and allied products (34,262,962); metals and metal manufactures ($27,445,915); wheat ($23,201,838). Total imports in 1928 were valued at $377,234,800. The five leading exports were: wood and manufactures ($66,203,946); coal and coke ($40,282,605); metals and metal manufactures ($31,394,000); swine ($23,349,717); textiles ($16,757,631). Total exports in 1928 were valued at $281,396,478. In 1927 the United States supplied 12.9 per cent of the imports and purchased 0.8 per cent of the exports; Germany, 25.5 and 32; the United Kingdom, 9.4 and 12.2; Austria 6.5 and 11; and Czechoslovakia 5.8 and 10.1. Imports in 1928 were purchased principally from Germany, the United States, United Kingdom and Ireland, Austria, Czechoslovakia, and France in the order named. The heaviest purchasers of Polish products in 1928 were Germany, Austria, Czechoslovakia, and the United Kingdom and Ireland in the order named.

History. In Russian Poland, prior to the World War, there was a very marked division of sentiment. Following the ill-starred Polish revolutions in the middle of the nineteenth century, Russia had applied herself sedulously to the task of breaking the Polish national spirit. Use of the Russian language was required, the Roman Catholic Church was opposed, and more insidiously, the Government at St. Petersburg sought to divide the country by inciting the peasants to uprisings. The Polish peasants were emancipated in 1864 and given a share in local government; but the effect of these measures was reduced by the advance of industrialization, bringing with it a socialism strongly tinged with nationalism, which was much in evidence down to the War. By 1914 many Poles gravitated toward Austria, some toward Germany, and some toward Russia, while a large number still clung to nationalistic aspirations. In Galicia (Austrian Poland), the Austrian government sought to gain the adherence of the Poles through a policy of studied kindness, permitting them the use of their own tongue in schools and law courts and granting them wide political and educational privileges, but, at the same time, covertly encouraged the Nationalist agitation of the Ruthenian minority, whom the Poles—it is charged—oppressed. Galician Poles were thus divided, some favoring Russia and others Austria.

In Prussian Poland, the Poles had firmly intrenched themselves economically and many of them had become successful members of the middle class. The fire of Polish nationalism was kept burning for the most part by the Catholic clergy, and the educational institutions in the former Austrian provinces—chiefly by the Cracow University. Aided by money and power, they created a strong nationalistic sentiment, against which Bismarck's Germanization campaign, characterized by an attempt to suppress Polish culture and to settle German colonists on the land, operated in vain. In spite of official animosity, Poles under Austria maintained their economic preponderance and their nationalistic unity and were almost completely mobilized for political independence by 1914.

When the World War broke out, there was thus no common sentiment to hold the loyalty of all the Poles. One group gravitated toward Russia, hoping for autonomy under the Russian Crown; another, under Josef Pilsudski, looked to Austro-German aid for the erection of a republican Poland that could serve as a buffer state against the Russian advance. A Polish legion was formed and offered to Austria; but no definite pronouncement of policy occurred until November, 1916, when the Central Powers recognized the independence of the Russian Poland but accorded autonomy only to Galicia. In the ensuing years, however, Poland came completely under German domination, which crushed all opposition. The Austrian Poles were suppressed, Pilsudski was arrested, and the Polish legion used merely as an auxiliary for the German Army.

With Russia no longer a menace, Polish hopes could conveniently be ignored. Not until the close of the War did the hope of an independent Poland definitely materialize. In October, 1918, a really National Polish Diet met, and at the same time the Austrian Poles quit the Reichsrat to assemble at Cracow. Meanwhile, a Polish Army, recruited in the United States and other countries, had been fighting as a recognized national unit on the western front, while the Polish National Council at Paris kept the Polish aspirations before the Allied leaders.

From Nov. 14, 1918, on, Pilsudski, who had been released by German revolutionists, was invested with full powers of a dictator. His known radical sentiments for a time threatened to disrupt Polish unity, and, had it not been for his political astuteness, the problem of creating a Polish state might have been well-nigh insuperable; but the conservatives were won over by the appointment to the Premiership of M. Paderewski, the musician and composer, who stood high in the favor of the Allies as a result of his work with the Polish National Council. A Constituent Assembly was next provided for and this body met at Warsaw on Feb. 9, 1919. Something of the divergent loyalties in the new nation may be gauged from the political grouping. There were 91 National Democrats, 51 Polish Peasants, 19 Peasants' Unionists, 14 Socialists, 7 Workmen's Unionists, 8 Jews, 6 United Polish Peasants, 2 German Colonists. A Conservative bloc supported the Paderewski government.

The problems before the administration were complex enough to try the strongest minds. The marking out of the frontiers in accordance with the Peace of Versailles and to the satisfaction of the Polish nationalistic aspirations led to a whole series of minor struggles in which, at one time or another, Poland saw herself engaged with almost all her neighbors; while the erection of a constitution, the economic rehabilitation of the country, the problem of racial minorities, in particular the Jewish question, all brought in their wake domestic difficulties of the most serious import. These matters must all be considered in some detail.

The peace treaties, as brought back to Poland in 1919 by M. Paderewski, made the following provisions: on the west and north, the boundary followed fairly closely the ethnographic frontiers; the greater part of Posen and part of West Prussia were granted to Poland, while the disposition of Masuria and Upper Silesia was made to depend upon plebiscites. Danzig (see DANZIG) was made a Free City, though the "corridor" and the administration of the Vistula River were to be turned over to the Poles. In the south, by a supplementary treaty signed on Aug. 10, 1920, Poland received West Galicia, with a slightly readjusted southern frontier. Eastern (Ruthenian) Galicia was to be provisionally assigned to Poland for a term of years. On the east, no definite frontier was established by the treaties, owing to uncertainty regarding Russia's future status; but the Peace Conference merely recommended a tentative minimal eastern boundary, based largely on linguistic statistics, leaving details to be settled subsequently by Russia and Poland. Furthermore, the Peace Conference required Poland to sign a minority treaty, June 28, 1919, which provided for religious freedom; equal civil and political rights for all inhabitants regardless of race, language, or religion; and freedom of transit on Polish waterways and railways for Allied Powers.

The number of hostilities in connection with the peace settlement was really astounding. With Czechoslovakia, a dispute arose over the disposition of the border districts of Teschen, Zips, and Orava, and some fighting actually took place in January–February, 1919. The first, Teschen, occupied a peculiar importance, having rich coal and iron deposits, as well as an important railway running through the heart of the district. In the west, the population was Czech, in the east, Polish. The wrangling dragged on over a year until finally, by the intervention of the Council of Ambassadors in the middle of 1920, an agreement was reached whereby most of the coal mines and the railway were given to Czechoslovakia, while the city of Teschen was left in Polish territory. By the same decision, the other two districts were similarly divided, the greater proportion of each going to Czechoslovakia. With the Ruthenians in Galicia, feelings were so bitter that actual warfare broke out in 1919. The conflict was waged intermittently, attacks being sporadic and as a rule, on defenseless populations. The Jews of Lemberg, in particular, suffered. Not until April, 1920, did hostilities cease. By the agreement reached, Poland gained *de facto* possession of East Galicia.

It was the war with Russia, however, that occupied most of Polish attention and diverted consideration from the more pressing domestic problems. Incited, it is now generally admitted, by the French, but as much motivated by her own nationalist ambitions, Poland, early in 1920, after some fighting in the previous year, launched a large-scale offensive against Russia. Her aim was to establish the frontier of 1772, and having gained the Ukraine as an ally, the moment was deemed propitious for the realization of the Polish hopes. Allied preoccupation elsewhere, and the desire on the part of the French to use Poland in a "sanitary cordon" against Bolshevism, gave spur to the adventure. The Poles pressed forward for more than 300 miles, took Kiev in May, 1920, and threw their line south into the northwestern Ukraine. A Russian counteroffensive, however, soon swept the Poles back to Warsaw's gates (August, 1920). Only the severity of the terms proposed by the Russians prevented the closing of the war with a Russian victory. Confronted by a desperate situation, Poland turned at bay and, aided by French leadership and Allied munitions, once more resumed the attack. The Russians had pressed too far beyond the lines of their communications. By the end of August, the Russians were in retreat and General Pilsudski had reached the line held by the Germans in 1918 on the eve of Brest-Litovsk.

In the Peace of Riga, which followed on Oct. 12, 1920, the terms obtained by the Poles were surprisingly favorable. The eastern boundary was fixed far beyond the line recommended by the Peace Conference in 1919 and contained the cities of Pinsk, Kovel, and Rovno; an indemnity was to be paid Poland; the Galician line was recognized; Lithuania was to be cut off from Russia, by a narrow arm of Polish territory extending north as far as Latvia. The treaty brought to a head another difficulty in which Poland was involved. During 1920 there had been some fighting between Poles and Lithuanians over the disposition of Vilna and the Suwalki region southwest of Vilna. The evacuation of Vilna by the Bolsheviks during the course of their retreat east in August, and the terms of the Riga Treaty, intensified the struggle with the result that, on October 9, General Zeligowski appeared in the city with an irregular military force, and, though unauthorized by the Polish government, drove out the Lithuanians and claimed the section for Poland.

Settlement by means of a plebiscite under League supervision was proposed, then abandoned, by the League of Nations; but, thanks in part to pressure from the League, Zeligowski withdrew from Vilna and elections for the local Diet were held in the disputed district in January, 1922. The Diet immediately voted for union with Poland, in February, whereupon the Polish Parliament resolved (March 24) to annex Vilna, and the formal incorporation of the district into Poland occurred on April 18. The Allied Council of Ambassadors acquiesced in a *fait accompli*, and in March, 1923, fixed the northeastern frontiers of Poland in such a manner as to include Vilna, despite vehement Lithuanian protests. Thereafter, however, Poland and Lithuania continued to show bitter feelings over the division of a "neutral zone" which had been established between the two countries. (See LITHUANIA.) Danzig, too, was a seat of trouble. Not content with the treaty provisions made for the Free City, Poland continued to agitate for a greater Polish control and in November, 1920, Paderewski, before the League Council, sought the right to police the city with Polish military. This demand was occasioned by the unfriendly attitude toward Poles in Danzig, but more particularly by the fact that munitions for Poland, during the Russian War, had been held up by the port authorities. Not until Oct. 25, 1921, did Poland consent to sign an agreement with Danzig and accept the Allied terms. (See DANZIG.) Much more serious was the conflict with Germany over the division of Upper Silesia.

It is thus evident how stormy was the early career of Poland. The consideration of the new constitution necessarily languished and it was not until Mar. 17, 1921, that the document was finally completed. It provided for a bicameral Parliament (Seym), a responsible ministry, and the President, elected for seven years by the Parliament. Roman Catholicism was made the state religion, though all other faiths were given freedom of worship. Labor was officially recognized. State insurance against unemployment, illness, and accidents was promised. A section modeled after the German constitution provided for the erection of local economic organizations, to centre eventually in the Supreme Economic Chamber of the republic. The conduct of foreign affairs and the increasing economic instability were responsible for the frequent political crises.

Paderewski fell from power Dec. 7, 1919, and 1920 saw two different cabinets. Radical disorders in Warsaw and Galicia and the continual turbulence of the Socialist and Workmen's members in the Assembly added to the general uneasiness. In 1921, the war ministry of MM. Witos, Grabski, Skulski, and Daszynski resigned and was succeeded by a government headed by M. Ponikowski, which, in 1922, underwent a reconstruction. The new ministry, however, lasted only four months, for in June, 1922, it was overthrown, and after considerable wrangling between the Diet and the President, a new ministry was headed by M. Nowak. During this period, there had been no legislation of any constructive character. It was not until November, 1922, that elections were held for members of the national Diet. In the following month, both Houses assembled for the election. The domestic uncertainty was heightened by the complexion of the national Diet. The national parties of the right and the left had, in the election, succeeded in gaining an equal number of seats, 177 each, so that the balance of power was thrown to the minority parties, e.g., the Jewish, Ukrainian, German, and Russian, who controlled, in all, some 90 votes. These parties united with the left and forced the election of M. Gabryel Narutowicz as the first president of the republic to succeed the provisional president, General Pilsudski. M. Narutowicz, a brief 48 hours after he assumed office, was assassinated (December 16) by a demented painter. Demonstrations against the racial minorities, and the Jews in particular, indicated the popular excitement in the week preceding the assassination. On Dec. 20, 1923, M. Wojciechowski was selected to become the new president.

The racial problem, that of the Jew above all, was a serious one. Though Poland, in common with other Succession States, had signed a minorities treaty with the Allies, and in particular had guaranteed the Jews educational and religious liberties, the inability or refusal of the government, especially during 1918–20, to defend the Jews from attack aroused much apprehension. Charged with being German sympathizers and fraternizing with the Bolsheviks, but above all, held in contempt because of their alleged lack of Polish patriotism and their adherence to trade, the Jews were made the object of discrimination and disparagement in a manner quite incomprehensible to western Europeans and Americans. By a social, economic, and educational boycott, all things Jewish were declared taboo. Jewish officials were dismissed, shops blacklisted, and professional men, i.e., teachers, doctors, and lawyers, dropped from the universities, army, and administrative posts. The Poles charged that the Jews consistently refused to conform their customs and life to those of the Poles about them; that the Zionist movement fostered a growing separatism. The Jews contended that political representation in proportion to their numbers was denied them, for although they formed about one-seventh of the population, they had only 11 members in a national Assembly of 390. Again, they claimed, the perpetual discriminations in education, politics, and the professions prevented the Jew from rising above the petty mercantile class and taking up those other pursuits where he might come in contact with the general cultural ideas of the West. There were excesses during 1918–20, which did not cease completely even by 1924. Sir Stuart Samuel, on a mission to the country, ascertained that at least 348 Jews had lost their lives as the result of rioting and the depredations of the soldiery. Other outrages were innumerable. Mr. Morgenthau, heading an American mission, reported similarly.

Internal affairs in the midst of such a tumultuous political and economic scene also, naturally enough, were muddled. The country was four-fifths agrarian, settled by an uneducated and unskilled peasantry working on lands of which 40 per cent were owned by 18,000 proprieters. To create a class of small landowners (for which, already, there was an ambitious programme formulated in 1921), to teach them modern technique, and then to provide them with opportunities for reaching their markets by the development of means of communication, were the insistent problems which a depleted treasury and a continually falling currency could do nothing to alleviate. The cost of living steadily mounted to the accompaniment of the inevitable strikes and lockouts. In July, 1923, about 70,000 textile workers were out in Lodz alone; 90 per cent of the men in the engineering trades of Warsaw were idle at the same time; there were building strikes in Posen and Lublin and labor disturbances in almost all the industrial centres. Cabinets continued to follow each other in rapid succession. During 1923, M. Witos, of the Peasant Party, headed a government for a time but before the end of the year he was defeated and surrendered his place to M. Grabski. The drift was steadily toward the right. It became evident in 1924 that the real problem before Poland was fiscal reform and a balanced budget.

In the field of foreign relations, Poland indicated a desire to come to an amicable understanding with most of her neighbors. On Mar. 3, 1921, a treaty was signed at Bucharest providing for an offensive-defensive Polish-Rumanian alliance and conversations for the further strengthening of this union were carried on in June, 1923. As a result of the settlement of the Upper Silesia question, measures were taken in 1921 for the restoration of friendly relations with Germany. On Nov. 7, 1921, a treaty with Czechoslovakia was signed at Prague by which each nation guaranteed the other a benevolent neutrality in the case of attack, as well as the recognition of each other's rights in Slovakia and Galicia. For the development of trade and transport with Russia, commissions were appointed, while the export of agricultural implements to Russia and the Ukraine was encouraged. In accordance with this spirit, on Sept. 2, 1923, a note was delivered at Moscow declaring Poland's readiness to recognize the Soviet Federation upon the acceptance by all of its constituent parts, of the terms of the Riga Treaty.

Improvement in the relations with Danzig were marked after the agreement of 1921. On Mar. 17, 1922, Poland signed with Finland, Estonia, and Latvia an agreement for the establishment of an enduring peace, while later in the year representatives of the Baltic States met with Russian commissioners for the purpose of effecting a general disarmament in the region. By the end of October, the boundary between Poland and the Ukraine had been definitively fixed by a mixed commission. As far as general international affairs were concerned, however, Polish policy seemed to be all in the interest of France. The French attitude toward Poland had been persistently friendly, so that by ties of gratitude Poland was united to her western ally. During 1916–19, the French had encouraged the organization of the Polish Legion and had championed Polish aspirations at the Peace Conference, going so far as to favor Polish claims to all Upper Silesia and both banks of the lower Vistula, and Danzig. In 1920, too, France had come to the aid of Poland in the Russian War and in the next year both had signed a defensive alliance. A general political alliance, pledging economic and diplomatic coöperation, and promising concerted action in case of unprovoked attack, was signed by France and Poland on Feb. 19, 1921. The alliance was supplemented by a commercial convention (Feb. 6, 1922) providing for reciprocal tariff concessions, by a loan agreement (1923) extending to Poland a French advance of 400,000,000 francs to be expended mainly for strategic railways and other military purposes, and by other commercial and military agreements. Under the friendly protection of France, and in close concert with the Little Entente to the south and the Baltic nations to the north, Poland had become the cornerstone of the barrier between Bolshevist Russia and vengeful central Europe. It was a position of strategic importance and prestige, but likewise of potential peril.

As the turbulent first years of the restored nation receded, Poland attempted to set her house in order by effecting a number of internal adjustments. On July 9, 1024, Parliament passed a law designed to conciliate the radical minorities. It permitted the use in schools, in courts, and before administrative authorities of the languages of the Ukrainians, the White Russians, the Ruthenians, and the Lithuanians, but not the Yiddish language. In June, 1925, an agreement was reached between the Government and representatives of the Jews intended to lessen the antagonism between the Jews and the anti-Semitic elements, and the attitude unfavorable to Poland taken by Jews in foreign countries, including the United States. The agreement included concessions to the Jews, reduction of certain taxes on small businesses which were exclusively in the hands of the Jews, permission to shops to open for a limited time on Sundays, etc. The Jews on their part agreed to cease general opposition to the Government and acquaint those in other lands who would be interested with the conciliatory moves on the part of the Government. In September, 1925, a mission was sent to Warsaw by the Ecumenical Patriarch of the Orthodox Church to proclaim the autocephalous status of the Church in Poland which had been declared by the Holy Synod in 1921.

On Dec. 28, 1925, Parliament finally passed on a long-debated measure providing for the compulsory distribution, on a limited scale, of large holdings of land. It represented a compromise between the conservatives and the extremists who urged the seizure of the large estates without compensation, providing for the transfer of 200,000 hectares annually for ten years. Payment was to be made partly in cash and partly in bonds. Large estates, however, were to be broken up only to the extent that land sales by peasants in a given year fell short of the figure named.

More momentous than all these measures, however, was the nation's struggle to emerge from the period of post-war inflation and set its finances on a sound basis. Recognizing the necessity for such action, the political parties declared a truce at the close of 1923 and placed the government in the hands of a coalition cabinet, headed by M. Grabski, Premier and Finance Minister. On the following January 3, Parliament granted him emergency powers with respect to finances. He attempted, through a series of vigorous measures, to arrest the rapid decline of the mark and lay a foundation for sound fiscal operation. Drastic economies were instituted in government expenditures. Efforts were made to put the state railways, which had been a heavy drain on the Treasury, on a self-supporting basis. Payment of certain property taxes was advanced two months and new taxes were laid. With the resulting funds and the proceeds from domestic gold loans, the Premier was enabled to halt the printing presses from turning out fresh issues of paper so rapidly. His whole scheme looked toward the stabilization of the finances. He soon announced a new currency having a gold-exchange basis, with the "zloty," equal in value to the gold franc, as the unit. It was put into effect on May 1. The National Loan Bank was abolished and on April 28 the National Bank of Poland as the sole bank of issue began operations.

The purpose of this programme was to make possible the balancing of national expenditure and revenue and to give the country, for the first time since its restoration, a sense of financial health; but the remedial measures proposed and partially put into effect (particularly the wiping out of the national debts) were so severe that for a while the people paid heavily. On the whole, this financial reform was not a success and, when Grabski left the ministry, Poland was on the verge of bankruptcy. Most of the items in his reform programme had been undertaken against the advice of the British financial adviser, as well as Polish economists. The failure of the programme indirectly led to the Pilsudski coup. In 1924 and 1925, the large currency reduction and sharp limitations on credit slowed down production to the point where distress became acute. There was much unemployment. Exports fell off and the maintenance of the exchange rate became very difficult. The harvest of 1924 was bad, foodstuffs had to be imported, and prices materially increased.

In November, 1924, Poland funded her war-relief debt with the United States and in December, her debt with Great Britain, and in February, 1925, floated a loan of $35,000,000 in the United States. While these acts helped to restore a feeling of confidence, the terms of the financial settlements and of the loan brought sharp criticism. Through 1925 the conditions of economic distress persisted, and gradually the Government's financial position was weakened. While the Bank of Poland kept rigidly to its policy of currency restriction, the pressing demands for currency brought about a mounting issue by the Government of unsecured notes and small coins whose total presently exceeded that of the bank's note issue itself. The value of the zloty could not be maintained and it fell to about one-half its nominal value. The economic distress brought in its wake the natural political consequences. In November, 1925, the Grabski ministry resigned and was succeeded by a coalition cabinet formed by Count Skrzynski. The new ministry stopped the issue of government notes and reduced the military and civil establishments, and the resulting financial improvement was reflected in a temporary rise of the zloty; but internal dissension continued, and dissatisfaction was increased by nervousness over the state of foreign relations. At the close of April, the Socialists withdrew their support from the government and the ministry was forced to resign. On May 10, the peasant leader, Witos, formed a government.

At this juncture, Marshal Pilsudski intervened. Living in retirement near Warsaw, he had found popular sentiment turning more and more to him as the one national figure capable of leading the nation out of its maze of difficulties. The situation was brought to a head by a dispute over the position of Pilsudski himself. Slated for the office of inspector general of the army, he insisted that the post be kept quite free from Parliamentary control; but the Government, strongly supported by the Right, proposed to make it thoroughly subservient to Parliament. On May 12, Pilsudski placed himself at the head of a body of troops loyal to him and entered Warsaw. During nearly two days of street fighting, the Government resisted, branding Pilsudski as a rebel, but a general strike prevented them from bringing up reinforcements and Pilsudski was soon master of the situation. The Witos cabinet and the President of the Republic resigned. Rataj, Marshal of the Parliament, became acting President. On May 31, the two Chambers of Parliament elected Pilsudski President by a large majority, but he refused the office, which then went to one of his supporters, Professor I. Mosicki. In the middle of June, Pilsudski became commander-in-chief of the army, with powers quite independent of Parliament or the cabinet. Although he was admittedly dictator, he refrained from assuming absolute power, and the opposition to him in Parliament continued strongly in evidence. It was sufficient in October to cause the resignation of the Bartel ministry, which had been placed in office following the coup in May. Pilsudski himself thereupon assumed the Premiership.

In the meantime, constitutional changes had been effected, the most significant of which gave the President power to issue decrees with the force of law when Parliament was not in session. The Government made use of this power to bring the national finances back to a sound position, as they had been drifting again toward inflation. It reaffirmed the invitation extended by the Skrzynski government to a commission headed by the American expert, Prof. E. W. Kemmerer, to make a thorough study of Polish finances, and the commission's chief recommendations were adopted. The British coal strike in 1926, bringing a foreign demand for Polish coal, and the harvesting of good crops materially helped, and the Government was able to stablize the zloty unofficially at about nine to the dollar, and to balance the budget. During 1926 the economic situation continued to improve and in October, aided by a loan of $70,000,000 obtained through American bankers and floated in New York, London, and other cities, the Government was able to stabilize the currency permanently. The value of the zloty was fixed at 8.9 to the dollar. A new currency system with gold, silver, and bronze coins was introduced. An American economist and financier, Charles S. Dewey, was appointed financial adviser to the Government with another American, Dr. E. Dana Durand, also an economist and statistician, as assistant. The finances of the country, following these moves, were soon in excellent shape.

While these internal readjustments were in progress, the foreign relations of Poland on the whole showed continued improvement, although they were marked by many disagreements which brought severe strains. Early in 1925, a brush occurred with the Free City of Danzig when Polish representatives set up a number of Polish letter-boxes in the city. The ensuing dispute was referred to the League of Nations and was settled by a decision of The Hague Court on May 16, favoring the Polish contention. A change in the Danzig administration in the summer brought much better feeling between the city and Poland.

With her other neighbors, except Germany and Lithuania and on one occasion Russia, Poland's relations were characterized by a friendship of increasing cordiality. In February, 1925, a concordat was signed with the Holy See. On July 13, the Polish Parliament ratified the arbitration convention signed by the four states, Poland, Latvia, Finland, and Estonia. Arbitration treaties were likewise signed with Czechoslovakia and Austria, a treaty of friendship was concluded with Jugoslavia, the alliance with Rumania was renewed, and commercial conventions arranged with a number of countries. With the United States, a *modus vivendi* existed. Negotiations for a treaty were pending in 1929.

With Germany, however, a state of latent friction over the western frontier of Poland kept a continual tension in diplomatic relations. Efforts by the Powers in 1925 to come to an agreement by which existing boundaries would be guaranteed were heartily seconded by Poland, but public opinion was aroused by German insistence on making an exception of the Polish-German frontier and the evident intention to seek a realignment of it. In the interest of security, Poland gave full support to the Geneva Protocol and later accepted the Locarno treaties although they aroused considerable criticism. The strain in German-Polish relations was not helped when, on June 15, 1925, a tariff war followed the failure to negotiate a commercial treaty and when friction also resulted over an exchange of nationals prescribed by the peace treaty.

When the question of the admission of Germany to the League Council came up in the spring of 1926, Poland, influenced by France, insisted also on having a permanent seat, but was finally induced to accept a three-year membership on the Council with privilege of reëlection. The coolness remained through 1926, but late in the following year an attempt was made to reach a commercial agreement which would end the tariff war, and several unfruitful conferences were held. The opposition of German agrarian interests to the importation of Polish products, however, blocked all attempts to conclude a treaty. Although efforts were renewed in 1928, the same factor prevented their success.

Still more serious was the hostility between Poland and Lithuania, an aftermath of the Vilna dispute. Refusing to acknowledge the award of Vilna to Poland, Lithuania maintained the attitude of being in an actual, though inactive, state of war with Poland. A conference in October, 1925, failed to achieve an understanding, and during the following two years the situation remained unchanged; but in December, 1927, Premier Valdemaras of Lithuania met with Marshal Pilsudski at the meeting of the Council of the League of Nations and agreed to end the "state of war" and work for a better understanding between the two countries. During 1928 several attempts were made to come to a definite agreement, but a conference in May and another in November broke up without results. Between Russia and Poland, the events of 1925 in Europe, particularly the Locarno treaties, induced a more friendly feeling, strengthened by the visit to Warsaw of the Soviet Foreign Minister Tchicherin in September. It did not, however, flower into a formal written undertaking. In 1927, the murder at Warsaw of the Soviet Minister to Poland, Peter Voikov, by a young Russian, led to the exchange of a number of acrimonious notes, but the incident was closed following the conviction and sentencing of the assassin. It had interrupted negotiations for a treaty of commerce and friendship which were later resumed. A Polish delegation visited Moscow in January, 1928. In February, a railway treaty between the two countries was signed at Vilna. At the close of 1928, Poland agreed to the Russian proposal for the signing of a protocol to the Kellogg-Briand Treaty, along with other countries of central Europe, by which the pact was to come into immediate effect as between those countries.

Up to midsummer, 1929, the Pilsudski dictatorship had shown no signs of weakening. In March, 1928, Parliamentary elections apparently returned a majority favorable to Pilsudski. When that body elected a speaker, however, his candidate was defeated by a Socialist. In May, a serious illness forced Pilsudski to retire temporarily, and the opposition gained the upper hand in Parliament. He returned to the helm in June, prorogued Parliament, accepted the resignation of most of his cabinet, and then himself resigned the Premiership, taking the position of Minister of War. M. Bartel once more became Premier, although there was no doubt that he was merely the dictator's agent and that the full power of the dictatorship remained. The opposition to Parliament which had marked Pilsudski's policy from the beginning increased. His former adherents, the Socialists, turned against him, and joined the opposition. In the summer of 1928, he attacked that body in a newspaper article of extraordinary violence. In January, 1929, as an expression of his dislike, he refused to attend the hearings on the budget and later severely criticized the budget adopted.

It was understood that this antagonism was to find full expression in the governmental reorganization provided by the long-awaited new constitution. The draft of this constitution, framed under Pilsudski's direction, appeared on Feb. 21, 1929, and fully confirmed these expectations. The chief feature of the new instrument was the transfer of power from the legislative to the executive. The President, who would be chosen by popular vote for a seven-year term, would have sole power to conclude treaties, possess the veto power over legislation, appoint ministers (responsible only to him, the President), and open and dissolve Parliament.

In the spring of 1929, a cabinet reorganization was made necessary by the resignation of Finance Minister Czechowicz, who had been impeached by Parliament on the charge of making large expenditures in excess of the budget without the approval of Parliament. Pilsudski assumed full responsibility for the act and the trial was brought to an inconclusive close. This was on March 8. On April 3, Premier Bartel resigned and there were changes in other posts. On April 14, Major Casimir Switalski, a Pilsudski adherent, became Premier, presiding over a cabinet made up of close followers of the dictator. With full control of the government and apparently with the support of the people, Pilsudski's position in the summer of 1929 appeared stronger than at any time since the *coup d'etat.* See DANZIG; LITHUANIA; SILESIA, UPPER; VILNA; GALICIA, EAST; UKRAINE; WORLD WAR, *Eastern Front.*

POLAR RESEARCH. The polar regions are becoming increasingly familiar to the world and the last 15 years have seen the unexplored part of the Arctic Sea substantially diminished. The more obvious, superficial surveys which the airplane and the airship make possible have in most cases been followed by careful and detailed studies.

Arctic. The Canadian Arctic Expedition, 1913–18, was divided into two parties, the northern under Stefansson and the southern under Anderson. Stefansson's plans were disarranged by the loss of his ship, the *Karluk.* Continuing his explorations under difficulties, Stefansson traced the continental shelf of the Arctic Ocean from Melville Island, northeast to 80° 7′ North Latitude, 94° 54′ West Longitude, discovered Meighen Island and mapped parts of Ellef Ringnes and Amund Ringnes lands and Lougheed Island. He made extensive sledge journeys on the ice north of Alaska; later his assistant Storkerson attained by sledge approximately 74° North Latitude, 150° West Longitude. During these expeditions, Stefansson made it a point to live off the country so far as possible and was generally successful. The southern division under Anderson did less spectacular work but made a thorough biological and physical study of the northern coast of the Northwest Territories. The official reports form a valuable contribution to science as they treat of the fauna, flora, ethnology, etc. of the Canadian Arctic.

On his 1913–17 expedition, MacMillan penetrated into the unknown regions northwest of Grant Land to the alleged site of Crocker Land, reported as a discovery by Peary, and proved its nonexistence. His second voyage, 1921–22, was to Baffin Island where he mapped a coast line, explored the interior, and made collections of its fauna and flora. The MacMillan Expedition of 1923–24 included work on the glaciers of the Kane Sea regions. He erected at Cape Sabine the tablet of the National Geographic Society marking the final work of the Greely Expedition which represented the United States in its first scientific coöperation with other nations—the International Circumpolar Stations, 1881–84.

The Fifth Thule Expedition of Rasmussen, 1921–24, engaged in a biological, anthropological, archæological, ethnological, and folklore survey of the Eskimo tribes living on the Arctic edge of North America. Amundsen had originally planned to drift the *Maud* across the Arctic Ocean starting from Bering Strait. Forced to winter, owing to ice conditions, at Aion Island, Siberia, in 1919–20 he discovered new islands and made collections of fauna and flora and studied the native Chukchees. Two dispatch bearers perished en route to Norway. Renewed efforts the next year damaged the ship so that Amunsden was forced to return.

Russians pursued explorations along the Siberian coasts with a view to establishing regular summer sea traffic, but the results were unsatisfactory. Vilkitski in 1915 completed the Northeast Passage from east to west. It was learned that the missing Russian Polar Expeditions of Russanoff and of Brusiloff perished east of Franz Josef Land.

Since 1924 polar discovery has been characterized primarily by the use of aërial transportation as a medium of exploration. The International Society for the Exploration of the Arctic Regions by Means of the Airship was organized in 1926. With members from twenty nations, the value of this Society as a coördinator of polar research is very evident. The programme of the Aëroarctic, as the Society is popularly termed, includes the publication of the Quarterly, *Arktis*, which was commenced in 1928; the establishment of scientific observatories in the Arctic; and extended exploration with the *Graf Zeppelin* in 1930 under the leadership of Fridtjof Nansen. In 1925 MacMillan led an expedition to Etah, Greenland, under the auspices of the National Geographic Society and the U. S. Navy Department. The chief interest centred in a naval unit of three planes and nine men under Commander Byrd. Because of adverse conditions, flying operations were limited to 15 days. Explorations of the Arctic Sea proved impossible because of the difficulty of establishing supply bases and although a number of flights were made, they served principally to familiarize the aviators with arctic flying.

On May 21, 1925, Amundsen with two men in the *N–25* and Ellsworth with two companies in the *N–24* started from Kings Bay, Svalbard, for the North Pole. Forced down within 136 miles of the Pole by a westerly drift which cost them the fuel necessary to make their goal, the two groups devoted their energies to getting the *N–25* into the air. After many failures, this was accomplished on June 15 and the entire party reached the coast of Spitzbergen where they were picked up by a sealer.

Commanded by O. Wisting, Amundsen's whaler *Maud* entered the Arctic Ocean at Bering Strait in August, 1922, drifted for two years along the northern coast of Eastern Siberia and returned to Nome, Alaska, on Aug. 22, 1925. Although the ship failed to traverse a new region, the scientific work under Sverdrup was of significance along magnetic, meteorological and oceanographical lines.

The year 1926 saw a renewal of aërial flights in the Arctic. Establishing his base at Kings Bay, Svalbard, Commander Byrd, with Bennett as pilot, on May 9 flew a Fokker plane to the North Pole and returned to his base in 15½ hours. No new land was seen over the 9000 square miles of hitherto untraversed territory.

On May 13, 1926, the Amundsen-Ellsworth-Nobile Transpolar Expedition completed a 71-hour flight in the dirigible *Norge* from Kings Bay, Svalbard, across the North Pole to Teller, Alaska. Radio communication was maintained until 87° North Latitude after passing the Pole. This 2700 mile flight eliminated a large area from the unknown, but to the north of Alaska where land is more probable, visibility was poor. Adverse weather conditions over Alaska confused navigation and forced the landing at Teller.

In 1926 the Cambridge Expedition to East Greenland, under Wordie, explored the coast from Scoresby Sound to Sabine Island where pendulum observations were made. High mountains were discovered in the vicinity of Petermann Peak. Basing his expedition on the maps by the Cambridge Expedition, Lauge Koch made two geological reconnaissance expeditions along the East Greenland coast during the winter and spring of 1926–27. MacMillan visited Greenland, Baffin Island and Labrador in 1926 to make collections for the Field Museum. George Palmer Putnam in the *Morrissey* reached Etah on a collecting expedition for the American Museum of Natural History. Putnam again went north in 1927 when, on visiting southwestern Baffin Island, his surveys eliminated some 5000 square miles from earlier maps of Foxe Land.

Desirious of searching for new land, of studying the feasibility of establishing meterological stations in the Far North, and of proving the efficiency of the airplane in high latitudes, Captain Sir Hubert Wilkins in 1926 frequently crossed the Endicott Mountains on flights between Fairbanks and Barrow, Alaska, and made one reconnaissance flight of 150 miles over the Arctic Sea. On March 29, 1927, with Eielson as pilot, he flew from Point Barrow to Latitude 77° 45′ North, 175° West Longitude, where a sounding was taken which revealed a depth of 5440 meters (17,847.7 feet). The gas supply failed before land was regained and the aviators walked and drifted for over 250 miles before reaching land. On April 15, 1928, traveling a previously plotted course to the north of the Canadian Arctic Archipelago, Wilkins accomplished a 21½-hour flight from Point Barrow to Dead Man's Island, Svalbard. Good visibility during this remarkable flight enabled him to reduce considerably the extent of unexplored area between North America and the North Pole. Kings Bay, Svalbard, served as the base for the dirigible, *Italia*, which made three polar flights in May, 1928, under the command of General Nobile. The first trip, to Franz Josef Land, was curtailed because of fog; the second was over the vicinity of Northern Land; on the third flight, which reached the North Pole, the *Italia* was wrecked near Northeast Land. Two weeks later, communication was established between the *Citta di Milano*, base ship of the expedition, and the occupants of the main gondola which had been torn from the bag when the airship first crashed. Many rescue expeditions were organized and on July 12 the Soviet icebreaker, *Krassin*, reached the marooned men. Previously, Nobile was rescued by the aviator, Lundborg, and Dr. Malmgren lost his life in an atempt to reach land with two Italian companions who were later taken aboard the *Krassin*. In all, eight of the crew were lost and Captain Roald Amundsen and five others disappeared while flying to the rescue of the Italians.

In 1929 a Soviet expedition made a voyage to Franz Josef Land on the ice-breaker, *Sedov*, and the Soviet flag was raised over this territory on July 29. The exploring expedition was headed by Otto Schmidt, and Professors Vize and

Samoilovich who headed the expedition on the *Malygin* and the *Krassin*, sent to rescue the members of the *Italia* in 1928, were members of the party.

During 1928 MacMillan collected natural history specimens for the Field Museum in northern Labrador. The Third University of Michigan Expedition to Greenland under Professor Hobbs completed a year's study of meteorological conditions and their relations to the problem of world weather. At Angmassalik, the Rumanian Greenland Expedition under Dumbrava made observations similar to those of the Hobbs Expedition. The Oxford University Expedition to Greenland of 1928 continued its biological studies under Dr Longstaff.

In the Siberian Arctic, numerous expeditions under the Soviet Academy of Sciences have studied the ethnology and natural resources of the area. A colony was established on Wrangell Island in 1926. Efforts to reach the island in 1928 were unavailing due to ice conditions. In July, 1929, the Soviet ice-breaker *Litke* left Japan for Wrangell Island with a party of scientists and explorers who were to remain there for several years.

Antarctic. The World War and the necessity of first trying airplanes in the more accessible and milder Arctic were causes for the lack of expeditions in the Antarctic during this period. Bold in plan and adventurous in execution was Shackleton's attempt to cross the continent of Antarctica from the *Endurance* in Weddell Sea to the *Aurora* in Ross Sea. In the *Endurance*, he penetrated Weddell Sea to 77° south latitude, 35° west longitude and, skirting the shores of the southern continent, added 200 miles of new (Caird) coast. No landing could be made and the ship, beset in ice and drifting with the main pack, was eventually crushed. After the sea-floe drifting north melted, the crew reached Elephant Island by boat from which isolated land they were finally rescued after four dangerous voyages by Shackleton. In 1917 this indomitable explorer rescued seven men of the *Aurora* marooned in Ross Sea where three had died in the meantime. On a subsequent antarctic voyage in the *Quest*, Shackleton died and was buried at South Georgia, 1922; the *Quest* reached, however, new positions in the Antarctic Ocean. Cope's Expedition 1920–23 wintered on the most southwesterly point reached on Graham Land, and there made extended physical observations. Its members, however, failed to cross Graham Land and explore the west shores of Weddell Sea.

Hoping to ward off depletion of the South Atlantic whaling grounds and effect a conservation of this very lucrative business, the British government in 1926 and 1927 equipped two ships, the *Discovery* and the *William Scoresby* and subsidized a systematic investigation of whales and their food. This was carried on at the whaling stations and in the surrounding waters of the Falklands and South Georgia.

Norwegian whalers, who are particularly active in the Antarctic, have accomplished considerable exploration in these waters. In 1926 the *Odd I* relocated Peter I Island, last reported in 1910. In 1927 a Norwegian group landed and took possession of Bouvet Island. The identity and exact location of this island have been geographical problems for many years—several islands having been reported from the neighborhood but proving elusive on further investigation. Great Britain has acknowledged the claim of Norway to this island. During the winter of 1928–29, the Byrd Antarctic Expedition established in the Bay of Whales, Ross Sea, a base for extended exploration of the Antarctic Continent. This large and well-equipped expedition left the United States in the fall of 1928 in three ships. Before him, Commander Byrd has the largest extent of unexplored land in the world, the possibility of conquering the South Pole by air and the opportunity of making valuable contributions to our knowledge of Antarctica. The 1928 Antarctic Expedition of Captain Sir Hubert Wilkins consisted of himself and three companions. Headquarters were established at the whaling station in the enclosed harbor of Deception Island where a perilous runway for the planes was prepared. On Dec. 19, 1928, Wilkins flew south through Graham Land and made the significant discovery that this peninsula is separated from the Antarctic Continent by a number of ice-filled depressions. Many new topographic features were noted and named.

POLÂSEK, Albin (1879–). An American sculptor and teacher, born at Frenstat, Moravia, who studied art at the Pennsylvania Academy of Fine Arts and the American Academy in Rome and in 1910 was awarded the Prix de Rome. After 1916 he was head of the department of sculpture at the Art Institute of Chicago. His sculptures have been exhibited at Rome, Paris, New York, Philadelphia, and Chicago and are on permanent exhibition at the Pennsylvania Academy of Fine Arts, the Metropolitan Museum of New York City, the Art Institute of Chicago, and the Detroit Museum. They include the bust of Pierpont Morgan at the Metropolitan Museum, a portrait of F. D. Millet at the Pennsylvania Academy of Fine Arts, "The Sower," at the Chicago Art Institute, "Aspiration," at the Detroit Institute of Art, and "Bubble," at the Milwaukee Art Institute.

POLICE POWER. See Law, Progress of the.

POLING, Daniel Alfred (1884–). An American clergyman, who was born at Portland, Oreg., and graduated at Dallas (Oreg.) College. He pursued post-graduate studies at Lafayette (Oreg.) Seminary and at Ohio State University. In 1912 he was the Prohibition Party candidate for Governor of Ohio. He was a leader in temperance campaigns and active in federated church movements. During 1923–29 he was pastor of the Marble Collegiate Reformed Church in New York City. He resigned in the latter year to devote his entire time to his work for youth. He is president of the International Society of Christian Endeavor and editor of the *Christian Herald.* In 1929 he was elected president of the Session of the General Synod of the Reformed Church in America. He wrote *Mothers of Men* (1914); *Huts in Hell* (1918); *Learn to Live* (1923); *What Men Need Most* (1923); *An Adventure in Evangelism* (1925); *The Furnace* (1925); *John of Oregon* (1926); *Radio Talks* (1926–27); and *The Heretic* (1928).

POLISH LITERATURE. With the reunion of the divided portions of Poland and the reorganization of the Polish Republic, a new epoch in literature opened and, as if to stress this fact, there came a series of deaths which removed nearly all the well-known authors. Henryk Sienkiewicz, accepted by the world as the pre-war representative of Poland, died in 1916. Wladyslaw (Ladislas) Reymont, who received the Nobel Prize for literature in 1924 for his novel, *The Peasants*, died in 1925; Stefan Zeromski, his great rival and the author of several historical novels, as *Ashes* and *The Wind from the Sea*, died a few months later. Jan Kasprowicz, the Polish Wordsworth, died in 1926; and Stanislaw Przybyszewski, known for his psychological novels, passed away in 1927.

With this heavy necrology, Polish literature passed into a post-war existence, but this existence itself stresses those qualities of daring and of adventure that have always marked Polish painting. Thus, we have many volumes of what may be called semi-fiction, dealing with the almost incredible experiences of Poles on the Eastern front, in Siberia, and elsewhere. Perhaps we should group here the writings of Ferdinand Ossendowski, *Beasts, Men and Gods*, and *The Horse on the Hill*, by Eugeniusz Malaczewski, who was killed during the War. There is also *The Blaze*, by Mme. Kossak-Szczucka. Other names in this group are Ferdinand Goetel and Waclaw Sieroszewski. In all these works, there is a union of adventure and of action with an almost mystical appreciation of the peaceful mission of Poland. Jozef Wejssenhof and Andrzej Strug are other notable novelists, and the tradition of Reymont is continued by Orkan, who writes of village life in the Tatra.

In poetry, the leading writer is undoubtedly Leopold Staff, but his achievments do not measure up to those of the preceding generation. Jozef Tuwim is another author of the same Warsaw group of internationalists who are striving to express in their works emotions and themes which are common to all mankind. Opposed to them is the Czartak group from the Tatra Mountains, the members of which stress the rich lore of the Polish soil. In this group, Zegadowicz is the most prominent name.

Other forms of literature, as the employment of psychoanalysis, etc., also are practiced, but it is easy to see that we are dealing with the nucleus of a literature and not with its definite flowering. The sudden restoration of national life, the sudden change of the problems before the literary world, and the loss of the modern masters have created a confusion which will be satisfactorily resolved in a few years, when the young men and women who have been trained in a free Poland will hold the literature in their own hands and will have created something which is fully in accord with modern conditions.

POLISH NATIONAL COUNCIL. See POLAND.

POLITICAL AND SOCIAL SCIENCE, AMERICAN ACADEMY OF. A learned society founded in 1889 for the study of political and social science, including industrial and economic topics. Its bimonthly official publication, *The Annals*, is devoted to the discussion of a particular subject of political, economic, or social importance. Among the subjects treated in 1915 were industrial opportunity, America's interests as affected by the War in Europe, and public budgets; in 1916, preparedness and America's international programme, and new possibilities in education. In the following year, *The Annals* contained articles on the purposes and ideals of the Mexican Revolution, modern insurance problems, and the stabilization of industrial employment, and in May a supplement was issued, dealing with the Mexican constitution and the relation of the United States to international affairs. Some of the issues in 1918 were devoted to the discussion of the mobilization of American resources for war and relief work, rehabilitation, and labor. In 1919 international economics and the railroad problem were discussed; in 1920 the new American thrift, bonds and the bond market; revival of American business, and child welfare; in 1922 the Federal Reserve System, Russia, western Europe and the United States; in 1923, among other subjects, prohibition; in 1924 the Monroe Doctrine, in the January supplement, and the organization and work of the League of Nations, were outstanding subjects of discussion. In 1925 the agricultural situation in the United States, and power; in 1927 the installment plan of buying, aviation, and Philippine independence were treated in separate issues; and volumes in 1928 were devoted to the subject of the large inland waterway projects in the United States, the international situation, stabilization of commodity prices, and the American Negro.

In 1923 the Academy was addressed by Sir Auckland Geddes at the annual meeting and two conferences were held in that year on the coal industries and the Monroe Doctrine, respectively. Subsequent annual meetings, for the most part, considered some phase of the international situation, usually America's relation to the European situation, the subject in 1928 having been Some Aspects of the Present International Situation. Other meetings in 1928 discussed Local Taxation; The Reconstruction of Belgium; and Freedom of Speech in the United States. The president in 1928 was Dr. L. S. Rowe, who had held this position since 1902; vice presidents were Dr. Ernest Minor Patterson, the Hon. Herbert C. Hoover, and Dr. Charles E. Merriam; secretary, Dr. J. P. Lichtenberger; and treasurer, Charles J. Rhoads.

POLITICAL SCIENCE, ACADEMY OF. An organization founded in 1880, composed of men and women interested in political, economic, and social questions. It functions, in coöperation with Columbia University, through two annual meetings, and its publications, *The Political Science Quarterly*, *The Annual Record of Political Events*, and *The Proceedings*, a semi-annual in which are printed the papers submitted at the general meetings.

Various articles by authorities on public questions of national and international scope appear in the *Quarterly*. War debts, taxation, the future of prices, popular ownership of property, and trade associations were some of the topics discussed at recent semi-annual meetings. In 1926 a meeting at Briarcliff Manor, N. Y., took the form of an international conference on the subject of the United States in relation to Europe, with representatives of England, France, Germany, and Switzerland participating.

The members of the academy numbered 6853 at the opening of 1929, 10 being honorary, 215 life, and approximately 1100 subscribing members, chiefly libraries and organizations. Both active and subscribing members are drawn from every part of the United States, and from Porto Rico, Hawaii, the Philippine Islands, and leading European countries. Officers for 1928 were: Samuel McCune Lindsay, president; Albert Shaw and Paul M. Warburg, vice presidents; Parker T. Moon, secretary and editor of the publications;

George A. Plimpton, treasurer; and Ethel Warner, secretary and assistant treasurer. The headquarters are in Fayerweather Hall, Columbia University, New York City.

POLITICS, Institute of. An annual session founded at Williams College, Williamstown, Mass., through the generosity of Bernard M. Baruch, and continued with the financial coöperation of the General Education Board and the Carnegie Corporation, for the purpose of advancing the study of politics and promoting a better understanding of international problems and relations. Although the institute was proposed in 1913, the first session, as a result of various conditions, was postponed until the summer of 1921. Membership is limited to men and women who are members of faculties of colleges and universities, to writers on foreign politics, to persons engaged in the direction of foreign commerce or banking, to diplomatic and consular officials, to officers of the Army and Navy, to editors, foreign correspondents of the press, and, by invitation, to others who have had training and experience in international law and politics. The public interest is advanced through lectures, conferences, and round-table discussions, under the leadership of authorities on international problems.

At the first session, held in July and August, 1921, and devoted to the study of international relations, among those present were Viscount James Bryce of England, Count Paul Teleki of Hungary, and Tommaso Tittoni of Italy. The second conference, devoted also to international relations, gave special emphasis to problems of central and eastern Europe, the Far East, and Latin America, and attracted such eminent scholars and statesmen as Lionel Curtis and Philip Henry Kerr of England, Manoel de Oliveira Lima of Peru, and Dr. Joseph Redlich of Austria.

The third conference, which was held in 1923, was addressed by Gen. Tasker H. Bliss, Sir Edward Grigg of London, Count Harry Kessler of Berlin, and others, and special interest centred in the various international aspects of the Russian question. Among the visitors of international reputation who participated in the sessions in successive years were: Sir Paul Vinogradoff of Oxford, John Spayo, Count Alexander Skrzynski, Polish Prime Minister, Robert Masson of Paris, Leo S. Rowe of Washington, D. C., and Sir Frederick Maurice of London, in 1925; Dr. Alfred E. Zimmerman, commissioner of the League of Nations at Vienna, Sir Frederick Whyte, president of the Indian Legislative Assembly from 1920 to 1925, and A. Mendelssohn-Bartholdy, in 1926; Dr. Jacob Lange, Danish authority on agriculture, Dr. Robert Michels, professor of political economy at the University of Basel, Switzerland, Bishop Nicholai of Ochrida, Serbia, Moises Saenz, Mexican Under-Secretary of Education, and Dr. Peter Reinhold, formerly Minister in the Luther cabinet in the German Reich, and Count Carlo Sforza, member of the Italian Senate, in 1927; and at the eighth session in 1928, Halide Edib Hanum, leader of the feminist movement in Turkey, Dr. Otto Hoetzsch, member of the German Reichstag and professor of history at the University of Berlin, Dr. Louis Pierard, member of the Belgian Parliament, Dr. Y. C. James Yen, leader of the Mass Educational Movement in China, Dr. Chao Chu Wu, former Secretary for Foreign Affairs of the Nanking government, and Count Carlo Sforza.

At the 1929 session, the speakers of international reputation included George Young of London, Count Giovanni Elia of Rome, and Prof. T. E. Gregory of London. Lecture courses were conducted by Dr. William E. Rappard of Geneva on the Trend of International Coöperation in Europe since the War and by André Siegfried of Paris on the Political System in France. The round-table discussions included such topics as Canadian-American Relations; Limitation of Armaments; The Interests of United States Citizens in Latin America; Post-War Constitutional Changes in Europe; Planned Prosperity: The Effect of Public Fiscal Policies on Trade and Employment; Banking, Currency, and Exchange; Trade Relations as Affected by Politics, Science, and Finance; and Inter-Ally Debts and Reparations. Special general conferences were held on the following: Mexico: Financial, Social, and Political Changes since 1910; Financial and Commercial Relations with Latin America; American-Canadian Mineral Resources; Chinese-Russian Relations.

The administrative officers of the institute in 1929 were Harry Augustus Garfield, chairman; Walter Wallace McLaren, executive secretary, and Willard Evans Hoyt, treasurer. The headquarters are at 1 Hopkins Hall, Williamstown, Mass.

POLK, Frank Lyon (1871–). An American public official (see Vol. XIX). He was counselor to the Department of State from 1915 to 1919, when he became Under-Secretary of State. In the absence of Secretary Lansing in 1918–19, he was Acting Secretary of State. He was appointed Commissioner of the United States to negotiate peace in 1919 and was head of the American delegation to the Peace Conference in Paris from July to December of that year. He has since practiced law in New York City.

POLLARD, Alfred William (1859–). A British bibliographer who was born in London and educated at King's College School, London, and St John's College, Oxford. He was assistant and keeper in the Department of Printed Books of the British Museum (1883–1924), professor of English bibliography at King's College, University of London (since 1919), and editor of *The Library* (since 1920). In 1922 he was made a fellow of the British Academy and a Companion of the Bath. He edited *English Miracle Plays* (1890); *Bibliographica* (1894–96); *English Bookman's Library* and *Macmillan's Library of English Classics* (1900); a catalogue of early printed books in possession of J. P. Morgan (1907); *Records of the English Bible* (1911). He is the author of *Early Illustrated Books* (1893); *Shakespeare's Folios and Quartos* (1909); *Fine Books* (1912); *Two Brothers* (1916); *St. Catherine of Siena* (1919); *The Foundation of Shakespeare's Text*, the British Academy annual Shakespeare lecture (1923); *A Short Catalogue of English Books, 1475–1640*, in collaboration (1926); and other publications.

POLLOCK, Channing (1880–). An American author and dramatist, born in Washington, D. C. He studied at Bethel Military Academy at Warrenton, Va., and at the Polytechnique in Prague. He had a varied newspaper career before devoting his attention to dramatic writing. His later plays include: *A Perfect Lady* with Rennold Wolf, produced by Rose Stahl (1914); *Ziegfeld Follies of 1915*, with Rennold Wolf (1915); *The Grass Widow*, with Rennold Wolf (1917); *Roads of Destiny*, produced by A. H. Woods (1918); *The Crowded Hour*, with Edgar Selwyn, produced by Selwyn and Company (1918); *The Sign on the Door*, produced by A. H. Woods (1919), by Gladys Cooper at the Playhouse in London (1921), and at the Théâtre Renaissance in Paris, as well as in Vienna, Madrid, Amsterdam, etc.; *Ziegfeld Follies of 1921*; *The Fool*, produced by Selwyn and Company (1922); *The Enemy* (1925); and *Mr. Moneypenny* (1928). During 1923 he lectured under the direction of the Pond Bureau. Besides his plays, he wrote many stories and made dramatizations of numerous books.

POLLOCK, Rt. Hon. Sir Frederick (1845–). An English jurist and author (see Vol. XIX), Judge of the Admiralty Court of the Cinque Ports since 1914. In 1920 he was appointed King's Counsel and Honorary Fellow of Trinity College, Cambridge. New editions of his early works were frequently published, and he wrote *The League of Nations* (1920, 2d ed., 1922); *Essays in the Law* (1922); and *Outside the Law* (1927). For the Selden Society, he edited *Selden's Table Talk* (1927).

POLLUTION OF STREAMS. See Sewerage and Sewage Treatment.

POLO. The United States, Great Britain, India, and Argentinia might be termed the polo centres of the world with the United States in 1929 possessor of the Hurlingham Cup, emblematic of the international championship. The U. S. government has done much to foster the sport of polo by furnishing mounts to various military units, colleges, and other institutions. A competition for the Hurlingham Cup was held in 1927 at Meadow Brook, L. I., and the United States four successfully defended the trophy by a score of 2 matches to 0. An international contest of unusual interest was that waged by United States and Argentine teams in 1928, also at Meadow Brook. The United States captured the first game, the visitors took the second, and then the United States triumphed in the third and deciding match. An international Military Title Trophy was placed in competition in 1923 by the Meadow Brook Club and was won by the U. S. Army four which defeated a British team in three straight matches. In 1925 the U. S. Army four again triumphed over the British at Hurlingham, England, in two straight matches. Among the United States colleges, Yale, Princeton, Pennsylvania Military College, and Harvard have made creditable progress in the development of powerful, smooth-working fours. Indoor polo tournaments have added a popular feature to the winter sports programme carried on in New York City.

POLYTONALISM. See Music.

POMERANIA. See Poland.

POMERENE, Atlee (1863–). An American legislator (see Vol. XIX). He was United States Senator for the term 1911 to 1917 and was reëlected in 1917 but defeated by Simeon D. Fess in 1922. In March, 1924, he and Owen J. Roberts were appointed by President Coolidge as counsel to investigate the question of oil leases and the criminal responsibility of persons whose connections with it had been revealed by the proceedings of the Senate Committee investigating oil leases. They secured the cancellation of Edward L. Doheny's lease on the Elk Hills, Calif., naval oil reserve in June, 1925, and of Harry F. Sinclair's lease on the Teapot Dome, Wyo., reserve in 1926. Both decisions were upheld by the United States Supreme Court in 1928.

POMONA COLLEGE. A coeducational institution at Claremont, Calif., founded in 1887 under Congregational auspices but free from ecclesiastical control. The student enrollment for the year 1927–28 was 777, and the faculty numbered 72 in the autumn of 1928. The total invested funds of the college in 1928 amounted to $3,728,883, of which $2,408,403 represented endowment funds; the total income for the year 1927–28 was $485,340; and the library contained 62,810 volumes. The honors course was inaugurated at Pomona College in September, 1924, and other developments between 1914 and 1928 included the enlargement of the campus, the improvement of a large central quadrangle and the erection of five large buildings. President, Charles Keyser Edmunds, Ph.D.

PONSELLE, Rosa Melba (1895–). An American dramatic soprano, born in Meriden, Conn. Her musical talent showed itself very early and she received systematic instruction in singing and on the piano. At the age of 12, she sang solos in a local church, and at the age of 15, accepted her first engagement as pianist in a motion-picture house. Then she filled similar positions in New Haven and New York, and in the latter city also appeared in vaudeville. After further study there under William Thorner, she sang for Gatti-Casazza in September, 1918, and was immediately engaged for the Metropolitan Opera House. Her début there as Donna Leonora in Verdi's *Forza del Destino* (Nov. 15, 1918) was the sensation of the season and she leaped into fame at one bound, and ever since has maintained herself as a prime favorite and powerful drawing card. With her in the principal rôles, the management revived many older operas, such as Verdi's *Don Carlos;* Lalo's *Le Roi d'Ys;* Rossini's *Guillaume Tell;* Weber's *Oberon;* Spontini's *La Vestale*, and Bellini's *Norma.* The climax of her triumphs probably was her London début as Norma (May 28, 1929), when after the *Casta Diva* aria the audience, disregarding the time-honored custom of no applause till the fall of the curtain, broke into frantic demonstrations.

PONSONBY, Arthur (Augustus William Harry) (1871–). A British public official and pacifist, educated at Eton and at Balliol College, Oxford. He was page to Queen Victoria from 1882 to 1887, was connected with the diplomatic service at Constantinople and Copenhagen from 1894 to 1899, was in the Foreign Office (1900–02), and from 1906 to 1908 was private secretary to Sir Henry Campbell-Bannerman, the Premier. He was a Liberal member of Parliament from 1908 to 1918, a Labor member after 1922, and in 1924 was appointed Under-Secretary of State for Foreign Affairs in the Labor cabinet of Ramsay MacDonald. He published *The Camel and the Needle's Eye* (1909); *The Decline of Aristocracy* (1912); *Democracy and Diplomacy* (1915); *Wars and Treaties, 1815–1914* (1917); *Rebels and Reformers*, with Dorothea Ponsonby (1917); *Religion in Politics* (1921); *English Diaries* (a review of English diaries from the sixteenth to the twentieth century, 1923); *Now is the Time; an Appeal for Peace* (1925); *More English Diaries* (1927); *Scottish and Irish Diaries* (1927); *Samuel Pepys* (1928); *Letters of the Empress Frederick* (1928); and *Falsehood in War-Time* (1928).

PONTOPPIDAN, pŏn-tŏp'ė-Dăn, HENRIK (1857–). A Danish novelist (see VOL. XIX). In 1917 the Nobel Prize for literature was divided between him and Karl Gjellerup. His later publications include *Enslevs Död* (1915); *En Fortælling-Kres* (5 vols., 1915–16); *Faysingholm* (1916); *Sandinge Menighed* (1916); *Torben og Jytte* (1916); *Et Kærlighedseventyr* (1918); *En Vinterrejse* (1920); *Hojsang* (1921); and *Mands Himmerig* (1927).

POOLE, ERNEST (1880–). An American author, born in Chicago. He graduated from Princeton in 1902 and for several years lived in the University Settlement in New York City. Here he accumulated material for articles and stories. His first published work was a play, *None So Blind.* This was followed by *The Man's Friends,* a play; *The Harbor,* a novel (1915); *His Family* (1917); *His Second Wife* (1918); *Blind* (1920); *Beggar's Gold* (1921); *Danger* (1923); *The Avalanche* (1924); *The Little Dark Man* (1925); *The Hunter's Moon* (1925); *With Eastern Eyes* (1926); *Silent Storms* (1927).

POOLE, REGINALD LANE (1857–). An English historian (see VOL. XIX). He continued as editor of the *English Historical Review* until 1920, as curator of the Bodleian Library until 1926, and as lecturer on diplomatics at Oxford until 1927, was vice president of Magdalen College (1922–23) and of the Royal Historical Society (1925–27), and received an honorary degree in philosophy and letters from the University of Louvain in 1927. His later publications include *Lectures on the Papal Chancery* (1915); *Benedict IX and Gregory VI* (1917); *The Early Correspondence of John of Salisbury* (1924); and *Chronicles and Annals* (1926). He also edited the *Historia Pontificalis of John of Salisbury* (1927).

PORCHÉ, pôr'shā', FRANÇOIS (1877–). A French poet and playwright. His plays *Les Butors et la Finette* (1917); *La jeune fille aux joues roses* (1919); *La dauphine* (1921); *Le Chevalier de Colomb* (1922); and *La vierge au grand cœur,* Joan of Arc (1925), were largely in verse. The sound and rhythm of the verse followed the action closely and subtle contrasts were emphasized by a quiet and delicate humor. His poems include *Humus et poussière*; *L'arrêt sur la Marne* (1916); and *Le poème de la tranchée* (1916). He also wrote *La vie douloureuse de Charles Baudelaire* (1926); and *Charles Baudelaire* (1928).

PORK. See LIVE STOCK.

PORTER, A(RTHUR) KINGSLEY (1883–). An American art historian. He graduated from Yale in 1904 and studied architecture at Columbia University. After several years of travel and study, he became lecturer and then assistant professor at Yale University. In 1920 he was appointed professor in the history of art at Harvard University. He has served as exchange professor in France and Spain (1923–24). Among his best-known books are *Mediæval Architecture* (1908); *The Construction of Gothic and Lombard Vaults* (1912); *Lombard Architecture* (1915–17); and *Romanesque Sculpture of the Pilgrimage Roads* (10 vols., 1923).

PORTER, HAROLD EVERETT ("HOLWORTHY HALL") (1887–). An American writer, born in Hyde Park, Mass. He graduated from Harvard in 1909 and for several years was engaged in the publishing business in Boston and New York. He served as captain of the Air Service in the United States Army in 1918 and later in the same year was detailed to the office of the Secretary of War. In collaboration, he wrote an official history of all types of aëroplanes and engines made in the United States. His books include *Pepper* (1915); *Help Wanted* (1916); *The Six Best Cellars,* with H. M. Kahler (1919); *Egan* (1920); *Rope* (1921). He was coauthor of the one-act play, *The Valiant,* first produced in 1921. He was a frequent contributor of short stories to leading magazines.

PORTES GIL, pōr'tĕs' hĭl, EMILIO (1891–). A President of Mexico, born in Ciudad Victoria and educated for a legal career there and in Mexico City. He joined the revolutionary movement which broke out at Vera Cruz in 1914 while still a student. Later, he became chief of military justice in Mexico City, Judge of First Instance and Magistrate of the Supreme Court in the State of Sonora (1915), Secretary of War to General Álvaro Obregón (1916), deputy to the National Congress, and, in 1920, Governor of his native State of Tamaulipas. He was serving as Secretary of State in the Calles administration when the assassination of General Obregón, the President-elect, resulted in his election as provisional President for the term Nov. 30, 1928, to Feb. 4, 1930. His administration was marked by a serious but unsuccessful revolt early in 1929 and the negotiation of an agreement for the settlement of the dispute between the Mexican government and the Roman Catholic Church in the summer of that year. See MEXICO, under *History.*

PORTLAND. A city and port of entry of Oregon. The population increased from 213,251 in 1910 to 258,288 in 1920 and to 354,608 in 1928, according to local estimate. Since 1914 the city has been engaged in carrying out a major street plan and port-development scheme. The programme has included the construction of eight principal streets, 100 feet wide, in the new and developing portions of the city and providing hauling streets, 120 feet wide, along the water front. A system of boulevards and parkways also was laid out, and a memorial civic centre planned. In 1928 an extensive street-widening scheme was inaugurated, for which $4,000,000 in bonds had been voted. Nine grade crossings were eliminated by depressing the tracks and by constructing viaducts over them, the cost of $1,055,000 being met by the railroad and the city together. In 1922 a bond issue was authorized for the construction of two concrete bridges over the Willamette River, $3,000,000 being allotted for a new bridge on the site of the old Burnside Bridge and $2,000,000 for another bridge at Ross Island. The first was about 3000 feet long with a bascule centre span; the second, which had no draw but a clearage at low water of 132 feet, was 4000 feet long.

In 1917 a $3,000,000 bond issue was approved by popular vote for improving the facilities of the port of Portland, including the construction of a grain elevator of 1,000,000 bushels capacity and a dock and warehouse 1000 feet long and 175 feet wide. In 1923 the city purchased about a mile of water-front property between four downtown bridges for the purpose of building a sea wall and filling in land behind it. The interurban railroad tracks were then moved from streets in the city to the filled land, interurban terminals constructed, and the approaches to the bridges elevated so that they would span the tracks. The channel depth of the Willamette River from Portland to its junction with the Columbia River was increased to 35 feet. In 1928 Portland became the largest wheat exporting port in the United States, 34,000,000 bushels being exported during a four-month period.

Building construction has been active in Portland, building permits having increased in value from $8,334,075 in 1914 to $28,973,452 in 1928. Among the buildings erected during 1927 and 1928 were the Masonic Temple, Terminal Sales Building, Pacific Building, Public Utilities Building, Dental Office Building, and Jewish Synagogue. In addition to the new $1,000,000 post office, the Federal Building is to be erected by the United States government at a cost of nearly $2,000,000. In 1924 a new sewer in the Lents district, costing $780,000 and a water conduit with a capacity of 65,000,000 gallons were constructed by the city; in 1929 the Bull Run reservoir, with a storage capacity of 31,000 acre-feet of water, was completed at a cost of $2,800,000. In 1927 the Portland municipal airport was located on Swan Island, a site provided by the port of Portland. The Columbia River Highway and the Pacific Highway intersect at Portland, making it the centre of one of the finest paved-highway systems in the United States. In 1927, 20,318 persons were employed in 766 industrial establishments and received $27,213,628 in wages; the value of products manufactured was $146,973,636. Bank clearings increased from $578,884,000 in 1914 to $1,978,930,066 in 1928. The assessed valuation of property in Portland in 1927 was $338,462,000; the net debt was $43,967,000.

PORTLAND CEMENT. See CEMENT.

PORTO-RICHE, pôr'tô'rēsh', GEORGES DE (1849–). A French dramatist (see VOL. XIX), who became a member of the Academy in 1923. His later works were *Le marchand d'estampes* (1917); *Anatomie sentimentale* (1920); *Le passé* (1921); and an unpublished scene taken from the *Marchand d'estampes* (1923).

PORTO RICO. An island possession of the United States in the West Indies with an area of 3435 square miles. The population of Porto Rico increased from 1,118,012 in 1910 to 1,299,809 in 1920, and in 1928 (estimated) to 1,454,000. The distribution in 1920, according to color, was as follows: white, 948,709; black, 49,246; mulatto, 301,816; all others, 38. During the decade 1910–20, the white population increased by 29.5 per cent, while the mulatto population decreased by 10 per cent, and the black by 2 per cent. The chief cities, with their populations in 1920, are San Juan, 71,443; Ponce, 41,912; and Mayaguez, 19,124; 1928 estimates: San Juan, 100,000; Ponce, 46,500; and Mayaguez, 21,000.

Government. The Organic Act of 1917 separated the legislative and executive functions and created an appointive judiciary system and an elective Senate. The chief executive is a governor, appointed by the President of the United States. The Legislature consists of two Houses, the Senate, composed of 19 members, and the House of Representatives, composed of 39 members. A resident commissioner represents Porto Rico in Congress. Six heads of departments form a council to the governor. The Judiciary includes the supreme court, seven district courts appointed by the governor, and minor courts which also are appointed by the governor.

Agriculture. The number of farms in Porto Rico decreased from 58,371 in 1910 to 41,078 in 1920; the improved land in farms decreased from 1,570,304 to 1,303,547 acres. The value of farm property, however, increased from $102,378,874 in 1910 to $179,392,511 in 1920, and the average value per farm increased from $1754 to $4367. The production of sugar cane increased from 3,180,750 tons in 1909 to 3,961,984 in 1919. Production of sugar from cane was 748,677 short tons in the fiscal year ending June 30, 1928, the largest output ever produced in the island. The production of tropical fruits has become an important industry in the island. Due to storm damage, the 1928 coffee crop was the lowest in 30 years, exports dropping to 7,800,000 pounds as compared to 26,300,000 in 1925–26. The owners of farms decreased from 46,779 in 1912 to 36,407 in 1920; the number of farm managers increased from 1170 in 1912 to 1213 in 1920; the tenant farmers decreased in number from 10,422 in 1910 to 3458 in 1920. White farmers in 1910 numbered 44,251, compared with 35,194 in 1920; colored farmers decreased in number from 13,850 to 5884. Extensive work in the island is carried on by the U. S. departments of Agriculture and Labor. Seed selection received special attention throughout the decade and experiments resulted in a considerable development of cotton growing. A vigorous campaign was carried on for the elimination of insect pests. The extension of the Federal Loan Act of 1922 was of great value to farmers in Porto Rico. Agricultural conditions after 1919 were particularly favorable to sugar cane, which increased its lead over the crops as a whole. The tobacco industry had a remarkable increase. Only 473 persons were employed in its production in 1913; there were 7272 in 1919, and 11,962 in 1922. In the fiscal year 1928, the tobacco crop was 22,000,000 pounds and the amount exported was valued at $20,777,937.

Mineral Production. Although gold, silver, iron, copper, and other minerals are found in Porto Rico, there is little mining. Some stone is quarried. The total value of the product of all the quarries in 1919 was $158,157, compared with $5459 in 1909, or an increase of nearly 3000 per cent.

Manufactures. Chief among the industries are the manufacture of sugar and sugar products, cigars, fine needlework, women's wear, and men's clothing. The sugar centrals constitute the bulk of the manufacturing of the island, with factories for the manufacture of cigars, cigarettes, and the stripping of tobacco ranking next. The cigar output in 1927–28 was 207,770,413, as compared with 581,548,820 in the peak year of 1919–20, and 207,368,253 in 1906–07. Cigarettes produced in 1927–28 totaled 390,243,600; in 1926–27, 354,453,850; in 1906–07, 358,183,000. The expanding needlework and embroidery industry has become one of the most important, with from 40,000 to 50,000 women and girls employed. Mayaguez is the centre of this industry. Bakery products, food preparations, and printing products also are manufactured.

Transportation. An elaborate system of excellent roads has been perfected. In 1928 there were 1058 miles of macadamized roads. A large part of the transportation of commodities is done by motor trucks over these highways. There were 339 miles of railroad on the island. In 1926 there were 1072 miles of telegraph wire, 27,745 miles of telephone wire, and 13,374 instruments. Important improvements were made in San Juan Harbor, where a reinforced concrete bulkhead was built along the entire waterfront. Streets leading to the harbor were paved and made suitable for the heavy transportation. The pier at Ponce was completed and placed in use in 1914. In 1920 provision was made for the construction of a large new pier in San Juan Harbor and the expansion of the bulkhead. The harbor was also dredged, to provide navigation by the largest vessels.

Education. After the island became a territory of the United States, the Government of Porto Rico had used the utmost efforts toward the education of the people, especially the children. These efforts have been well received by the people and the results have been extremely favorable. The average daily attendance in all the public schools increased from 155,830 in 1914 to 184,991 in 1920, but was 182,365 in 1925–26. In 1928, of a total enrollment of 220,940 pupils, 127,930 pupils were enrolled in rural schools and 92,873 in urban schools. In addition, there were 7365 pupils in private schools. The total number in public and private schools was 228,305.

At the time of the American occupation, 80 per cent of the population was found to be illiterate. This proportion was reduced in 1910 to 66 per cent and in 1920 to 55 per cent. In 1899 only 8 per cent of the persons 5 to 17 years of age were attending school; in 1920 over 45 per cent were reported in school. Special attention is given to practical instruction in agriculture. During the first decade of American occupancy, 950 rural schools were established; there were 1700 in 1920 and 2144 in 1928. Industrial education also received adequate attention. In 1914 manual training for boys and household economics for girls were made obligatory for students in grades 6 to 10 in the public schools, in towns where the attendance warranted the installation of the necessary apparatus.

The importance of placing education within the reach of a large number of illiterate adults was early recognized and for their benefit night schools were established. In 1914 an average of 825 such schools were maintained, and this number had greatly increased in 1928. Instruction in hygiene and health preservation was established and strengthened. Dental clinics were established in many schools and general health clinics were started and medical inspection in rural schools was begun. The total expenditure for educational purposes in 1928 was $5,834,467, of which $1,505,576 was supplied by the municipalities and $4,328,890 by the Department of Education.

Facilities for higher education were provided by the University of Porto Rico and by the College of Agriculture and Mechanic Arts at Mayaguez. The university consists of a college of liberal arts, college of law, college of pharmacy, normal school, and high-school division. The number of students enrolled in 1922–23 was 1477, and in 1927–28, 3404.

Trade and Commerce. The remarkable commercial expansion of Porto Rico is shown by a comparison of trade figures. In 1913–14 the combined value of imports and exports was $79,509,549; in 1927–28, it was $195,877,068. The merchandise shipped from Porto Rico to the United States in 1913–14 was valued at $34,423,180; in 1927–28 it was $96,662,619. The imports from the United States in 1914 were valued at $32,568,368, and in 1927–28, $79,743,088. The chief exports are sugar, cigars and cigarettes. tobacco leaf, and coffee. The exports of sugar increased from 320,633 tons, valued at $20,240,335 in 1914, to 605,620 short tons, valued at $54,579,000 in 1927–28. There were exported in 1914, 150,363,991 cigars and 144,378,000 in 1928. The tobacco leaf and scrap exported in 1914 was valued at $3,206,610, and in 1928, at $17,074,560. The coffee exports in 1914 were valued at $8,193,544 and in 1928 at $2,596,872. The exports of fruit, including oranges, pineapples, coconuts, and grapefruit, were valued in 1914 at $3,400,903, and in 1928 at $7,538,794. During the American occupation, there was a rapid growth of trade with the United States. During the years covered by this occupation, the value of imports from all foreign countries increased from only 3 to 13 million dollars, while the value of purchases from the United States increased from 6 to 121 million dollars in 1920, and then fell to $81,981,000 in 1928. The value of exports from Porto Rico to all foreign countries increased from 3 to 7 million dollars, while the value of Porto Rican shipments to the United States increased from 3 to 158 million dollars in 1920. In 1928 exports to the United States amounted to $97,269,000. More than 90 per cent of all the external commerce of the island was with the United States. Porto Rico has had a favorable trade balance in all except 4 of the last 30 years. Imports in 1927–28 totaled $92,342,329 and exports, $103,534,739. The figures for 1926–27 were: imports, $98,810,750; exports, $108,067,434.

Finance. There occurred soon after 1913 a severe financial crisis caused by the fact that laws passed by the Legislature to provide sums for public improvements failed to attain the results expected. The result was a large deficit. Prompt measures were taken to avert disaster and the legislative assembly in 1914 passed laws to meet the situation. All forms of expenditure upon public improvements were suspended and provision was made for an issue of $1,000,000 of bonds. The severe hurricane of 1928 again disturbed the fiscal situation. Total revenue receipts for 1927–28 were $12,446,219 and nonrevenue receipts, $2,968,335, or a total of $15,414,554. Total expenditures were $14,784,013. The receipts for the fiscal year 1922–23 were $10,118,891 and the expenditures, $10,801,640. The bonded indebtedness in 1913–14 was $5,925,000. On June 30, 1928, it stood at $25,517,000.

Health and Sanitation. The sanitation service on the island was organized in 1913 under a law passed in 1912, and year after year successively vigorous and successful work was carried on by this service. Successful efforts also were made, in particular, to promote the building, in various cities and towns, of modern aqueducts for a supply of pure water, for sewer systems, for sanitary slaughterhouses and meat markets, and for clean dairies. Great improvement also was made in the proper construction and plumbing of dwelling houses. The work of eradicating the hookworm, which was so prevalent in the island that over 90 per cent of the laboring people were infected, was undertaken. The Insular Health Service and the Rockefeller Foundation coöperated for the eradication of the disease with remarkable success. By 1923 approximately one-sixth of the rural population of the island had received treatment. Tuberculosis is the chief menace to the health of the people. The percentage in proportion to general mortality increased from 7.28 in 1914 to 12.1 in 1928. Every effort was being made to eliminate conditions favorable to this disease. Malaria ranks third in mortality records. In 1923 arrangements were made by which the Rockefeller Foundation united with the insular authorities in an intensive campaign for mosquito and malaria control. The death rate increased from 18.6 per thousand in 1913 to 23.3 per thousand in 1926–27. In 1927–28 it was 20.4. The death rate for 1913 was the lowest then recorded on the island. For 1912 it was 24.02. A leper colony was maintained at Trujillo Alto in the interior of the island. In 1910 a service was instituted in the island for the study and prevention of tropical and transmissible diseases and in 1920 the Legislature created an institute of tropical medicine and hygiene. Twenty-five public-health dispensaries have recently been established. The hurricane of September, 1928, threatened great damage to public health through homelessness and privation, but these conditions were successfully met, largely by the action of the insular health organizations.

History. The most important event in the political history of Porto Rico after its passing under American control was the passage by Congress, in 1917, of a new Organic Act, providing for the government of the island. Business conditions in Porto Rico were greatly affected by the tariff law passed in 1913. More important than this, however, was the serious decline in the sugar industry in 1914, owing to local and general conditions. In 1915, because of a lack of coöperation between the two Houses of the Legislature, comparatively little important legislation was enacted. The Legislature of 1916 passed several important measures relating to revenue and taxation. On Mar. 2, 1917, President Wilson approved the Organic Act for Porto Rico. This was received everywhere with great satisfaction. The people were especially pleased with the granting of American citizenship. With the entrance of the United States into the World War, many new problems arose in Porto Rico. The price of foodstuffs, already abnormally high, rose sharply. A food commission with wide powers was appointed. The compulsory military-service law applied to Porto Rico, which showed a strong feeling of patriotism and loyalty. After Mar. 2, 1918, the prohibition of all alcoholic beverages went into effect. A destructive earthquake occurred in October, 1918. The heaviest losses were at Mayaguez and Aguidilla. About 150 lives were lost and the damage to government works and public buildings was over $1,000,000. A great sea wave followed the earthquake and increased the loss, especially at Aguidilla. The Legislature in 1918–19 passed a new election law changing the methods and machinery of election, a new municipal law, providing for a larger degree of self-government, a grand-jury law, several labor laws, and a measure establishing a minimum wage. The year 1920 was one of unusual prosperity and progress, although there were several strikes during the year in the sugarcane fields and among the dock workers. In spite of these disturbances, the general prosperity of the island increased greatly. A special session of the Legislature, on Apr. 26, 1920, passed an important amendment to the tax laws. It also amended the excise laws, the election law, the municipal law, and the workmen's-compensation law. An act was passed authorizing coöperative societies of production and consumption. E. Mont Reily was appointed governor by President Harding in July, 1921, succeeding A. M. Yager, who had occupied that post since 1913. Following the inauguration of Governor Reily, the aggressive attitude adopted by him toward the political leaders of the island at once created a situation of great difficulty. The Unionist Party was accused by supporters of Governor Reily of aiming at secession from the United States. This party was the most powerful of the political bodies of the island and was headed by Antonio R. Barcelo, president of the Senate. The leaders of this party were charged by Governor Reily with sedition and he administered a severe rebuke to Señor Barcelo, who resigned from the leadership but was obliged to resume it on account of the insistence of his supporters. The Governor dismissed several high officials and replaced them with Republican successors. In this, he was severely criticized. By the end of the year, a majority of both the Lower and Upper Houses petitioned President Harding for the removal of Governor Reily. The President took no action, but Governor Reily resigned on Apr. 1, 1923. He was succeeded by Horace Towner, under whose administration political difficulties subsided. Governor Towner resigned in 1929 and Colonel Theodore Roosevelt was appointed by President Hoover to succeed him. There remained a feeling of dissatisfaction with Porto Rico's status, which eventually took the form of agitation for statehood. The Legislature addressed to the Government of the United States in January, 1928, a request that the island be made a State. In a letter to Governor Towner, President Coolidge made an adverse reply. On Sept. 13, 1928, a hurricane swept the island, taking over 200 lives, rendering some 400,000 persons homeless, and ruining crops, particularly the coffee crop; damage was estimated at $85,000,000.

PORTUGAL. A republic of western Europe with an area, including the Azores and Madeira islands, of 35,490 square miles, and a population in 1920 of 6,032,991, or 169.9 per square mile. The 1911 population was 5,957,985. The chief towns, with their populations in 1920 and 1925 are Lisbon, the capital, 489,667 (529,524 in 1925); Oporto, 203,199 (215,625 in 1925); Setubal, 37,074; Braga, 21,970. Emigration continues to keep the population almost stationary; 39,837 natives left the country in 1926 of whom 29,948 went to Brazil, 170 to North America, and 6810 to European countries. In spite of frequent governmental decrees, education has made no perceptible advances. The number of primary and of secondary schools in 1920 showed little increase over those recorded in 1911. In 1926–27 there were 7174 public elementary schools with 318,437 pupils and 8384 teachers, 33 secondary schools with 11,430 pupils and 935 teachers, and 5 primary normal schools with 793 pupils and 85 teachers. There are three universities, Lisbon (founded 1858), Coimbra (founded 1920), and Oporto. Seventy-five per cent of the population is believed to be illiterate.

Industry and Trade. After 1902, when the last census of agriculture was reported, the state of agriculture declined, being handicapped by lack of transport facilities and of efficient use of fertilizers. In the earlier years, 34.9 per cent of the total area was devoted to tillage; of late (1927) this had dropped to 26 per cent. The yield of wine, one of the most important activities, dropped from 6,869,400 hectoliters in 1908 to 4,392,780 hectoliters in 1919, but had risen to

7,975,000 hectoliters in 1927. The cereal crops cultivated, i.e., rye, wheat, corn, are for home consumption and the fattening of stock. Articles that entered into the trade of the country, indicating a certain amount of application, are cork, olive oil, raw wool, hides, sardines, and wine. Trade in 1913 was: imports, $82,625,000, exports, $32,767; in 1920, $134,675,000 and $43,297,000; in 1926, $120,156,000 and $37,419,000. In 1913, 10,638 vessels of 24,368,120 tons entered Portuguese ports; in 1917, 5860 vessels of 4,906,599 tons entered; in 1920 (the best post-armistice year), 9909 vessels of 16,101,695 tons entered; in 1927, 8929 vessels of 24,703,103 tons. During and after the World War, the general economic conditions reflected the prevailing social and political unrest. Raw materials could be obtained only with difficulty—the shortage of cotton, gasoline, tin plate, and coal being particularly severe—and factories and mines had to suspend operations. Only the activities of the colonies succeeded in keeping the home industries active, for the raw materials imported made up in part for the decline of the foreign trade.

Communications. In 1913 there were 1854 miles of railway in operation; in 1926, 2005 miles, of which 824 miles were state owned. The continued steady depreciation of equipment and the falling off of traffic increased the obligations of the systems. Several sections of the state-owned lines have been taken over for operation by the company operating a number of private lines.

Finance. The budget for 1914–15 called for revenues of 79,649,140 escudos and expenditures (ordinary and extraordinary) of 83,390,965 escudos. The 1922–23 budget included revenue estimates of 276,137,853 and expenditures of 561,326,125 escudos. That for 1928–29 provided total receipts of 1,919,388,375 and total expenditures of 1,917,811,677,000 escudos. The debt on July 1, 1926, consisted of: Internal funded debt, without that held by the Government, $62,676,000; the internal floating debt, $86,165,000; external funded debt, $160,716,000; external floating debt, $116,397,000. The unit of currency is the escudo which has a par value of $1.0805. The exchange value in 1913 was $0.9274; by 1927 it had dropped to $0.0503; in 1928 it was $0.045.

History. Portugal's history from 1914 to 1929 was a continuous change of administrations accompanied by crises of lesser or greater importance. The great gulf existing between political leaders and the people at large was perceptible as ministries rose and fell amid a general indifference. The increasing illiteracy, the steady emigration of the peasantry to the New World, and the lack of capital for new enterprises, all accounted for the general stagnation. The violent break between church and state, which had been one of the first works of the revolution, was considerably tempered by conversations resumed by President Paes with the Vatican in 1918. In 1919 a papal nuncio was appointed to Portugal, and in 1920 the Pope expressed himself as satisfied with the improved conditions.

Portugal's traditional friendliness with England, her dependence on the latter for heavy importations of wheat and coal, and the fear entertained for the safety of the African colonies, led Portugal to affirm her obligations under the British Treaty, in November, 1914. Troops were immediately despatched to Africa and contingents were sent throughout the War, 40,000 men seeing service in this area. In 1916 Portuguese troops entered the Kionga triangle and thus restored to their country a territory that had been seized by Germany in 1894. In 1916 German ships lying in Portuguese waters were seized (240,000 tons); Germany retaliated by formally declaring war on Mar. 9, 1916, and opening a severe submarine attack on shipping and ports. In 1917 shipping losses were particularly heavy. Portuguese contingents saw action on the western front in 1918, in all, 60,000 men taking part. At the Peace Congress, Portugal was represented, first by Dr. Egas Moniz, and later by Dr. Afonso Costa. Subsequent meetings of the Supreme Council restored the Kionga triangle to Mozambique and allotted Portugal 0.75 per cent of the German indemnity.

Portugal's participation in the War did not check internal disorders. In 1915 a mutiny of sailors resulted in the bombardment of Lisbon and the killing of 100 persons; Sr. Pimenta de Castro, the Prime Minister, was transported to the Azores; his successor was shot at, and resigned soon after; and this was followed immediately by the resignation of President Arriaga. These events were a prelude to the greater events of 1917. In December of that year, a revolution broke out in Lisbon and the fleet was fired upon. The purposes of the revolutionaries were for a more active participation in the War, and the resignation of the Government which had antagonized the conservative classes. The result was the deportation of President Machado, the arrest of the Premier, Dr. Afonso Costa, and the selection as provisional President of Maj. Sidonio Paes, leader of the revolt. On Apr. 28, 1918, Sr. Paes was elected by direct suffrage as President, though the Republican parties refused to participate. By the support of the Catholics, whom he immediately propitiated, and the conservative elements, his powers at once became dictatorial. Parliamentary ministers were transformed into secretaries responsible to the President; all efforts were bent on the prosecution of the War, to the great approval of the Allies; but Sr. Paes, who might have restored Portugal to something like stability, was assassinated on Dec. 14, 1918, and the country was once more in a state of turbulence.

In 1919 the uncertainty was capitalized by the monarchists who proclaimed a monarchy at Oporto under the regency of Captain Conceiro. The general rising of the marines and the radical elements made the royalist revolution short-lived, so that after a few weeks of desultory fighting, Captain Conceiro was captured and the civil war ended. Ministry followed ministry in rapid succession. Admiral Canto e Castro, having followed Paes in the Presidency, resigned in 1919; he was followed by Dr. José de Almeida. The railroad strike of 1920 embarrassed the Government; the failure to cope with the pressing internal problems of taxation, the currency, public works, served to render the existing machinery useless. The counsel of former King Manuel to his followers, in 1920, to give up violence and resort to constitutional tactics only, had little influence on affairs. During 1921 Sr. Granjo, the Prime Minister, was killed as the result of another outbreak in Lisbon; and bomb outrages were frequent in 1921 and 1922.

After eight ministries had held office for brief terms in 1922, a cabinet formed by Antonio da Silva contrived to exist for over a year and a half, despite sporadic bomb-throwing, strikes, and rioting. Teixeira Gomes, elected President in August, 1923, was inaugurated in October to the accompaniment of a fruitless revolution fomented by his adversaries. Following da Silva's resignation in November, there commenced a new cycle of short-lived governments. Dr. Genestal Machado served as Premier from November 15 to December 13. He was succeeded by Col. Alvaro de Castro, who abolished about 2500 official posts, reduced the budgetary deficit somewhat, but dealt a staggering blow to Portuguese credit by decreeing (Feb. 11, 1924) that since the escudo continued to depreciate the interest on public securities would be paid in paper money rather than in gold, as had been promised. A generally unpopular financial policy led to the overthrow of the Castro cabinet in June, 1924. A new government under Rodriquez Gaspard survived until November, notwithstanding various Communist disorders, military mutinies and industrial disputes. Then, a ministry headed by Dominique dos Santos proclaimed a programme of "Liberty, bread, education," but after a few progressive steps had been taken, its existence was summarily terminated in Februray, 1925, when a bomb outrage and other incidents set the political pot boiling.

The spectre of revolution constantly menaced the next government under Premier Victorino Guimaraes. Minor insurrections in March were followed by a more serious though unsuccessful revolt in April, which aimed to replace the existing civil régime with a military dictatorship. Lack of parliamentary support compelled the Guimaraes cabinet to resign (June 26), whereupon Antonio da Silva held the reins for the ensuing month and managed to suppress a new revolutionary outbreak just prior to his supersession by Dominjor Pereira. A parliamentary election in November, 1925, caused no special excitement and registered no significant change.

In December, President Gomes resigned because of ill health, and Dr. Bernardina Machado, a former incumbent who had been exiled in 1917, was elected to succeed him. Simultaneously, the Pereira cabinet resigned and Antonio da Silva resumed control. An unsavory bank scandal in Angola, another revolutionary upheaval during February, 1926, projected constitutional revision, parliamentary debates on the customary budgetary deficit, and popular opposition to a renewal of the state tobacco monopoly, which expired April 30, were symptomatic of the prevailing political unrest.

Late in May, 1926, a bloodless military *coup d'état* overthrew the da Silva ministry. President Machado resigned June 1 and control of the government was assumed by a triumvirate consisting of Naval Commander Mendes Cabeccadas, General Manuel Gomes da Costa, and Major Armando da Lama Ochoa, the first named becoming Premier. The revolutionists declared that they merely wished to set up a more democratic form of government and to rid the country of professional politicians. Friction speedily developed, however, and on June 17, General da Costa entered Lisbon in triumph at the head of the army, compelled Cabecadas and his adherents to resign, and by an official decree of June 27 installed himself as supreme ruler; but ministerial disputes coupled with widespread dissatisfaction in the army because of his failure to carry out his announced programme of reform led to the speedy downfall of da Costa. On July 9, he was arrested by a former colleague, General Antonio Oscar de Fragoso Carmona, who now seized power and organized a new cabinet with himself as Premier. General da Costa was sent into temporary exile, but some months later was made a Marshal of Portugal and eventually allowed to return. On Nov. 29, 1926, Carmona extra-legally assumed the Presidency. Early in 1927, most of the factions opposed to the dictatorship issued a manifesto to the foreign legations stating that when they came into power they would not recognize any foreign loans contracted by General Carmona's government. Carmona promptly took steps in reprisal which helped precipitate a formidable military revolt under General Souza Diaz. Violent fighting took place at Oporto and Lisbon with heavy casualties, but by drastic measures the Government crushed the insurgents and restored "law and order." In August, 1927, Carmona displayed personal courage in foiling an armed attack when several officers invaded his home during a cabinet meeting to demand that the Government resign.

In the face of some bitter criticism, a presidential "election" was arranged for Mar. 25, 1928, to legalize the provisional régime of the dictator. Regulations were promulgated to ensure a satisfactory outcome, and, as predicted, General Carmona, the only candidate, was elected. The cabinet was then reconstituted with Col. Vincente Freitas as Prime Minister and with some changes held office until July, 1929. Parliament had ceased to exist. Meanwhile, the League of Nations had been requested to sponsor a $60,000,000 loan for the financial rehabilitation of Portugal, but after an investigation (beginning February, 1928) it proposed conditions which the Portuguese government felt unable to accept and the project fell through. During 1929 there was somewhat widespread complaint about burdensome taxation, but the Carmona régime appeared to be fairly firmly intrenched. The national budget showed a surplus of $400,000 according to the dictatorship and provision was being made for continued improvement of public works. Portugal's war debt to Great Britain had been funded by an agreement negotiated in December, 1926.

PORTUGUESE EAST AFRICA, or MOZAMBIQUE. A Portuguese colony on the east coast of Africa with an area of 428,132 square miles and an estimated population of 3,657,008. In 1919 the Supreme Council awarded the province an area of 400 square miles, formerly part of German East Africa, known as the Kionga triangle. Capital of Province of Mozambique, Lourenço Marques, had a population of 37,301, Dec. 29, 1927. Sugar, coconut palm, and sisal areas have increased, particularly in the districts controlled by the Mozambique Company. Other products are rubber, ivory, wax, and various ores. The trade figures for 1913 and 1927 were, in escudos: imports, 12,678,000 and 57,260,765; exports, 5,346,000 and 56,905,087. Most of the transit trade was handled through the port of Lourenço Marques, at which 774 vessels of 3,693,320 tons entered in 1927. In 1913–14, the budget balanced at 5,878,598 escudos; in 1928–29, 322,483,961 escudos, estimated. (One escudo = $1.08 at par.) After 1913, the railway building was active due to the interest manifested by the British South African provinces because of their desire to utilize the Territory's ports. Some 160 miles along the route from Delagoa Bay to Inhambane were completed; a line 156 miles long from Beira to the Zambezi was opened for traffic in 1922. The position of

Portuguese East Africa became increasingly important after 1909, because the province served as the nearest outlet for the British South African products to the sea. Delagoa Bay in particular, being 100 miles nearer to Johannesburg than Durban, was favored, and the commercial facilities and social amenities of its city, Lourenço Marques, showed continual improvement. Coal-bunkering plants were erected, as well as large wharves and docks. Through Delagoa Bay went much of the Transvaal's coal, copper, tin, asbestos, and maize. Shipping after 1914 was mainly in British and Portuguese hands. This economic relationship between the province and the British colonies accounted for the attention which Portuguese East Africa has received from the home administration. The natives were subjugated and turbulent areas pacified, and Portuguese capital was invited to aid in the province's exploitation. The result of the War put an end to the attempts of the German-controlled Nyasa Company to dominate the province. Great Britain, of course, then became the paramount factor.

Due to active and developing trade and their close propinquity, differences developed between Mozambique and the Union of South Africa. For a number of years, the two countries lived under a *modus vivendi* which it was desired to replace by a definite commercial treaty. The underlying questions concerned the Lourenço Marques Railway, the employment of Mozambique natives in the Rand Mines, and commercial relations generally. In 1927 it was announced that negotiations which had been under way had broken down and notice was given that on June 1, 1928, the labor agreement was to be terminated by Portuguese East Africa. On May 13, 1928, however, an agreement was reached and later in the year a draft convention was signed at Lisbon. This was followed by a final agreement signed at Pretoria on Sept. 11, 1928, dealing with the question of recruiting native labor for the mines, regulating customs, dues, and charges on shipments through Lourenço Marques, and stipulating the portion of tonnage to be assured to that port by the Government of the Union of South Africa.

PORTUGUESE WEST AFRICA. See Angola.

POSEN. See Poland.

POSITION INDICATOR. See Electric Motors in Industry.

POST'GATE, John Percival (1853–1926). An English classical scholar (see Vol. XIX), professor of Latin at Liverpool University (1909-20), then professor emeritus. He served as president of the Philological Society (1922–25) and of the Classical Association (1924–25), and was a fellow of the British Academy. Besides numerous articles in journals, he wrote *Lucan*, book viii, text and commentary (1917); *New Latin Primer* (1918); critical edition of *Phædrus' Fables* (1922); *Translation and Translations* (1922); *Prosodia Latina* (1923); and *Guide to Greek Accentuation* (1924).

POST-IMPRESSIONISM. See Painting and Sculpture.

POTASH. See Fertilizers.

POTATOES. The average annual production of potatoes in the United States, 1919-28, was 392,219,000 bushels. The largest planting, 4,384,000 acres, was harvested in 1917; and the largest yield, 462,943,000 bushels, was secured in 1928. Beginning with 1914, potato culture increased in the northern Mississippi Valley, especially in Minnesota and North Dakota; and several localities, particularly in western Nebraska, Idaho, and Colorado, became prominent in the production of the crop. Latterly, the production of early potatoes, marketed about May 1, has become an important enterprise in Florida. The growing of certified potatoes for seed also became an established industry, with an increasing annual production of such potatoes in a number of States and in Canada. In 1924 the production in the United States was 7,474,637 bushels, the highest on record. Certified potatoes are grown and inspected under rules and regulations for eligibility to certification. The requirements generally are freedom from varietal mixtures; conformity of tubers to the accepted type for the variety in shape, color, size, and characteristic markings; a fair degree of uniformity in size, and freedom from disease. During the World War, limited supplies and unsettled conditions led to the subjection of the international trade in potatoes to governmental regulation in many countries. In the United States, all large potato dealers were under license to the Food Administration, and standard grades recommended by the Food Administration and the Department of Agriculture were prescribed from Jan. 31 to Dec. 10, 1918. Use of the grades proved so satisfactory that it was continued voluntarily, and many States later passed laws establishing these or very similar grades as their official standards. As revised and effective June 30, 1927, the United States grades for potatoes comprise U. S. Fancy, U. S. No 1; U. S. No 2. These ratings are based on size, shape, uniformity, and the general absence of defective stock. In 1921 and 1922, low prices and high freight rates reduced shipments from many sections producing potatoes commercially, and these conditions added materially to the financial distress which befell farmers in the years following the War.

The potato diseases known as hopperburn (or tipburn), spindling sprout, late blight, and mosaic are among the most injurious. Hopperburn, spread by the potato leaf hopper, is a blighting and drying up of the leaves during hot and dry seasons; spindling sprout is a production of weak and threadlike sprouts; late blight is a total blighting of the stems and leaves during the later period of growth; and mosaic, long known in Europe, is a disease showing mottling of the leaflets with patches of light green. The introduction of the Colorado potato beetle, reported from France and Belgium, was regarded as resulting from wartime intercourse. Consult William Stuart, *The Potato: Its Culture, Uses, History, and Classification* (Philadelphia and London, 1923); U. S. Department of Agriculture *Yearbook* for 1925 and 1927.

POUND, Ezra (1885–). An English poet and translator who was born in the United States (see Vol. XIX) and was a follower of Confucius and Ovid. As literary executor for Ernest Fenollosa, he worked on Chinese and Japanese poetry, and on the Noh drama of Japan. He was London editor of *The Little Review* (1917–19). He wrote the music of an opera, *Le Testament*, which had a partial performance in Paris in 1926. His later poems were *Lustra and Other Poems* (1917); *Quia Pauper Amavi* (1919); *Umbra*, a collection of early poems (1920); *Hugh Selwyn Mauberley* (1920); and *Selected Poems*

(1928). His later prose works included *Gaudier Brzeska* (1916); *Pavannes and Divisions* (1918); *Instigations* (1920); *Indiscretions* (1923); and *The Ta Hio*, American version (1928). He translated *Certain Noble Plays of Japan*, from the Fenollosa manuscripts (1916); *Noh, or Accomplishment* (1917); *Twelve Dialogues of Fontanelle* (1917); and edited a *Catholic Anthology* (1915); and the *Letters of John Butler Yeats* (1917).

POUND, Roscoe (1870–). An American lawyer and educator (see Vol. XIX). From 1913 he was Carter professor of jurisprudence and from 1916, dean of the law school at Harvard University. He was one of the 10 members of the National Law Enforcement Commission appointed by President Hoover May 20, 1929, and was granted a leave of absence from Harvard to pursue this work. He wrote *Lectures on the Philosophy of Free Masonry* (1915); *The Spirit of the Common Law* (1921); *Criminal Justice in the American City* (1922); *Introduction to the Philosophy of Law* (1922); *Interpretation of Legal History* (1923); *Law and Morals* (1924–26).

POWDER, Smokeless. See Explosives.

POWELL, E. Alexander (1879–). An American author and war correspondent, born at Syracuse, N. Y., and educated at Syracuse University and Oberlin College. During the World War, he was correspondent for daily papers in New York and London and for *Scribner's Magazine*, and served with distinction in the Army. His books include: *The Last Frontier* (1912); *Gentlemen Rovers* (1913); *Fighting in Flanders* (1914); *Italy at War* (1917); *The Army Behind the Army* (1919); *The New Frontier of Freedom* (1920); *Asia at the Crossroads* (1922); *By Camel and Car to the Peacock Throne* (1923); *The Struggle for Power in Moslem Asia* (1923); *Beyond the Utmost Purple Rim* (1925); *The Map That Is Half Unrolled* (1925); *In Barbary* (1926); *A Virginia Pilgrimage* (1927); *Embattled Borders* (1928).

POWELL, John (1882–). An American pianist and composer, born at Richmond, Va., and educated in music in Vienna, where he studied from 1902 to 1907 with Leschetizky (piano) and Navrátil (composition). After his pianistic début in Berlin (1908), he played in Vienna, London, and Paris. In 1912 he returned to his native country and made his American début in New York. He later made frequent appearances, chiefly as interpreter of his own works. While his compositions have titles suggesting classical forms, the contents and treatment are very free, so that the works give the impression of being improvised rather than logically developed. For his thematic material, he made extensive use of Negro melodies harmonized in the most modern fashion. His works comprise a concerto for piano and orchestra; a violin concerto; an overture, *In Old Virginia; Rapsodie Nègre*, for piano and orchestra; and a string quartet. His piano works, almost exclusively in cyclical forms, include four sonatas *Virginianesque, Psychologique, Noble, Teutonica*, and two suites, *In the South* and *At the Fair*.

POWER, Frederick Belding (1853–1927). An American chemist, born at Hudson, N. Y., and educated at the Philadelphia College of Pharmacy and in Strassburg. During 1880–83 he had charge of the chemical laboratories of the Philadelphia College of Pharmacy and during 1883–92 was professor of pharmaceutical chemistry and materia medica at the University of Wisconsin. In 1916 he was given charge of the phytochemical laboratory of the Chemical Bureau of the U. S. Department of Agriculture. His original researches were in connection with phytochemistry and with essential and fatty oils, especially the development of chaulmoogra oil as a remedy for leprosy. In addition to writing many scientific papers, he was associated with F. Hoffman in the publication of the *Manual of Chemical Analysis* (1883).

POWER PLANTS. The importance of power as a factor in American industry is shown by the fact that in 1869 there was employed only 1.14 horse power per wage earner. By 1889 this had increased to 1.4; in 1919 it was 3.24 and in 1928 it had reached 4.7 horse power, an increase of 45 per cent during the last nine years. Approximately three-fourths of the machinery in American mills and factories is now motor-driven. These figures represent nearly twice the power per worker in Great Britian, over three times that in France, eight times that in Japan, and thirty times that in China.

According to the Industrial Census of the United States of 1927, the total installed primary horse power employed in manufacturing is over 39,000,000. Of this, over 18,000,000 horse power is supplied by central stations and the remainder privately generated. The difference between this and the total central station capacity represents that used for nonindustrial purposes. To this should be added between 3,000,000 and 4,000,000 horse power installed in nonindustrial buildings. Since 1914 central station power has increased at a much greater rate than private generating plants, growth among the latter now being confined mostly to the larger plants and those in industries requiring exhaust steam for process uses. At present, many of the private plants are going to relatively high steam pressures of around 400 pounds, a few have gone to 800–1000 pounds, and one to 1800 pounds. There is also a trend among many of the larger plants to purchase part of their power and generate part to the extent of balancing process-steam demands. Interchange of power between central stations and large industrial plants has likewise gained headway in many sections.

The total installed capacity of central stations in the United States at the end of 1928 was over 31,000,000 kilowatts (42,000,000 horse power), representing an investment in plants and equipment of approximately $10,000,000,000. In 1928 there were generated over 88,000,000,000 kilowatt-hours of which over 40 per cent was supplied by water power and the remainder mostly by steam. Internal-combustion engines accounted for only a very small part of central station power.

Despite increased costs in nearly every line since the World War, electric rates have steadily declined. This has been made possible through increased efficiencies in the production of electricity. In 1919 the average consumption of coal per kilowatt-hour was 3.2 pounds, and by 1928 this had been reduced to 1.7 pounds, with several individual plants doing better than a kilowatt-hour on a pound of coal. Extensive interconnections of power systems have made possible further operating economies and reduced the investment tied up in reserve capacity.

The accompanying table showing prime mover capacity of central stations was based on research

PRIME MOVER CAPACITY OF CENTRAL STATIONS IN THE UNITED STATES

Year	Prime Mover Capacity as of Jan. 1, h.p.	Hydro electric Prime Movers, h.p.	Fuel-plant Prime Movers, h.p.
	United States		
1922	22,023,000	6,251,000	15,772,000
1923	23,471,000	6,742,000	16,729,000
1924	25,114,000	7,236,000	17,878,000
1925	28,511,000	8,267,000	20,244,000
1926	33,558,000	9,267,000	24,291,000
1927	36,406,000	9,960,000	26,446,000
1928	39,569,000	10,538,000	29,031,000
1929	42,857,000	12,050,000	30,807,000
	New England States		
1922	2,279,000	590,000	1,689,000
1923	2,308,000	607,000	1,701,000
1924	2,466,000	642,000	1,824,000
1925	2,652,000	652,000	2,000,000
1926	2,873,000	729,000	2,144,000
1927	3,204,000	779,000	2,425,000
1928	3,356,000	778,000	2,578,000
1929	3,634,000	935,000	2,699,000
	Middle Atlantic States		
1922	6,649,000	1,182,000	5,467,000
1923	6,816,000	1,287,000	5,529,000
1924	7,021,000	1,398,000	5,623,000
1925	7,728,000	1,603,000	6,125,000
1926	9,349,000	1,673,000	7,676,000
1927	9,972,000	1,757,000	8,215,000
1928	10,670,000	1,811,000	8,859,000
1929	11,113,000	1,867,000	9,246,000
	East North Central States		
1922	4,615,000	552,000	4,063,000
1923	4,786,000	589,000	4,197,000
1924	5,193,000	619,000	4,574,000
1925	6,100,000	654,000	5,446,000
1926	7,461,000	755,000	6,706,000
1927	8,218,000	770,000	7,448,000
1928	8,740,000	807,000	7,933,000
1929	9,357,000	863,000	8,494,000
	West North Central States		
1922	1,718,000	361,000	1,357,000
1923	1,798,000	364,000	1,434,000
1924	1,912,000	373,000	1,539,000
1925	2,047,000	408,000	1,639,000
1926	2,498,000	425,000	2,073,000
1927	2,593,000	436,000	2,157,000
1928	2,762,000	445,000	2,317,000
1929	2,947,000	452,000	2,495,000
	South Atlantic States		
1922	2,298,000	803,000	1,495,000
1923	2,861,000	912,000	1,949,000
1924	3,159,000	998,000	2,161,000
1925	3,829,000	1,351,000	2,478,000
1926	4,025,000	1,463,000	2,562,000
1927	4,441,000	1,600,000	2,841,000
1928	4,884,000	1,727,000	3,157,000
1929	5,438,000	2,198,000	3,240,000
	East South Central States		
1922	659,000	232,000	427,000
1923	745,000	271,000	474,000
1924	889,000	321,000	568,000
1925	1,047,000	445,000	602,000
1926	1,385,000	728,000	657,000
1927	1,526,000	864,000	664,000
1928	1,662,000	963,000	699,000
1929	1,978,000	1,192,000	786,000
	West South Central States		
1922	594,000	13,000	581,000
1923	701,000	13,000	688,000
1924	728,000	13,000	715,000
1925	936,000	27,000	909,000
1926	1,102,000	29,000	1,073,000
1927	1,232,000	29,000	1,203,000
1928	1,462,000	41,000	1,421,000
1929	1,629,000	75,000	1,554,000
	Mountain States		
1922	1,030,000	807,000	223,000
1923	1,048,000	821,000	227,000
1924	1,086,000	852,000	234,000
1925	1,160,000	903,000	257,000
1926	1,262,000	960,000	302,000
1927	1,333,000	1,011,000	322,000
1928	1,481,000	1,096,000	385,000
1929	1,527,000	1,129,000	398,000
	Pacific States		
1922	2,181,000	1,711,000	470,000
1923	2,408,000	1,878,000	530,000
1924	2,660,000	2,020,000	640,000
1925	3,012.000	2,224,000	788,000
1926	3.603,000	2,636,000	967,000
1927	3,885,000	2,714.000	1,171.000
1928	4,552,000	2,870,000	1,682,000
1929	5,234.000	3,339,000	1,895.000

studies made by the *Electrical World* and data collected by the U. S. Geological Survey and U. S. Census Bureau. All figures as of Jan. 1, 1929. Generating plants of electric light and power companies, electric railways, Bureau of Reclamation, and those manufacturing companies selling energy for public utility use are included.

The trend in American central-station practice has been toward higher steam pressures, larger boiler and turbine units, and interconnection of systems. Among those responsible for the design of the more recent stations, there are three groups, those favoring 400 pounds steam pressure, those who believe that 600 to 700 pounds represent the most economical pressure and those favoring 1200 to 1400 pounds. The newer stations are about equally divided among these classes. There were in 1928 three 1200- to 1400-pound stations in operation (Edgar near Boston, Lakeside at Milwaukee, and Northeast at Kansas City). Two more (one at Deepwater, N. J. and the other at Holland, N. J.) were nearing completion, and a sixth, at San Francisco, was under construction.

In the industrial-plant field, steam pressures of 400 pounds are common, a few are operating at 600 pounds, one at 1000 pounds and one, the Philip Carey plant, Cincinnati, will employ 1800 pounds pressure. Single-boiler units are now in operation that supply regularly over 500,000 pounds of steam per hour and others are on order capable of supplying 850,000 pounds of steam per hour. Several turbine units of 160,000-kilowatt capacity have recently been installed and one of 200,000 kilowatts will soon be in operation.

While advancement in Europe has been slower from the standpoint of electricity supply, many countries are now devoting much attention to better utilization of fuels, higher efficiencies, and adequate supply with a realization that more power in industry is the key to national prosperity and better conditions. Individually, several countries, notably Germany, Belgium, and Switzerland, have made many advances in power generation, especially in the utilization of higher steam pressure, higher temperatures, and the development of materials to meet the demands of these new conditions. Italy, having no native coal, has set out to develop her water powers on an extensive scale.

European conditions in general are not conducive to such large systems and stations as in the United States, hence, the generating units are of smaller capacity. An exception to this is to be found in the Klingenburg Station near Berlin, which is designed for an ultimate capacity of over 500,000 kilowatts and now has three turbines of 80,000 kilowatts. Germany has also gone in strongly for high steam pressures. A number of plants (mostly of smaller capacity) are operating at over 800 pounds and there are two Benson boilers in service at 3200 pounds per square inch. Steam is reduced to 2400 pounds, super-heated to 840° F., and used for process after passing through a steam turbine.

Europe has lead the United States in higher steam temperatures with a number of plants operating at over 800° F., although there are signs of higher temperatures in American practice. See ELECTRIC POWER STATIONS AND GENERATING APPARATUS; WATER POWER; STEAM TURBINES.

PRAGUE, prāg. The capital of Czechoslovakia. The population at the census of 1921 was 676,657. On Jan. 1, 1922, Greater Prague was created by the incorporation of 38 surrounding townships. The city was divided into 13 administrative districts and 19 divisions. The population was increased to approximately 750,000.

The municipal government of Prague is in the hands of a mayor, communal assembly, communal council, the committees, particularly the finance committee, and a communal board of magistrates. The communal assembly, consisting of 100 members, passes on all the more important matters concerning the commune; while the communal council, consisting of 24 members, conducts the administration. The mayor, who is elected by the assembly from their number, presides over both bodies, prepares and carries into effect their resolutions, represents the commune in its dealings with outside bodies, and with two members of the communal council forms the communal board of magistrates. The mayor's appointment is confirmed by the President of the Republic. He is assisted by three deputy mayors. The seat of the local government is Municipal House, erected between 1903 and 1911 on the site of a one-time royal palace. It contains magnificent halls filled with sculpture and paintings by Czech artists. The largest one, the Smetana Hall, is used for concerts and was the place of assembly of the National Committee which in October, 1918, proclaimed Czechoslovakia an independent state.

Since 1918 the Castle of Prague has been the residence of the President of the Republic and the seat of different departments, such as the civil and military. Numerous excavations which have been made in the courtyards of the Castle, under the direction of the Archæological Institute of Prague, give an interesting history of the successive periods of its construction. There also have been discovered remnants of fortifications dating from the early Middle Ages, two Roman towers of the twelfth century, in the centre of the third courtyard a Roman church of unknown date, a connecting passage to the Cathedral of St. Vitus with a Roman crypt, and at the deepest level, Roman wooden buildings which date from the ninth century. Other departments of the Government are housed in famous buildings. The Thun Palace, in which the dethronement of the House of Hapsburg was proclaimed in November, 1918, has been occupied since 1919 by the Senate of the Czechoslovak Republic. The Ministry of Foreign Affairs is housed in the Cĕrnín Palace, which is the largest in Prague, and the Ministry of Finance in the former monastery connected with the Church of St. Joseph. The meetings of the Bohemian Diet, established in accordance with the administrative reforms of 1927, were to be held in the seventeenth-century building, formerly occupied by the Jesuit College, during the construction of the new Parliament Building.

The Cathedral of St. Vitus, which had been in the process of construction for nearly 600 years, was completed in October, 1929. In 1928 the Royal Crypt, in which are buried such famous rulers as Emperor Charles IV, King George of Podĕbrady, and Emperor Rudolph II, was opened. Round the crypt are remnants of the Roman building of the church dating from the twelfth century. In front of the former presbytery of the Cathedral, a monolith was erected in 1928 to commemorate the valor of Czechoslovakia's Unknown Soldier. A bronze statue of Woodrow Wilson also was erected the same year, in front of the Wilson Station, by Czechs living in the United States, as a mark of gratitude for the American President's sympathy in Czechoslovakia's fight for freedom. In 1925, 510 years after his death, a monument was erected to John Huss, and a Museum of the Czech Reformation, with special emphasis on the Hussite movement, was housed in the former Summer Palace. The Nunnery of the Blessed Agnes, founded in the thirteenth century, is to be entirely restored and used as a lapidarium or municipal museum, and in the Nostitz Garden there is to be erected the new State Art Gallery in which will be housed Prague's public collections of pictures, statues, and graphic art productions. The Museum of the Czechoslovak Legions was erected in 1928 at the foot of the Žižkov Hill, and it is the intention of the authorities to erect on the summit a statue of the celebrated Hussite commander, Jan Žižka, and a monument to commemorate the legionaires who lost their lives during the World War.

PRAJADHIPOK, King of Siam (1893–). He was born at Bangkok, the son of King Rama V (Paramindr Maha Chulalongkorn), and succeeded to the throne following the death of his brother, King Rama VI, on October 26, 1925. He was crowned Feb. 25, 1926, and immediately inaugurated a policy of economic and commercial development of the country along modern lines. Prajadhipok has strengthened the position of his country and of himself as an independent Oriental monarch by recently concluded treaties of friendship and commerce with the leading powers of Europe and with the United States. He married Rambai Barni. See Siam.

PRANDTL, Ludwig (1875–). A German scientist in charge of experimental work on aërodynamics in the laboratory at Göttingen. He published, with C. Wieselsberger and Dr. A. Betz, *Ergebnisse der aerodynamischen Versuchsanstalt zu Göttingen*, containing heretofore unpublished results of experiments, some conducted during the World War, and some shortly after its termination. He is best known for the *Technische Berichte* included in his book.

PRATELLA, Balilla (1880–). An Italian composer, born at Lugo. He was trained at the Liceo Rossini in Pesaro, taught at Cesena, and in 1910 became director of the Instituto di Musica at Lugo. He was one of the most active of the extreme futurists, both as composer and writer. He was the first to formulate the musical creed of the futurists, as early as 1915. His writings are mainly attacks on established standards and institutions. His compositions may serve as practical illustrations of his theories. He wrote the operas, *Lilia* (Lugo, 1913), *La Sina di Vargoun* (Bologna, 1919), *L'Aviatore di Dro* (Lugo, 1920), *La Ninna Nanna della Bambola* (Milan, 1923), and *Dono Primaverile* (Bologna, 1923); *Romagna*, five poems for orchestra; *La Guerra*, three dances for orchestra; *Inno a Vita*; chamber music; and pieces for organ and for piano.

PRATT, James Bissett (1875–). An American professor of philosophy, born at Elmira, N. Y., and educated at Williams College and Harvard University. In 1905 he joined the faculty of Williams, where he has been professor of philosophy since 1913. He studied the native religions of India in 1913–14 and Buddhism in China, Japan, and Siam in 1923–24. With Santayana, Lovejoy, and others, he published *Essays on Critical Realism* (1920). His other writings are concerned largely with the philosophy of the religious life. They include: *The Psychology of Religious Belief* (1907); *What Is Pragmatism?* (1909); *India and Its Faiths* (1915); *Democracy and Peace* (1916); *The Religious Consciousness* (1918); and *Matter and Spirit* (1922).

PRATT INSTITUTE. A nonsectarian institution for men and women in Brooklyn, N. Y., founded in 1887, comprising four schools: Fine and applied arts, household science and arts, science and technology, and library science. The enrollment for 1923–24 was 3722, for 1928–29 it was 4614. The faculty was increased during the same period from 157 members and approximately 65 lecturers to 175 members and 79 special lecturers; the library from 109,098 volumes in 1914 to 140,000 in 1928. President, Frederic B. Pratt, A.M., L.L.D.

PRAY, James Sturgis (1871–). An American landscape architect. During 1905–14 he was assistant professor of landscape architecture, and from 1914, Charles Eliot professor, at Harvard University, and from 1908 to 1928, chairman of the school of landscape architecture. From 1915 to 1920, he was Harvard adviser to the Cambridge Planning Board, meanwhile acting (1917) as city-planning expert in laying out various army cantonments, and planning (1918) United States government towns for munition workers. He was founder and in 1920–21 chairman of the National Conference on Construction in Landscape Architecture. He was special lecturer at the Massachusetts Institute of Technology, 1922–27, and author of *City Planning*, with Kimball (1913).

PREHISTORIC RACES OF MAN. See Man, Prehistoric Races of; Anthropology.

PREHISTORY. See Anthropology.

PREKINDERGARTEN SCHOOLS. See Education in the United States.

PRESBYTERIAN CHURCH. The Presbyterian Church comprises nine branches, as follows: Presbyterian Church in the United States of America; Presbyterian Church in the United States (South); Cumberland Presbyterian Church; United Presbyterian Church; Colored Cumberland Presbyterian Church; Associate Reformed Presbyterian Synod; Reformed Presbyterian Church Synod; Reformed Presbyterian Church, General Synod; and Associate Synod of North America. The Presbyterian and Reformed churches represent those features of the Reformation which were emphasized by Calvin and Zwingli.

As a whole, the various branches of the Presbyterian Church showed marked growth in the years between 1924 and 1929. The total number of members, in full communion and good standing, in the United States increased from 2,948,140 in 1922 to 3,292,610 in 1928. The members and adherents of the Presbyterian and Reformed churches throughout the world, all holding the Presbyterian system and organized in a World Alliance for purposes of fellowship and coöperation, increased during the period from 41,000,000 to 49,763,940, exclusive of more than 5,000,000 Reformed Lutherans.

In the United States, the largest of the Presbyterian churches is the Presbyterian Church in the United States of America. Its membership increased from 1,458,085 in 1914 to 2,004,467 communicants in 1929, and the number of Sunday-school scholars from 1,318,628 to 1,595,313. The number of churches dropped from 10,130 to 9361, and the number of ministers was increased from 9536 to 9966. Contributions in 1914 totaled $27,681,970, and in 1929, $65,113,110. Of the total for 1914, $2,401,972 was contributed for home missions, $1,562,800 for foreign missions, $891,654 for education, and $19,771,059 for general congregational expenses; and of the 1929 total, $4,404,123 was contributed for home missions, $3,806,946 for foreign missions, $926,000 for education, and $49,450,686 for congregational expenses.

The Presbyterian Church maintained 11 theological seminaries in 1914 and 13 in 1929. The reports of the Board of Foreign Missions showed a decrease between 1914 and 1928 from 27 to 26 foreign missions, and from 166 to 156 stations, but an increase from 1428 to 1527 missionaries, from 6856 to 8803 native helpers, from 1027 to 1385 fully organized churches, and from 178,299 to 196,781 communicants. The number of mission-school students increased from 78,733 to 105,635, and the number of Sunday-school scholars, from 232,321 to 305,088, and the number of hospitals and dispensaries, from 175 to 210.

The administration of the church is through the office of the General Assembly, the Rev. Lewis Seymour Mudge, D.D., LL.D., chief permanent executive officer, with departments of administration, publicity, vacancy and supply, church coöperation and union, and historical research and conservation; the General Council; and four boards as follows: National Missions and Foreign Missions, both at 156 Fifth Avenue, New York; Christian Education and Pensions, both at Witherspoon Building, Philadelphia.

The Presbyterian Church in the United States has always maintained a place of outstanding leadership in all movements toward the reunion of Christendom and has laid special emphasis upon the ultimate organic union of all of the Reformed churches in America holding the Presbyterian system of government. Looking to this end, union was achieved in 1906 with the Cumberland Presbyterian Church, and in 1920 with the Welsh Calvinistic Church. Negotiations were in progress during 1929 for union with the United Presbyterian Church and with the Reformed (Dutch) Church in America. In 1929 overtures by the Methodist Episcopal Church looking toward organic union were also under consideration.

The Presbyterian Church in the United States (South), often called the Southern Presbyterian Church, became a distinct denomination in 1861. It increased its membership of communicants in good standing from 310,612 in 1914 to 444,657 in 1928, its churches from 3430 to 3596, and the number of its ministers from 1819 to 2342. Its theological seminaries numbered four in 1915, and five in 1928.

See also Cumberland Presbyterian Church and United Presbyterian Church of North America.

PRÉVOST, prā′vō′ (Eugène) Marcel (1862–). A French novelist (see Vol. XIX) who was literary editor of the *Revue de France.* His later works include *Monsieur et Madame Moloch*; *L'adjutant Benoît*, translated into English as *Benoit Castain* (1916); *D'un poste de commandement*, a play produced in 1918; *La nuit finira* (2 vols., 1920); *Mon cher Tommy* (1920); *Le domino jaune* (1921); *Les Don Juanes* (1922); *L'art d'apprendre* (1922); *Nouvelles letters à Françoise* (1924); and *Sa maîtresse et moi* (1925).

PRICES. Changes in price levels, in distinction from changes in the cost of living, are measured customarily from differences in wholesale prices of certain commodities. The commodities usually selected are those which have been available in the markets in uniform grade for some period of time and seem likely to continue to be so available in the future. In the United States, the more important index numbers for wholesale prices are those of the U. S. Bureau of Labor Statistics, the Federal Reserve Board, *The Annalist*, Bradstreet, Dun, and the somewhat different type of index number established by Prof. Irving Fisher. Price changes in Great Britain are shown by the index numbers of the British Board of Trade, *The Economist*, and *The Statist* (Sauerbeck). For Canada, we have the index number of the Dominion Bureau of Statistics; for Australia, that of the Commonwealth Bureau of Census and Statistics; for France, that of the Statistique Générale; for Italy, that of Prof. Riccardo Bachi; for Japan, that of the Bank of Japan in Tokyo. Index numbers of wholesale prices are available also in many other countries. While there is always some variation in the amount of change shown by different index numbers in the same country, as well as by those for different countries, according to the kinds of commodities selected as the basis for the index number and the way in which the prices of these commodities happen to be affected by current market conditions, there was a surprising uniformity prior to the World War in the price trend shown by the indexes then available. Following a world-wide increase in prices over many years, a decrease in prices began about 1873 in all countries and continued until about 1896. An upward movement then began and was still in progress in 1914.

With the many and varied economic disturbances caused by the War, the accurate measurement of changes in price levels became increasingly difficult. Prices of certain articles rose rapidly, others but slightly. Elaborate systems of price fixing were established in many countries; fairly high prices were fixed in some in-

WAR INDUSTRIES BOARD INDEX NUMBER

Separated into Controlled and Uncontrolled Prices (Average Prices, July, 1913, to June, 1914 = 100)

		Controlled prices (573 commodities)	*Uncontrolled prices* (793 commodities)	*All commodities* (1366 commodities)
1913	Year	100	102	101
1914	Year	100	97	99
1915	Year	102	102	102
1916	Year	125	124	126
1917	August	204	162	187
	September	205	163	186
	October	198	167	182
	November	200	172	183
	December	193	174	182
	Year	188	156	175
1918	January	195	178	185
	February	198	180	187
	March	197	182	188
	April	196	187	191
	May	192	189	190
	June	189	191	189
	July	195	194	193
	August	199	195	196
	September	204	199	201
	October	201	201	201
	November	200	200	200
	Year	197	191	194

INDEX NUMBERS OF WHOLESALE PRICES, BY YEARS, 1890 TO 1928
UNITED STATES
[1926 = 100]

Year	Farm products	Foods	Hides and leather products	Textile products	Fuel and lighting	Metals and metal products	Building materials	Chemicals and drugs	House-furnishing goods	Miscellaneous	All commodities
1890	50.4	55.5	47.5	57.8	38.1	105.3	46.5	73.2	49.9	97.9	56.2
1891	54.2	54.8	47.9	54.6	37.0	92.2	44.2	74.0	50.4	94.3	55.8
1892	49.5	51.0	47.2	55.2	34.8	84.0	41.7	74.6	48.1	86.6	52.2
1893	51.3	54.7	45.1	54.1	35.3	76.8	41.6	72.7	48.1	89.0	53.4
1894	44.6	48.2	43.0	46.1	34.3	65.7	39.8	65.5	45.3	86.4	47.9
1895	43.9	47.3	49.4	44.3	40.3	70.4	38.8	64.7	43.5	88.9	48.8
1896	39.6	44.1	45.2	43.1	39.5	71.2	38.9	65.0	43.4	90.2	46.5
1897	42.5	45.5	45.9	42.9	33.9	65.0	37.4	70.9	42.5	92.5	46.6
1898	44.9	47.8	48.3	44.9	34.5	65.3	39.6	77.4	44.0	93.4	48.5
1899	45.8	47.7	49.4	47.7	41.2	100.0	43.6	81.1	45.0	97.4	52.2
1900	50.5	50.8	49.4	53.3	46.3	98.0	46.2	82.1	48.9	102.0	56.1
1901	52.8	50.5	48.9	48.1	44.6	93.1	44.3	84.2	48.9	93.4	55.3
1902	58.4	53.3	50.8	49.4	51.8	91.0	45.3	86.5	49.2	88.1	58.9
1903	55.6	52.0	49.9	52.8	60.3	90.2	46.7	84.1	50.9	98.9	59.6
1904	58.5	54.0	49.7	52.9	53.3	79.9	45.0	84.1	50.3	109.5	59.7
1905	56.4	55.1	53.9	54.1	49.6	89.1	48.1	82.3	49.7	117.4	60.1
1906	57.3	53.4	57.7	58.7	52.0	102.4	54.0	76.8	51.3	115.3	61.8
1907	62.2	57.0	58.0	63.5	54.4	109.8	56.8	78.5	55.0	108.2	65.2
1908	62.2	58.7	55.6	54.8	53.7	86.3	52.0	79.6	51.6	97.8	62.9
1909	69.6	62.6	61.5	56.5	51.6	84.5	53.7	79.9	51.7	129.6	67.6
1910	74.3	64.9	60.2	58.4	47.6	85.2	55.3	82.0	54.0	152.7	70.4
1911	66.8	62.0	58.8	55.5	46.7	80.8	55.3	81.6	52.7	108.6	64.9
1912	72.6	66.8	64.5	55.7	51.4	89.5	55.9	80.7	53.0	106.4	69.1
1913	71.5	64.2	68.1	67.3	61.3	90.8	56.7	80.2	56.3	93.1	69.8
1914	71.2	64.7	70.9	54.6	56.6	80.2	52.7	81.4	56.8	89.9	68.1
1915	71.5	65.4	75.5	54.1	51.8	86.3	53.5	112.0	56.0	86.9	69.5
1916	84.4	75.7	93.4	70.4	74.3	116.5	67.6	160.7	61.4	100.6	85.5
1917	129.0	104.5	123.8	98.7	105.4	150.6	88.2	165.0	74.2	122.1	117.5
1918	148.0	119.1	125.7	137.2	109.2	136.5	98.6	182.3	93.3	134.4	131.3
1919	157.6	129.5	174.1	135.3	104.3	130.9	115.6	157.0	105.9	139.1	138.6
1920	150.7	137.4	171.3	164.8	163.7	149.4	150.1	164.7	141.8	167.5	154.4
1921	88.4	90.6	109.2	94.5	96.8	117.5	97.4	115.0	113.0	109.2	97.6
1922	93.8	87.6	104.6	100.2	107.3	102.9	97.3	100.3	103.5	92.8	96.7
1923	98.6	92.7	104.2	111.3	97.3	109.3	108.7	101.1	108.9	99.7	100.6
1924	100.0	91.0	101.5	106.7	92.0	106.3	102.3	98.9	104.9	93.6	98.1
1925	109.8	100.2	105.3	108.3	96.5	103.2	101.7	101.8	103.1	109.0	103.5
1926	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1927	99.4	96.5	107.9	95.7	86.5	98.2	93.3	96.6	98.2	89.9	95.4
1928	105.9	101.0	121.7	96.3	82.8	99.8	93.7	95.5	97.4	83.0	97.7

stances to encourage production, and in other instances fairly low prices were fixed to check profiteering, both in connection with large sales to the Government and its allies, and in connection with retail sales to consumers. The general effect of price control in the United States is illustrated by the accompanying table showing index numbers for a large number of commodities brought under official control between August, 1917, and November, 1918, in comparison with other commodities left uncontrolled.

In the European countries especially closely affected by the War, price control began much earlier than in the United States; a large number of articles were usually covered, and all price rulings were carefully enforced. In all countries, however, whether or not there was price control, uniform tendencies were found in price trend, indicating the strength of the forces which control changes in price levels in all parts of the world. As between 1913 and 1914, almost no change in price level was shown. A significant and continued increase beginning in 1915 culminated about October, 1918. During the winter of 1918–19, there were slight and irregular fluctuations in prices, followed by a period of rapid increase, until the peak was finally reached during the summer of 1920. Prices then fell even more rapidly during a year and up to 1924 remained relatively stationary with slight tendencies toward small increases in most countries, the exception being in the price indexes of countries with a depreciating paper currency. Following 1924, prices in the United States fluctuated within a narrow range. The accompanying table, prepared by the U. S. Bureau of Labor Statistics, gives index figures for wholesale prices, based on 1926. Some 550 commodities were used.

Although, as has been indicated above, a policy of price fixing was adopted during the War as a stimulus to production, there was little tendency to continue this policy longer than necessary for war purposes. This has been true also with reference to price fixing as a means of protecting purchasers from excessively high prices in relation to costs of production and distribution; every effort was usually made to restore as rapidly as possible earlier conditions of price control through free and open competition. The acute housing shortage in many countries necessitated the protection of tenants from rent increases until additional housing construction should have brought available supply of houses into closer relation to acute demand for housing accommodations. See Agricultural Credit; Finance and Banking; Housing.

PRIESTLEY, John Boynton (1894–). A British writer, whose chief fields were those of biography, essay, and critical review. He was born at Bradford, educated there and at Trinity Hall, Cambridge, and served in the army throughout the World War. Besides articles for magazines, his publications include *Brief Diversions* (1922); *I For One* (1923); *Figures in Modern Literature* (1924); *The English Comic Characters* (1925); *Talking* (1926); *George Meredith* (1926) and *Thomas Love Peacock* (1927) in the English Men of Letters Series; *Adam in Moonshine* (1927); *Benighted* (1927); *Too Many People* (1928); *Apes and Angels* (1928); *English Humor* (1928); *Farthing Hall*, with Hugh Walpole (1929); and *The Good Companions*, novel (2 vols., 1929). Some of the works that he edited were *Tom Moore's Diary* (1924); *Essayists Past and Present* (1925); *Fools and Philosophers: a Gallery of Comic Figures in English Literature* (1925); and *The Bodley Head Book of Verse* (1926).

PRIESTLY, Herbert Ingram (1875–). An American historian, born at Fairfield, Mich., and educated at the University of Southern California. He taught in California for several years and from 1901 to 1904 was a teacher and superintendent of schools in Luzon, P. I. Returning to the United States, he was superintendent of schools and teacher in California high schools until 1912, when he was appointed assistant curator of the Bancroft Library at the University of California. In 1920 he became librarian and also associate professor of Mexican history at that university and in 1923 full professor of the same subject. He wrote *José de Galvez, Visitor-General of New Spain, 1765–71* (1916); *The Mexican Nation, a History* (1923); *The Luna Papers* (1927); *The Neighbors of the English* (1928); *The Coming of the White Man, 1492–1849* (1929); and many articles on Californian, Mexican, and Spanish-American history. In 1918 he was awarded the second Loubat Prize at Columbia University for the best work on the history of North America during the colonial period.

PRIMITIVE MAN. See Anthropology.

PRIMO DE RIVERA. See Rivera y Orbaneja, Miguel Primo de.

PRINCE, John Dyneley (1868–). An American diplomat (see Vol. XIX). He resigned as professor of Slavonic languages at Columbia in 1921 when he was appointed Minister to Denmark. Since 1926 he has been Minister to Jugoslavia. He wrote *Practical Grammar of the Lettish Language* (1925).

PRINCE, Morton (1854–1929). An American neurologist and psychologist born in Boston (see Vol. XIX). Dr. Prince was active in relief and other war activities following the entrance of the United States into the World War and received numerous foreign decorations. He was made associate professor of abnormal psychology at Harvard University in 1926. In addition to his earlier works, he published numerous monographs on medical, psychological, and philosophical subjects and collaborated in a number of medical volumes. See Psychology and Psychoanalysis.

PRINCE EDWARD ISLAND. The smallest of the Canadian provinces with an area of 2184 square miles. In 1911 the population was 93,728; in 1921 it had fallen to 88,615, or a decrease of 5.5 per cent. In 1929 the population was estimated officially at 86,100. The rural population was still preponderant though it declined as a result of the migrations to the cities; 84 per cent of the population was rural in 1911, and 78.5 per cent in 1921. Populations of the principal cities in 1921 were: Charlottetown, 12,347; Summerside, 3228.

Industry and Trade. Of the total 1,397,990 acres in the province, 1,216,483 acres are occupied as farms. Among the field crops, hay and clover, oats, potatoes, and wheat receive the most attention. Diversified farming, however, is the rule, the abundance of fodder crops making the live-stock industry particularly important. Total value for farm products was $22,012,000 in 1927. Fox breeding continues to be important and yielded over $3,000,000 in 1926, there being in this year 575 fur farms with land and build-

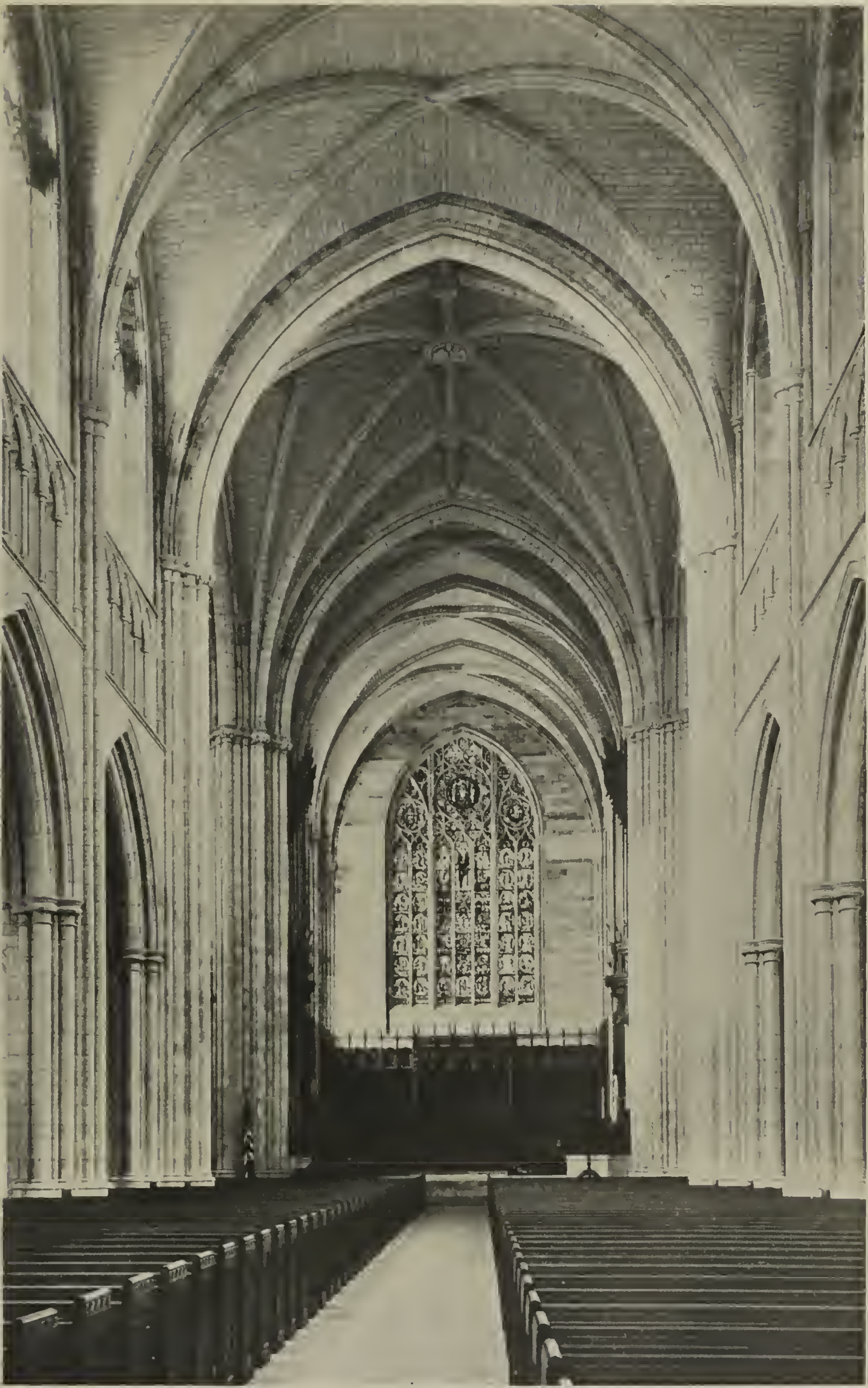

Photo by Sigurd Fischer

UNIVERSITY CHAPEL, PRINCETON UNIVERSITY

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ings valued in excess of $1,000,000. The fish catch netted $1,367,807 for 1927, as compared with $1,379,905 in 1913. Lobsters make up three-fourths of the total and are canned in local establishments. Manufacturing continues on a small scale. In 1927 the 291 establishments represented a capital of $3,081,504 ($2,013,365 in 1910), employed 2332 workers, and had a gross output valued at $4,493,628. Exports to foreign countries in 1928 amounted to $1,265,888; imports for consumption, to $1,734,583. In 1927 there were 279 miles of railways.

Government. Revenues for 1927 were $836,748; in 1914 they were $525,555. Expenditures for 1914 and 1922 were $445,396 and $870,427. The bonded indebtedness of the province in 1927 was $1,933,000. Expenditures on education for 1913 were $261,641; for 1927, $458,477, of which $284,313 was government grants and $174,164 local assessment. Women have been enfranchised and given the right to stand for the provincial assembly. Representation in Canadian Parliament: House of Commons, 4; Senate, 4.

PRINCE OF WALES. See EDWARD ALBERT CHRISTIAN GEORGE ANDREW PATRICK DAVID, PRINCE OF WALES.

PRINCETON UNIVERSITY. A nonsectarian institution for men at Princeton, N. J., founded in 1746. The enrollment increased from 1641 in 1914 to 2453 in 1928, of whom 2226 were undergraduates. In 1922 a limitation of numbers to about 2000 undergraduates was adopted owing to lack of housing and teaching equipment for a larger registration. During the period, the productive funds of the university increased from $5,399,150 to $17,743,840; the faculty from 207 to 264 members; and the library from 320,701 to 611,000 volumes. With the limitation of enrollment, a selective process was instituted by which admission was based not only on scholarship, but also on character. As a continuation of the Reserve Officers Training Corps maintained during the war period, the Reserve Officers Training Corps in Field Artillery was instituted after the War, commissioning selected students, on graduation, to serve as reserve officers in the United States Army. The necessary reconstruction of the university on a more substantial financial basis led at the close of the War to a campaign for increasing endowment and nearly $10,000,000 was collected. The executive and administrative departments of the university also were reorganized with a view to better coördination. Faculty autonomy and sympathetic coöperation between the board of trustees and the faculty were developed. All questions of academic policy were discussed in joint council through a conference committee; a plan for systematizing faculty appointments, salaries, promotions, retirement, and pension was in operation; the faculty had a voice in nominating its committees; representatives of the faculty sat with the trustees' committee on honorary degrees; and the rights of the individual in case of dismissal were safeguarded.

In 1925 the first Princeton Summer Art Institute was held under the auspices of the Harvard-Princeton Fine Arts Club. In 1926, by the will of David Paton, the Egyptologist, his library of 2900 volumes was left to the university and the Garret Collection of Arabic Manuscripts acquired 500 items by purchase from the Baroody and Widgery collections. The psychological laboratory, Eno Hall, the buildings of the artillery department, and several dormitories were completed. In 1927, $150,000 was given anonymously to endow a chair in geography; the library received an endowment from Mrs. P. L. LeBrun for the development of the valuable Montaigne and Rabelais collections, and the private library of the late Charles Richard Williams, poet and scholar; $150,000 was used by Arthur Sachs of New York to establish the Arthur Sachs Foundation to finance *Art Studies*, a publication issued jointly by the department of art and archæology at Princeton and the division of fine arts at Harvard. The Princeton Scientific Expedition in 1928 discovered in the Bighorn Basin of Wyoming valuable fossil material for the study of the mammalian fauna of the lower Eocene.

Chiefly as a result of an endowment increase of $2,000,000 raised by the alumni, the scale of faculty salaries was raised in 1928. The new range is $6000 to $9000 for full professors, $4500 to $5750 for associate professors, and $3000 to $4250 for assistant professors. Extensive building operations were engaged in, including the Lockhart Dormitory, extensions to the Graduate College, the gymnasium, and McCormack Hall for the school of architecture, and an engineering school dedicated in the fall of that year. Mr. Harvey S. Firestone gave $50,000 to the university chapel fund. Early in 1929, $500,000 was given by Thomas D. Jones and Miss Gwethalyn Jones of Chicago for a building to be devoted to the department of mathematics and the department of mathematical physics and in memory of the late Dean Henry Burchard Fine. President, John Grier Hibben, Ph.D., D.D.

PRINGLE-PATTISON, ANDREW SETH (1856–). A British philosopher (see VOL. XIX). He retired as professor of logic and metaphysics in the University of Edinburgh in 1919 and was Gifford lecturer at the university in 1921–23. He was made a fellow of the British Academy. His later publications include *The Idea of God in the Light of Recent Philosophy*, Gifford lectures (1917); *The Idea of Immortality*, Gifford lectures (1922); *The Philosophy of History*, British Academy lecture (1923). He edited *Locke's Essay Concerning Human Understanding*, abridged (1924), and *Essays in Ethics and Religion*, by Professor James Seth, published with a memoir (1926).

PRITTWITZ UND GAFFRON, FRIEDRICH WILHELM VON (1884–). A German diplomat, who was born in Stuttgart. Entering the diplomatic service in 1909, he served in a subordinate capacity at the embassies in Washington and St. Petersburg (Leningrad) previous to the World War. During that conflict, he was in the German Chancellor's office. Appointed consul in Trieste in 1920, he was transferred to the German Embassy at Rome in 1921 and served there until his appointment as Ambassador to Washington in January, 1928.

PROBATION. See JUVENILE COURTS.

PRODUCERS' COÖPERATION. See COÖPERATION.

PROHIBITION. Prohibition is the term generally used throughout the United States to describe governmental prohibition of the manufacture, sale, and transportation of intoxicating alcoholic beverages. As an outgrowth of the temperance and anti-saloon movements of many preceding decades, it became one of the outstanding issues of the period after 1914. Many believe that prohibition by legislation and amendment was precipitated by the World War. Federal or national prohibition is the culmination of various efforts to regulate and restrict the liquor traffic and is a sequence to cumulative local and State prohibition. The term prohibition is being used to include activities similar to those just mentioned when they occur in other countries.

Local and State Prohibition. Prohibition early became effective in the United States through the exercise by communities of the privilege of "local option" in this matter, as extended to them through State legislation. In time, this local option extended to districts and to States; and until 1914 it was the prevailing form of prohibition in the United States. State-wide prohibition, by legislation and constitutional amendment, spread rapidly during the first few years of the decade 1914–24. At the close of 1913, only nine States had "gone dry," as the popular expression went. Eight of these, Maine, North Dakota, Kansas, Oklahoma, North Carolina, Georgia, and Mississippi, had adopted State-wide prohibition before 1910; West Virginia joined these in 1912. In some of these States, the early enforcement legislation proved inadequate, and the States did not have what was commonly called "bone-dry" legislation until a later date. In 1914 four more States, Colorado, Oregon, Virginia, and Washington, brought the total to 13; and in 1915, three more, Alabama, Arizona, and South Carolina, made the total 16. Alabama had enacted statutory prohibition in 1909 which was practically repealed in 1911 and reënacted in 1915. In 1916 seven additional States, Arkansas, Idaho, Iowa, Michigan, Montana, Nebraska, and South Dakota, made a total of 23, one less than half the number of States in the United States, but principally the less densely populated Southern and Western States. In others, there had been a rapid extension of local prohibition under local option, so that some of these States were half, and a few three-quarters, dry territorially.

All of this occurred before the United States entered the World War in 1917. State-wide prohibition continued to spread steadily, and before the Federal Amendment had become effective in 1920, State-wide prohibition had carried in 10 more States. Four of these, Indiana, New Hampshire, New Mexico, and Utah, went dry in 1917; four, Florida, Nevada, Ohio, and Wyoming, in 1918; and two, Kentucky and Texas, in 1919. The amendments and legislation in many of these States did not become effective until the year following its adoption, and in several cases not until the second year thereafter. Prior to the time that the National Prohibition Amendment became effective, 33 States had adopted some form of State-wide prohibition, and many of the States had supplemented their early legislation with "bone-dry" laws. It has been estimated that the dry territory at this time contained about two-thirds of the population of the United States, for some of the more densely populated States, so far as State legislation was concerned, remained "wet" until they came under Federal prohibition. Considerable sections of these 15 wet States were, however, under local prohibition. In 21 of the 33 dry States, the issue had been decided by popular vote and in 12, by the respective State legislatures.

Federal Prohibition Legislation. Federal action on this issue began in 1913, when the Prohibitionists attained a majority in Congress, which up to 1924 they had never lost. The first act was the passage of the Webb-Kenyon Interstate Liquor Shipment Act over the veto of the President of the United States. This act made illegal the shipment of liquor from a "wet" to a "dry" State. Although President Taft vetoed the bill because in his opinion it was unconstitutional, the Supreme Court handed down a decision (Jan. 8, 1917) upholding its constitutionality. Shortly after this decision, the Alaska Prohibition Act and the Porto Rico Prohibition Referendum were passed. On Mar. 3, 1917, the President signed the District of Colombia Prohibition Bill, which became effective Nov. 1, 1917. As a result of activities led by Senators Reed and Jones and by Representative Randall, there were passed as amendments to the Post Office Appropriation Bill provisions whereby the United States mails were closed to all advertisements of the sale of alcoholic beverages, including letters or newspapers containing the same, when addressed to any person, firm, corporation, or association in any State or Territory where the sale and manufacture of intoxicating liquors had been prohibited. These amendments included what was in effect an extended and more definite statement of the intent of the Webb-Kenyon Act. This legislation was also approved by the President on Mar. 3, 1917.

During the War, a number of emergency measures, restrictive and prohibitive, were passed, aiming to conserve the food and fuel supply and to protect the efficiency of the Army and Navy and of the workers in the war industries. Among these was the War Prohibition Act, passed Nov. 21, 1918, and effective in July, 1919, which forbade until demobilization had been completed the sale for beverage purposes of distilled, malt, or vinous intoxicating liquors. This act continued to function until the Eighteenth Amendment became effective.

The Eighteenth Amendment. The general movement for Federal prohibition registered itself in 1914, when a resolution proposing a constitutional amendment received a majority vote in the House of Representatives, and in 1916, when such a motion was reported by committee in the Senate. A resolution submitting to the States the National Prohibition Amendment to the Constitution of the United States was adopted by the Senate on Aug. 1, 1917, by a vote of 65 to 20, and passed with slight amendments by the House of Representatives on Dec. 17, 1917, by a vote of 282 to 128. The day following, the Senate concurred, and the resolution was adopted. The article of the joint resolution which is now Article XVIII of the Amendments to the Constitution was and is as follows:

> 1. After one year from the ratification of this article, the manufacture, sale or transportation thereof of intoxicating liquors within, the importation into, or the exportation thereof from, the United States and all territory subject to the jurisdiction thereof, for beverage purposes, is hereby prohibited.
> 2. The Congress and the several States shall have concurrent power to enforce this article by appropriate legislation.
> 3. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the Legislatures of the several States, as provided by the Constitution within seven years from the date of the submission hereof to the States by the Congress.

The legislatures of the necessary three-fourths (36) of the States had ratified the amendment on Jan. 16, 1919. The ratification was proclaimed by the Secretary of State on January 29. Subsequently, 10 additional States ratified. The States that did not ratify were Rhode Island and Connecticut.

Federal Enforcement Legislation. The National Prohibition Act, commonly known as the Volstead Act, was passed by Congress and submitted to the President, who vetoed it on Oct. 27, 1919. The same day, the House voted to pass over the veto: yeas, 176; nays, 55; answering present, 3; not voting, 197. The next day, the Senate voted to pass over the executive veto: yeas, 65; nays, 20; not voting, 11. This act fixed one-half of 1 per cent as the maximum of alcohol in nonintoxicating beverages. It placed responsibility for enforcement with the "Commissioner of Internal Revenue and his assistants." They were to "investigate violations" and to "report to the local United States Attorney," who must "prosecute offenders under the Attorney General's direction." The law provided for drastic enforcement of the amendment and established strict regulation of the distribution of liquor for the few specific uses permitted by the law. The United States Supreme Court on June 7, 1920, in a unanimous decision sustained the validity of the Eighteenth Amendment and of the Volstead Act. In 1925 steps toward the centralization of the enforcement machinery were taken by Secretary of the Treasury Mellon, when he combined the administration of the activities of the Customs Service, the Coast Guard, and the Prohibition Unit under one head, an Assistant Secretary of the Treasury.

General Lincoln C. Andrews, the first incumbent of this post, served from 1925 to August, 1927, when he was succeeded by Seymour Lowman of New York. Under the new plan, the 49 State Federal Prohibition directors were eliminated and for them there were substituted 24 Federal Prohibition Administrators in charge of areas corresponding to the Federal judicial districts. In 1927 Congress enacted a series of laws placing enforcement agents under the Civil Service, making the Prohibition Unit a Federal bureau, and centralizing the whole enforcement machinery in the office of the Secretary of the Treasury.

To strengthen further the enforcement process, Congress in 1929 enacted the drastic Jones Law which provided that persons convicted of manufacturing, importing, exporting, selling, and transporting liquor could be sent to jail for five years and fined $10,000. Under Assistant Attorney General Mabel W. Willebrandt (resigned in 1929), in the Coolidge and Hoover administrations, the Department of Justice prosecuted prohibition violators vigorously, though in New York City serious setbacks were received in the refusal of juries to find indicted persons guilty because of the vigorous penalties awaiting them. During the period, in a number of decisions, the Supreme Court interpretated the prohibition law strictly, even countenancing in 1928 by a vote of 5 to 4, the use of wire-tapping by enforcement agents endeavoring to obtain evidence against suspects.

For the fiscal year 1924–25, $10,629,770 was spent by the Federal Government on prohibition. For the year 1928–29, Congress authorized the expenditure of $13,500,000 for the Prohibition Bureau and $14,686,000 for the Coast Guard. The debate in Congress at that time indicated that such a sum was preposterously small. The wets sought to pass a bill voting an expenditure of $300,000,000 for enforcement on the theory that prohibition should be given a complete test once and for all; but the drys evidently feared to put the matter to the test, for they fought the passage of higher appropriation measures.

One of the serious charges made against the enforcement machinery during the period was the high toll of life taken. Figures published in 1929 showed that, during 1920–28, 135 civilians and 55 dry agents had been killed through dry enforcement work. The divided authority between the enforcement and prosecuting agencies, and the obvious weaknesses in the enforcement machinery led President-elect Hoover in 1928 to announce that one of the early tasks of his administration would be a complete overhauling of the enforcement machinery.

Treaties. On Jan. 23, 1924, the United States and Great Britain signed a liquor treaty by which Great Britain agreed to waive her rights beyond the three-mile limit to permit American revenue ships to pursue suspect ships for the purpose of boarding. The right of seizure was recognized within one hour's sailing distance from the coast. Treaties along similar lines were made with the following powers during 1924–28: Norway, Germany, Sweden, Denmark, Italy, Panama, Netherlands, France, Greece, and Japan. In 1924 the Canadian government signed a treaty by which it agreed to coöperate with the United States in checking rum-running. Mexico in 1925 and Cuba in 1926 followed suit. In 1929, however, Canada refused to give the American government additional rights in its attempt to cope with liquor smuggling across the border on the score that it could profit nothing from such an arrangement.

In March, 1929, the whole subject of the status of these treaties became a matter of discussion when a Coast Guard cutter fired upon and sank the *I'm Alone*, an admitted Canadian rum-runner, 215 miles off the Louisiana coast. The American prohibition agents insisted they were entitled to the right of continuous pursuit if the chase had been taken up within the allowed one-hour's sailing distance (12 miles). In April, Canada filed a formal protest.

Anti-saloon League of America. The agency more responsible than any other for leadership in the State and National prohibition legislation during the decade was the Anti-saloon League of America. Organized in May, 1893, it is frequently described as "the church in action against the saloon." It is properly credited, both by its friends and its enemies, as having been chiefly responsible for the rapidly increasing sentiment in favor of prohibition. It is organized by States and acts as an agent for the churches in matters concerning the annihilation of the liquor traffic. The league established national propaganda headquarters at Washington, D. C., in 1915, and in 1916 it launched the national campaign for the amendment of the Federal Constitution. It has kept a corps of trained men at the National and at State capitals to represent its constituency. It has examined the practices of representatives of the people and inquired into the attitude of candidates for public office, in so far as these related to prohibition, and opposed those who did not concur, regardless of party affiliation. Since the adoption of the Eighteenth Amendment and the passage of the Volstead Act, it has turned its energies to the difficult task of promoting law enforcement, to project a programme of Americanization, and to carry on the work of prohibition in foreign countries. For the latter purpose, the World League against Alcoholism has been formed. The avowed purpose of the new organization is "to attain by means of education and legislation the total suppression throughout the world of alcoholism." It pledges itself to "avoid affiliations with any political party as such, and to maintain an attitude of strict neutrality on all questions of public policy not directly and immediately concerned with the traffic in alcoholic beverages." The leading spirit and general counsel of the Anti-saloon League, Wayne B. Wheeler, died in September, 1927. His work was thereafter divided in two sections headed, respectively, by Dr. F. Scott McBride, in charge of the political and legislative work, and Ernest H. Cherrington, in charge of the education and propaganda.

Opposition. Beginning about 1925, opposition to the Prohibition Amendment began to take on a serious and organized form. Up to that time, opponents had talked vaguely of sumptuary legislation, States' rights theories, unwarranted extension of police power, etc. From 1925 on, however, the principle of nullification (its use had been effectively pointed out by Walter Lippmann) began to be applied. The Association Against the Prohibition Amendment, which was organized in 1927 and elected Henry H. Curran as its president in 1928, with a large budget and effective educational methods, gave serious attention to organizing this sentiment. The result was that during 1926–29, the following action took place: In April, 1929, the Legislature of Wisconsin repealed the State enforcement law; in 1929 the New York Legislature refused to pass a State Enforcement Act (which it had originally repealed in 1923); the Illinois electorate in 1926 voted in favor of the modification of the Volstead Act; the Montana Legislature in 1928 refused to enact the Volstead Law as a State law to replace its repealed Prohibition Law (1926); the Nevada electorate in 1926 voted "yes" on these two questions: "Is Prohibition a failure?" and "Should Congress call a Constitutional Convention to amend the Eighteenth Amendment?"

Similarly, in 1928, the Massachusetts voters instructed their State Senators to ask Congress to repeal the Eighteenth Amendment. The proposals to repeal State enforcement acts won in Illinois by a vote of 3 to 2; in New York by a vote of 3 to 1; and in Nevada by a vote of 4 to 1. On the other hand, similar proposals were voted down in North Dakota, Colorado, California, and Missouri, but by very small majorities.

Governor Alfred E. Smith of New York, in the presidential campaign of 1928, evoked much popular enthusiasm in his demand for the modification of the prohibition law on the basis of State manufacture and sale of alcoholic beverages. While the drys claimed his defeat as a victory for prohibition, it was generally recognized that the election did not centre on the prohibition issue and that Governor Smith's defeat was due in part to other causes.

Social and Economic Consequences of Prohibition. Many statistics have been compiled in order to prove the good and ill effects of prohibition. Proponents have seen in the passing of the saloon an undoubted social gain; from this have come prosperity, decline in dependency, increase in savings-bank accounts, etc. Opponents attribute to prohibition the increase in drinking among the youth of the country, the development of night-club life and the increase in prostitution, and the great flaring up of crime: For example, the Association Against the Prohibition Amendment has found, since 1920, a gradual increase in the four major indices of intemperate drinking, etc., arrests for drunkenness, arrests of drunken drivers, alcoholic insanity, and deaths from alcoholism. Of the many dubious statistical data cited on both sides, the American public made its choice, selecting those that confirmed previously arrived-at attitudes. There is no question that dependency was on the decrease rather than otherwise, and that prosperity was due to economic causes and not prohibition. The old-type saloon was worth abolishing; but whether the regulated sale of liquor (as was being done in Quebec) could not have effected the same end without producing the bootlegger, the rum-runner, and tainted or poisonous alcohol were subjects ardent drys refused to discuss.

The enthusiasm which greeted Governor Smith's proposals in 1928 showed that many thinking people had serious doubts whether prohibition on its present lines could ever be enforced or was indeed desirable.

By 1929, therefore, it was evident that prohibition had assumed the same proportions before the American public that the slavery question occupied before the Civil War. Slavery was a moral question and not solely economic or racial or social. So it was with prohibition. Evidence, no matter how scientific, could not persuade people to relinquish their present views or change them. The fact is, in only one way could its success be demonstrated and that was by honest and thoroughgoing enforcement. The drys were not willing to chance this yet, with the result that the South and West remained dry and the industrial centres were even wetter than before the prohibition era.

The Consumption of Liquor since Prohibition. The consumption of liquors has been of two sorts, legal and illegal. The former covers especially consumption for medicinal and sacramental purposes and conversion for industrial alcohol. The latter included irregular withdrawals from warehouses, domestic manufacture, and smuggling. The facts regarding the withdrawal of bonded liquors from bonded warehouses are comparatively definite. The "peak" of the annual withdrawals of liquor of this sort occurred in 1917, during which year 160,000,000 gallons were taken out of bond. In 1923 about 11,000,000 gallons were thus withdrawn. At the beginning of the decade, there were 285,000,000 gallons in bond and in 1923 but 45,000,000. It is self-evident that this source of supply could not long continue, and the activities of the enforcement unit were operating to make more difficult the removal of the balance for illicit purposes. The commercial manufacture of high alcoholic drinks seemed to have been abandoned by almost all of those engaged in this business prior to 1920. The consumption of beer is quite another matter. Prior to prohibition, beer constituted by volume 90 per cent of the liquor consumed in the United States. The American Brewers' Association estimated that the total production of beer after prohibition was about 20 per cent of what it formerly was, and there are reasons for believing that this is a fairly liberal estimate.

"Home-brew" activities spread rapidly. All efforts to gauge their extent in the aggregate were relatively futile. The various studies made of the consumption of commodities essential to home brew, such as malt, rye, hops, yeast, etc., and of the sale of apparatus for the purpose, were full of errors and of doubtful hypotheses. There was much illicit manufacture of wines. This was somewhat reflected in the enormous traffic in grapes, which, however, must be considered also in relation to the general increase in the traffic in fruits and the increased use of grapes for unfermented grape-juice products. There were many ramifications of these activities, some of which were merely more extensive activity in ancient practices such as the making of hard cider and of applejack. Many prominent social workers were inclined to look on these activities, especially home brewing, as temporary reactions; novelties which were troublesome, expensive, a general nuisance, and which at best yielded unsatisfactory products of amateurs. They did, however, furnish a very considerable supply of alcoholic beverages for local consumption.

Liquor sold in "speakeasies" and by bootleggers came from other sources. During the period 1920-29, the chief sources for the illicit supply were the following:

1. *Rum Row.* Before the signing of treaties with foreign powers and the use of the Coast Guard in enforcement work, the illicit liquor came from foreign countries, i.e., Great Britain, Canada, West Indies, etc. This was run into ports by fast motor boats and despite heavy losses, the great size of the traffic made the business highly profitable. Beginning with 1924, however, the Government began to wage unceasing war on these rum rows, as the ships stationed outside the three-mile limit were called. By making treaties with foreign powers extending the right of search and seizure and by diverting the Coast Guard to this work, the Government by 1928 was able to say that rum rows had been eliminated.

2. *Synthetic liquor.* About 1924, liquor made from diverted industrial alcohol assumed the place of chief importance. Though the Government denatured all alcohol released for industrial purposes, using poisons to make them impotable, bootleggers were able to extract most of the poisonous or offensive substances by renaturing processes. The less scrupulous were not so careful, with the result that many people were blinded or killed by consuming the poisonous stuff sold as a beverage. The people who suffered largely were the poorer classes who bought their "hootch" in "speakeasies." It was estimated in 1926 that fully 60,000,000 gallons of industrial alcohol were being diverted annually for the purpose of making synthetic liquor. About 1927, the Prohibition Bureau began to order the reduction of industrial-alcohol production; but by 1928 synthetic liquor was no longer the chief source of supply. It had been replaced by *"wild cat" alcohol.* Interestingly enough, when in 1928 the Durant Prize of $5000 was given to an enforcement plan that was based on the checking of the diversion of industrial alcohol, even the Prohibition Bureau confessed that "wild cat" alcohol (the old moonshine) had taken first place. In other words, there were thousands of illicit stills working on a large scale making alcohol out of sugars, cereals, etc. It would appear that there were no limits to the resources of the bootlegger and that when he found one door closed to him he merely kicked open another.

Liquor Regulation in Other Countries. In Canada, some of the provinces had prohibition; some, regulation. Prohibition was in effect in 1928 in Prince Edward Island (1907) and Nova Scotia (1916), but in 1929 by popular vote was abandoned for State control. British Columbia adopted prohibition in 1916 and changed to state control in 1921; Manitoba adopted prohibition in 1916 and state control in 1923; Ontario went dry in 1916 and adopted state control in 1929; Quebec has government control as has also New Brunswick. In England during the World War, the liquor traffic had been variously regulated, in zones about army and navy stations, and where war material was being handled; in 1921 a bill imposing somewhat similar restriction was enacted for the country as a whole, to regulate hours of sale and alcoholic content of hard liquor.

The proposal to adopt national prohibition was defeated (Apr. 20, 1923) in the House of Commons by a vote of 236 to 14. Finland, after having its prohibition legislation twice annulled by the Czar under the old régime, in 1917 again passed a prohibition law, effective in 1919. In Norway, as a result of a referendum in 1919, traffic in liquors containing over 14 per cent of absolute alcohol was forbidden; but following the threat of France, Spain, and Portugal to bar the fish products of Norway if her wine importation were cut off, the alcoholic content in 1923 was raised to 21 per cent. In 1926 the people of Norway went wet altogether by a vote of 525,423 to 415,637. Local option obtained in parts of Holland, Belgium, Scotland, Poland, and Denmark (where a uniform local-option bill failed in the Upper House in 1919); and some measure of regulation was being exercised in Germany, Austria, Northern Ireland, Japan, Mexico, and many South American countries. Federal control and taxation of liquor was defeated in Switzerland in 1923.

National and International Temperance Organizations. The following bodies were permanently organized for the promotion of temperance and the prevention of alcoholism: World League against Alcoholism; World's Woman's Temperance Union; Permanent International Congress on Alcoholism; International Order of Good Templars; Sons of Temperance; World Student Federation against Alcoholism; Intercollegiate Prohibition Association; World Prohibition Federation; National Temperance Council; National Legislative Conference; Scientific Temperance Federation; National Temperance Society; International Reform Bureau; Woman's Prohibition League of America; Committee of One Thousand. In addition, there are the various boards of churches and church federations. See WOMAN'S CHRISTIAN TEMPERANCE UNION; LAW, PROGRESS OF THE; AND UNITED STATES.

PROJECTILE. During the World War, several new types of shell were given trials; some seemed likely to come into general use. TNT (trinitrotoluene) became the explosive generally used in the bursting charge in place of picric-acid compounds and gunpowder. (See EXPLOSIVES.) In the Naval services, the use of the common shell with thin walls and extra heavy bursting charge, in fleet action, was practically given up. The nonricochet or "diving" shell, so designed that, even at a low angle of impact, it would enter the water and nearly maintain its aërial direction, was devised for use against submarines, and the models brought out near the close of the War were efficient. The gas shell, so effective in land operations, was little used at sea, although gas shell and aërial gas bombs are likely to be important features of naval warfare in the future unless barred by international agreement. Illuminating shells were used to some extent and were generally adopted as a necessary naval equipment. They may be fitted to burst in the air or on contact with the water and illuminate nearby objects. Smoke shell, producing a large volume of dense smoke, have a limited usefulness. Anti-aircraft shell, fitted with night and day tracers giving out visible lines of fire or smoke, continued to be improved in the years succeeding the War. See Guns, Naval; Artillery; Ordnance.

PROKOFIEV, Sergei (1891–). A Russian composer, born at Sontsavka in southern Russia. Having received his first instruction from his mother, he entered the Petrograd Conservatory in 1904 and studied piano with Essipov and composition with Liadov and Rimsky-Korsakov. Graduating in 1910, he won the Rubinstein Prize. He made several tours as a pianist, appearing in the United States in 1918. As a composer, he belongs to the extreme futurists. His works include the operas, *Maddalena*, *The Gambler* (Petrograd, 1916), and *Love for Three Oranges* (Chicago, 1921); a ballet, *Le Bouffon*; *Sinfonietta*; a symphonic poem, *Dreams*; *Scythian Suite*, for orchestra; a *Classical Symphony*; *Overture*, on Jewish themes; a violin concerto; piano concertos; *Conjurements*, for soli, chorus, and orchestra; and miniature bits for piano and songs.

PROLETKULT. See Æsthetics.

PROPERTY. See Law, Progress of the.

PROTEINS. See Food and Nutrition.

PROTESTANT EPISCOPAL CHURCH. In doctrine, this religious body is similar to the Church of England, from which it is descended. It recognizes three orders in the ministry—bishops, priests, and deacons. The diocesan bishops are elected by the clerical and lay members of the convention of the diocese. Following the General Convention of 1925, the offices of the presiding bishop and the president of the National Council were merged into one and the office made elective instead of being filled on the basis of seniority in the House of Bishops. The term of office is six years. The number of communicants grew from 1,015,248 in 1914 to 1,241,828 in 1928. The number of clergy rose from 5538 in 1915 to 6237 in 1928, the number of Sunday-school pupils from 462,221 to 487,505, and the number of teachers and officers from 52,534 to 58,477.

The chief executive council of the denomination meets triennially, conventions being held at New Orleans, La., in 1925, and at Washington, D. C., in 1928. One of the most important problems scheduled to come before the 1928 convention was the revision of the Book of Common Prayer, begun in 1913. Completed in 1929, the revised Prayer Book was put in use in most churches the first Sunday in Advent. Other subjects considered were marriage and divorce, rural work, labor and industry, world peace, and young people in the church. A maintenance budget of $4,224,670 annually was adopted for the current three years, and plans were laid for raising $3,000,000 for future work. The triennial thank offering of the Women's Auxiliary amounted in 1928 to $1,101,450, as compared with $912,841 in 1925. It was decided to continue the Commission on Faith and Order, which had attended the Conference at Lausanne, Switzerland, in 1927, and to create a new commission to confer with Methodists and Presbyterians on the subject of church unity. Arrangements were made for the 1931 convention to be held in September at Denver, Colo. The deficit of $1,534,303 with which the National Council of the church began the 1926–28 triennium was completely liquidated at the end of that period. This was largely due to the adoption of a pay-as-you-go plan at the 1925 convention, and the administrative ability of the Rt. Rev. John Gardner Murray, presiding bishop from 1925 until his sudden death on Oct. 3, 1929, at Atlantic City, N. J. C. P. Anderson, Bishop of Chicago, was elected presiding bishop in November 1929.

The national and foreign work of the church is carried on under the various departments of the National Council. Members of the Council serve as directors of the Domestic and Foreign Missionary Society, which is managed by the Department of Missions and Church Extension. During 1928 the Department of Missions expended $2,697,664, out of a total budget for the National Council of $2,809,361. Of this amount, $1,152,019 was for field work in the foreign missionary fields and $1,182,025 for work in domestic missions. There were 2628 men and women missionaries in the field in 1928, as compared with 3067 in 1927, 3406 in 1925, and 3105 in 1922. American missionaries in foreign fields in 1928 numbered 147 men and 181 women; the native staff in foreign fields, 1119 men and 531 women; missionaries in the United States, 457 men and 90 women; native staff in the United States, 101 men and two women. The decrease in the missionary staff in recent years was attributed almost entirely to conditions in China, where severe restrictions have been imposed upon missionary schools by the Nationalist government. After a church commission had investigated the situation in China from October, 1927, to April, 1928, the National Council, on Oct. 9, 1928, announced that schools in China supported in whole or in part by that body would not register so long as governmental regulations served to nullify their Christian character and purpose. In the United States, the church continued its missionary work. In addition to establishments in 10 European centres, the church maintains missionary stations in the Orient, Liberia, Mexico, the Philippines, Alaska, Hawaii, Brazil, the Canal Zone, Cuba, Porto Rico, Haiti, the Virgin Islands, and Palestine. Besides diocesan publications, the church issues *The Spirit of Missions*, *The Church at Work*, *Findings in Religious Education*, and *Bulletin of the National Council*. There are six independently owned periodicals concerned with the work of the denomination and circulated among its members. Headquarters of the National Council are in the Church Missions House, 281 Fourth Avenue, New York City. See Religious Controversies.

PROUST, prōōst, Marcel (1871–1922). One of the leading French writers of the twentieth century, born in Paris. Proust, like his fictional hero, Swann, was a man of the world and seemed to his friends to be nothing more than that, with perhaps an amateurish interest in letters. At the age of 45, he had published only two French translations of Ruskin, *The Bible of Amiens* and *Sesame and Lilies*, and an original volume, *Les Plaisirs et les Jours* (*Delights and*

Days). It was in the preface to the latter volume that Anatole France indicated that Proust "delights equally in describing the desolated splendor of the setting sun and the agitated vanities of a snobbish soul." A man of feeble constitution, Proust alternated his mundane parties with seclusion in an invalid's bed. It was thus that he prepared himself to be the fictional Saint-Simon of French society of the *fin de siècle*. In 1914 he began the publication of his fictional notebooks, an 11-volume novel, *À la Recherche du Temps Perdu* (*In Search of Days Gone By*), which was completed but not all corrected or published at his death. Public attention was attracted to his work in 1919 when the section of his novel called *À l'Ombre des Jeunes Filles en Fleurs* (*Within a Budding Grove*, trans. 1928) won the Prix Goncourt. He was hailed immediately as an eccentric literary genius who wrote from imaginative reminiscence instead of from imaginative construction. He described his literary method in the *Coté de Guermantes*. The sections of the novel are called: *Du côté du chez Swann* (*Swann's Way*); *À l'ombre des jeunes filles en fleurs*; *Le côté de Guermantes* (*The Guermante's Way*); *Sodome et Gomorrhe*; *La prisonnière*; *Albertine disparue* and *Le temps retrouvé* (1927). In 1927 *Chroniques*, essays, was published. Consult Lalou's *Histoire de la Littérature Française Contemporaine*, pp. 639–645 (1923) and Léon Pierre-Quint's *Marcel Proust, his life and work* (trans. 1927).

PROVIDENCE. The capital of Rhode Island and the second city of New England. The population increased from 224,326 in 1910 to 237,595 in 1920; in 1928 it was estimated to be 286,300, according to the Bureau of the Census. An extensive plan for the improvement of the port was started in 1918. The city appropriated $800,000, the State, $1,500,000, and the Federal Government, $1,000,000 to have the harbor deepened and a straight 30-ft. channel dredged to deep water. The State built a large pier with a two-story steel shed 400 by 100 feet, and the city built a quay 3000 feet long in 30 feet of water at mean low tide, equipped with complete freight-handling apparatus and railroad connections.

A new water-supply project was inaugurated in 1915 and completed in 1928 under the auspices of the Water Supply Board. The main features were: The large Scituate storage reservoir formed by a dam across the Pawtuxet River, 3200 feet long and 100 feet high; a 7-mile aqueduct connecting the reservoir with the new filtration plant; and the 7-mile Neutaconkanut Conduit connecting the aqueduct with two covered reservoirs, the Neutaconkanut for low pressure and the Longview for high pressure. The Scituate Reservoir had a storage capacity of 37,421,000,000 gallons, an area of 3600 acres, an average depth of 32 feet, and a flow line 284 feet above the mean high water of Providence Harbor. In 1928 Providence had 129 day schools with an enrollment of 41,613 pupils; the assessed valuation of school property was $9,741,740. During 1928, 1932 new buildings were erected at an estimated cost of $13,172,494. A multiple-arch concrete bridge over the Seekonk River was under construction in 1929. In 1927, 42,735 persons were employed in 764 industrial establishments and received $50,817,844 in wages; the value of products manufactured was $214,616,951. Bank clearings in 1928 amounted to $813,885,000. The assessed valuation of property in 1928 was $659,525,312; the net debt was $28,367,864.

PRUSSIA. In the early part of 1914, there was a good deal of protest on the part of the Prussian Conservatives against the imperial policy of Bethmann-Hollweg, which they alleged worked to the prejudice of the position of Prussia in the Empire. The appointment of the Prussian Minister of the Interior, von Dallwitz, to the post of Statthalter of Alsace-Lorraine removed the most violent opponent of Prussian Franchise Reform; but the sanguine hopes which had been placed on his successor, von Löbell, were soon shattered by the latter's inaugural speech in the Diet, in which he stated that he had no intention of drawing up a Franchise Bill. The outbreak of the World War temporarily forced all internal questions into the background, but the problem of internal reform in Prussia could not long be ignored. On Jan. 13, 1916, the Chancellor appeared before the Prussian Diet with a promise of electoral reform, but stated at the same time that it must be deferred until the end of the War. The Government was forced, however, to abandon this position as a result of the changes in the foreign and internal situation during 1916 and 1917 and particularly in consequence of the ever-growing opposition of the Reichstag majority. Hence, the more liberal Hertling government, installed late in 1917, introduced during November of the same year reform measures which, while making certain progress in regard to electoral reform, curtailed substantially the rights of the Lower House in the matter of the budget. After much wrangling, the bill was finally adopted on Oct. 24, 1918, but then the situation had gone too far to be capable of being remedied by mere electoral reform.

The revolution of November, 1918, did away with the dynasty, Prussia's position of hegemony in Germany, and the personal union between the German and Prussian governments. A republic was proclaimed, the House of Lords was abolished and the Lower House dissolved. On Nov. 15, 1918, a ministry, consisting for the most part of Socialists, was appointed by the Executive Committee of the Workers' and Soldiers' Council. The result of the elections for the Constituent Assembly on Jan. 26, 1919, was as follows: Majority Socialists, 145; Independent Socialists, 24; Centrists, 88; Democrats, 65; German People's Party, 21; German National Party, 50; Hanoverians, 7. The revolutionary period proper ended with the convening of the Assembly on March 13 and the promulgation of a provisional constitution. Thereupon, the Socialist Hirsch formed a Coalition cabinet, consisting of Socialists, Centrists, and Democrats, which was succeeded, after the Kapp Putsch in March, 1920, by a similarly constituted Coalition ministry under the Socialist Braun. The new constitution of Prussia was completed by the Assembly after many difficulties on Mar. 30, 1920. It was drafted under the decisive influence of the constitution of the Reich and merely carried out the instructions of the latter. In it, the attempt was made to bring about closer union with the Reich and far-reaching decentralization within Prussia. When the elections for the Diet in February, 1921, resulted in a strengthening of the extreme Right and Left, the formation of a new ministry was made very difficult and only on April 22 did the Centrist, Fehrenbach, succeed in forming a coalition of Centrists, Democrats, and experts. In the Braun ministry of November, 1921, this coalition was broadened so as to include the Socialists and the People's Party. As a result of the election of December, 1924, Herr Braun was able to maintain his position as Prime Minister.

Prussia suffered severely under the Peace Treaty of Versailles. She lost the Province of Posen, the larger part of West Prussia, parts of East Prussia, Silesia, Schleswig-Holstein, and the Rhine Province, in all 56,000 square kilometers with approximately 4,700,000 inhabitants. See GERMANY, *History*.

PRZEMYSL, BATTLES OF. See WORLD WAR, *Eastern Front*.

PSYCHIATRY. See PSYCHOLOGY, ABNORMAL, AND PSYCHOANALYSIS; INSANITY.

PSYCHOANALYSIS. See PSYCHOLOGY; CONSCIOUSNESS AND THE UNCONSCIOUS; ÆSTHETICS.

PSYCHOLOGY. A historian of contemporary psychology has an exceedingly difficult task because of the many new and sometimes revolutionary movements that have developed, especially during the period since 1914. These movements, bringing with them new conceptions of old problems, cannot be evaluated with any degree of assurance. There is the so-called Behaviorism (q.v.) which limits the data of psychology to overt observable behavior and the stimuli that give rise to them. In its extreme form, it denies the existence of consciousness, and in its milder forms refuses to be concerned with consciousness. It rules out of existence the process of introspection as a means of gaining insight into behavior. This point of view is reflected in more than one of the current textbooks of psychology.

Equally startling in its influence upon systematic psychology is the attack upon instincts as the motivating forces in human nature. In the preceding decade, there had been a pronounced shift away from a descriptive, and toward a dynamic, psychology characterized by a search for causes. Instincts offered themselves as such causes, and interest was directed toward the cataloguing of them and determination of the ways in which they could be modified and developed into the mature individual. Now, the concept of instinct (q.v.) has been seriously questioned, and in its place has been put the reflex (Kuo) or groups of reflexes (Allport). This change is having its effect upon current psychological doctrine.

The concept of conditioned reflex (see BEHAVIORISM) introduced by the physiologist, Pavlov, supported the battle against the instincts by assuming reflexes to be the real native behavior units which are elaborated into more complex forms of behavior through a process of conditioning. More than that, the conditioned reflex appeared to furnish a simple substitute for all the laws of learning envisaged under the concept of association. It provided for unconscious learning and pushed the period of active learning back into the earliest days of infancy. The conditioned reflex has found its widest acceptance in the realm of animal psychology and has also had much influence upon the character of human psychology.

Gestalt psychology (see PERCEPTION) has made its impression not only upon the theories of perception, but upon the whole subject matter of psychology. *The Growth of the Mind*, by Kurt Koffka (1924), is a psychology built upon Gestalt concepts. Particularly pronounced are the changes in the learning process as conceived by this new school.

The active development of the mental-measurement movement (see MENTAL MEASUREMENT) since 1914 has left its stamp upon the character of systematic psychology by turning attention to practical problems where mental tests were called for, and by forcing attention upon the need for suitable concepts to serve as the foundation stones for the whole mental-measurement structure. Thus, we find psychologists interested in the problems of vocational selection and guidance, of adjustment of the individual in industry, of the mental defective, of the superior child, of the elementary and college students, and the factors upon which their success depends. This major interest has had a pronounced effect upon the content of modern psychology.

The measurement of intelligence, of character, of temperament, of personality, and of special aptitudes has led to excursions into the theory of mental organization. Numerous concepts have arisen out of the studies of Charles Spearman (see *Abilities of Man*, 1927), of Thorndike, and many others, such as the concept of general factors, the concept of special factors, and the concept of group factors. Experimental research has been stimulated to determine whether such traits as intelligence, perseverance, accuracy, speed, and memory are general, special, or group factors. Special statistical techniques have been created as tools for the solution of these problems, and have become a part of the subject matter of psychology.

The psychoanalytic movement (see PSYCHOLOGY, ABNORMAL, AND PSYCHOANALYSIS) has left a very definite mark upon current trends. Its emphasis upon unconscious mechanisms (see CONSCIOUSNESS AND THE UNCONSCIOUS), upon dreams and their interpretation, upon emotional shocks and their lasting impressions, and upon a unique form of reëducation, has given rise to the term "new psychology" because to superficial observation the psychology of the psychoanalyst bears little or no resemblance to orthodox psychology. Even where the "new" has not been accepted, its influence has been felt in the introduction of terms and ideas which have been borrowed from it.

The philosophers, too, have contributed their share to the apparent confusion by their concepts of vitalism, mechanism, purposivism, realism, etc., which they try to postulate as the principle underlying the systems of the psychologist.

These rapidly developing, changing, and conflicting points of view in psychology are not to be taken as signs of disintegration, but as signs of growth. The last 10 or 20 years have seen changes equally revolutionary occurring within the sciences of physics and chemistry. The fundamental facts and laws of physics are just as unstable as are the concepts of instinct and the laws of learning; but no one fears for the future of physics. No more should fears and misgivings arise concerning the future of psychology.

In the midst of this variety of viewpoints, numerous textbooks and systematic treatises have appeared, so that one can find a book strongly influenced by any one of the above-mentioned movements. As a result, the question has arisen as to what should be presented to the student as the real subject matter of psychology. Conferences and symposia have been held on a number of occasions with the purpose of finding a body of knowledge which will underlie or be common to all the varied points of view. Their progress is encouraging.

A most instructive insight into current psychological doctrines may be gained from "Psychologies of 1925," a series of papers prepared by nine well-known psychologists, Madison Bentley, Knight Dunlap, J. W. Hunter, Kurt Koffka, Wolfgang Köhler, William McDougall, Morton Prince, J. B. Watson, and R. S. Woodworth. The topics include behaviorism, dynamic psychology, gestalt psychology, purposive psychology, reaction psychology, and structural psychology.

There remains to be mentioned an interesting effort to produce a psychological system which will cut across all mere "movements" and rest upon a series of fundamental facts and principles. *Psychology: Its Facts and Principles*, by H. L. Hollingworth (1928), "presents a systematic descriptive account of mental phenomena and of psychological processes. The phenomena are subjective events; the processes are redintegrative sequences in nature. It is not easy to characterize the view here presented in terms of contemporary 'isms.' The book aspires to a straighforward description of certain aspects of nature, rather than to the defense of a prejudice. Although descriptive, the view is not that of 'structuralism.' It does not deal with a reputed dependent realm of 'mental contents' or 'conscious elements.' Its psychology is dynamic, in that it deals with activities, processes, occurrences, rather than with static cross-sections of mental life.

"But neither is it 'mere behaviorism,' since it refuses to limit itself to the account of visible changes (movements). It shuns the visual bias of behaviorism; it insists that aches and pains receive the consideration to which their occurrence entitles them. Algesic patterns (pains), as well as visual patterns (animals), 'behave.' In contrast with behaviorism, the book offers a social report, based on all the evidence of all the available reporters; at least it advocates such a report. It is neither intimidated nor discouraged by the descriptive difficulties of any event in nature.

"The point of view is not that of 'associationism.' Although there may be superficial resemblances, the contrast is striking. Mental activities, as here described, do involve association; but two important divergences from classical associationism are apparent throughout. It is not 'mere ideas' that are connected, but primal events in nature. Some of these are ideas, but not the images nor psychic entities of historic tradition. Ideas are natural events, partial details of larger contexts, for which they function as equivalents in the course of mental procession. And they are ideas only when they thus operate, as instigating cues. Ideas do not arouse their former totals. Instead, they act as adequate surrogates for these in the instigation of consequents which may or may not be ideas.

"Since this is a textbook of psychology, it resolutely stands by its title. It has no chapters on neuro-anatomy, the physiology of the nervous or other systems of the animal body, or the structure of the sense organs. It finds plenty of honest psychological material at hand and cannot even grant space for many relevant suggestions concerning practical applications."

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PSYCHOLOGY, ABNORMAL AND PSYCHOANALYSIS. If one accepted the standard division of knowledge into theoretical science and applied science, one might suppose that abnormal psychology were the concrete application of the data and laws furnished by general or systematic psychology. In actual fact, this supposition is not entirely borne out. So far from borrowing its material exclusively from general psychology, abnormal psychology and its derivative, psychoanalysis, have furnished a new approach to the problems of mental behavior. The trend of thought known as the "new psychology," even with its exaggerations and unsupported generalizations, may be put down to the credit of psychiatrists who were able to combine clinical knowledge and therapeutic skill with genuine philosophic insight.

The main distinction between abnormal psychology as an application of the theoretical science of psychology and psychiatry is that the former looks upon abnormalities as deviations of greater or less magnitude from the normal. (See E. G. Conklin, *Principles of Abnormal Psychology*, 1927.) The psychiatrist begins with the classical mental derangements and gradually extends his interest more and more toward the milder distortions of the mind until he includes the normal also. (See A. J. Rosanoff, *Manual of Psychiatry*, 1927.) The products reached by these opposing methods differ so much that the psychological system derived by the psychiatrist and the psychoanalyst has been called the "new psychology."

Among the class of psychiatrists may be included Charcot and Janet in France, Freud in Austria, and Morton Prince and Boris Sidis in America. Different as are their various theories on specific problems, these psychiatrists are yet at one in their refusal to reduce them to the materialistic system of psychology. They affirm the specificity of psychological phenomena and the necessity of an explanation of such phenomena in terms of psychological conceptions rather than in terms of an unknown structure of the cortex and body nerve tissue. This is not to say that one attempts to explain phenomena in terms of new psychical or spiritistic entities but rather in terms of the meanings which particular objective events have for particular individuals in particular circumstances. Just as when we seek to account for the effect the reading of a particular book had on a particular person, we find the objective facts about ink and paper of little importance and must attempt to envisage the subjective meanings aroused by the contents of the book; so psychologists have come to realize that it is of no purpose to study events as mere physical shocks on a physical system without taking into account the emotional contexts, the meanings more or less individual to the particular organism.

To describe this type of meanings, many psychologists and physicians have preferred to use the notion of function, and they thus speak of certain psychological troubles as functional neuroses; but whether this term is adopted or not, it has been found that there was only one method of studying the phenomena in question and that was for the psychiatrist to familiarize himself, by patient questioning and clinical observation, with the inner history of the trouble. This leads us to another observation; namely, that knowledge and theories of this sort—dependent, as they are, very largely upon the artistic insights of the physician and psychiatrist —cannot have the same positivity as the observations of physical science. Freud himself recognized this fact when he wrote (in his *Introduction to Psychoanalysis*) that "it would be an error to suppose that a science is composed only of theses rigorously demonstrated, and it is a mistake to demand this." Janet said much the same thing when he pleaded for psychologists not to consider psychology as a science (in the same sense that physicists use the term) but rather as a collection of monographs.

Now the difficulty of the psychoanalytic technique is that it employs both of these schematisms. The psychoanalyst tries to be both a scientist, dealing not in advice but in observed correlations of fact, and a philosopher-confessor who assists his patient in the pursuit of happiness. Professor Janet, in reporting to the French Academy of Medicine on the doctrines of Freud, pointed out that psychoanalysis at times lays claim to an entire system of ethics. In a certain sense, it is true, neither the psychiatrist nor the physician escapes that responsibility. The analysis of human nature is too close to the aspirations of human nature to avoid involving the latter; but the scientific and ethical responsibility must be distinguished and recognized for what they are.

The war cases of shell shock have disproved, in an objective way, the extreme Freudian thesis that sex disturbances (in the more specific sense) are the cause of neuroses. They revealed a rather new type of neuroses with preoccupations very different from those of civilian cases and reflecting quite definitely the war anxieties. They also served to disprove the mechanistic, physiological conception of the so-called functional nerve diseases.

With the destruction of the extreme Freudian thesis and the dogmatic physiological contention, no specific theory of neuroses has been left standing. In France—where psychological thought has never accepted either of these theses —an attempt was made by a brillant writer, Dr. Albert Deschamps, to exploit the theory of fatigue as the *raison d'être* of the general type of neurasthenic diseases. Both the theory and the cure which it proposed harked back to the famous rest treatment of Weir Mitchell, which was very popular among psychiatrists a generation ago; but like so many other theories in abnormal psychology, the conception of fatigue and insufficiency of nervous energy was seen to be a valuable partial truth which permits the observer to understand the concrete nature of a particular class of cases, but which is misleading when generalized into what amounts to a metaphysical conception.

The question may well be asked why such partial truths do not sooner or later find their place in a systematic classification, such as obtains in the natural sciences; why, for instance, there is not as complete a table of mental diseases with more or less empirical specifics as is the case in physiological therapeutics. The answer is to be found in the entire absence of a spatial form of representation, a circumstance which makes every mental concept, every mental theory, an elusive metaphor. In the domain of the mind, we come in contact with truths in a manner not very different from scents and odors. That is why the science of the mind, necessarily different from the science of matter, comes in the long run to have no other criterion than the cultivated taste of the connoisseur.

Doubtless because of the frailty of the subject matter, the theories of psychoanalysis were subject to grave misunderstandings. On the one hand, the worshippers of clear and precise ideas were scandalized at the fleeting nature of some of the intuitions; but on the other hand many advocates of the psychoanalytic doctrine more than made up for this by bringing rather too much precision into their science. They could do this only by constructing a metaphysics of the sex instinct and its symbolization. In this metaphysics, complexes and symbols were treated sometimes as dynamic concepts (i.e., with fluid meaning), sometimes as static concepts on a par with those of the physical sciences. An ambiguity of this type is practically unavoidable, for such notions as symbol and complex carry with them this ambiguity in their philological meaning.

We need only remember that the earliest philosophers to use the notion of symbolism, the Pythagoreans, slipped very naturally into the error of confounding the metaphorical act of symbolization with symbols as static entities representing other objects. Similarly, the association psychologists confounded the dynamic act of association or growth of meaning with association viewed externally as a mechanical process, and therefore describable by laws; and inasmuch as the idea of complex is practically identical with association, it is readily seen how psychoanalysts fall into the same ambiguity.

For the purpose of inference, it is necessary to treat some of these concepts statically as if they were obeying the laws of mechanical causality; but when that is done, the results must be tested by empirical facts and not by means of the semi-æsthetic, symbolic intuitions.

Thus, it is one thing for a commander of military troops to treat sex as a mechanical, almost material problem, on a par with food supplies and munitions. It is quite another thing for a psychoanalyst, tracing genetically the rise and fall of sentiments in a human individual, to discover what he calls transferences or sublimations of the sex instinct. In the first instance, we are treating man as a machine with definite springs which behave in definite fixed ways, and sex is one of those springs. Such a conception is an abstract one, and scarcely fits the facts even in a limited situation. However, it is a precise conception and allows itself either to be verified or denied by empirical facts. In the second case, sex ceases to be a definite thing at all and becomes a sentiment—"an aspiration after happiness," to quote Rémy de Gourmont, "than which nothing is less definite." And the many gropings, the many expressions of the ultimate libido, are not so much causes of one another as contingent temporal sequences. In order to show a relation of causality in the intellectual or scientific sense, it is necessary to have a limited situation in which an observed sequence, after being purified, so to speak, of its arbitrariness and subjectivity, has been experimentally confirmed.

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PSYCHOLOGY, EXPERIMENTAL. A legitimate distinction can no longer be drawn between experimental psychology and psychology, for the psychology of today which deserves to be called scientific is psychology based upon experiment. The term "experimental psychology" originated in the time of Wundt when he introduced the methods of physiology into a psychology which was primarily philosophical speculation. Today, psychological theories grow directly out of laboratory investigations or, if they develop independently, are at once put to a laboratory test and survive or fall upon the findings. Thus, the very movements which are at the focus of attention in psychology (see PSYCHOLOGY), such as Gestalt, conditioned reflex, behaviorism, etc., form the subject matter of laboratory research.

In addition to these newcomers in the field, the more classical experiments remain the objects of interest. Thus, the psychophysical methods for determining the limits of discrimination for the various senses which were studied in the earliest psychological laboratory (that of Wundt in Leipzig) are still being investigated. Attempts are being made to equate these methods of average error, constant stimuli, right and wrong cases, etc., so that the findings by one method may be directly compared with the findings by another method. Most psychological laboratories are likewise engaged upon the study of various sense experiences, which also formed the subject matter of the earliest laboratories (see VISION; AUDITION; TASTE AND SMELL; SENSATION, CUTANEOUS AND ORGANIC). Investigations of vision and audition are particularly active. Laboratory workers have taken advantage of recent inventions for sound production and control in the fields of the telephone and the radio, and researches are being repeated with the higher degree of accuracy made possible by these new devices.

New devices have been drawn into service particularly in the study of the emotions where the introspective method has given way to objective recordings by means of the X-ray, the motion picture, the galvanometer, and the oscillograph. The application of these methods is just beginning to bear fruit, in the analysis of emotions into their essential components and the determination of the relation of the external stimuli to glandular and neural mechanisms.

PSYCHOLOGY, SOCIAL. See SOCIAL PSYCHOLOGY.

PUBLIC DEBTS. See FINANCE AND BANKING.

PUBLIC FINANCE. See FINANCE AND BANKING.

PUCCINI, pōōt-chē'nē, GIACOMO (1858–1924). An Italian operatic composer (see VOL. XIX). *La Rondine* was produced at Monte Carlo (March 27, 1917), but met with little success. The première of his next work, a triptych consisting of *Il Tabarro, Suor Angelica,* and *Gianni Schicchi,* took place at the Metropolitan Opera House (Dec. 14, 1918). Of these, only the third has maintained itself in the repertory. His last work, *Turandot,* was all but finished, when the composer underwent an operation for cancer, from the effects of which he died in Brussels, Nov. 29, 1924. From Puccini's sketches, Frano Alfano completed the finale of the opera. which was produced in Milan on Apr. 25, 1926. The American première took place in the same year at the Metropolitan Opera House (November 16). The enthusiasm manifested at the first performances abated considerably, when the public began to realize that they had been dazzled by brilliant stage effects rather than by great music. Consult A. Wiessmann, *Giacomo Puccini* (Munich, 1922); Gino Monaldi, *Giacomo Puccini e la sua opera* (Milan, 1924); A. Fraccarroli, *La Vita di Giacomo Puccini* (Milan, 1925).

PUEBLO INDIAN LANDS. See INDIANS.

PUEYRREDON, HONORIO (1872–). An Argentine diplomat and public official. Trained for the practice of law at the University of Buenos Aires, he entered politics and served two years as Minister of Agriculture and six years as Minister for Foreign Affairs previous to his appointment as chief representative of Argentina in the League of Nations Assembly in 1920. He was largely responsible for his country's withdrawal from the League in the same year. He was Ambassador to the United States from 1923 to 1928, resigning following the Pan-American Conference at Havana in the latter year, at which he was president of the Argentine delegation. He stated that his resignation was due to the refusal of the delegates to the conference to include in a proposed convention of the Pan American Union an article pledging the Union to use its influence to break down artificial tariff barriers. At the same conference, he vigorously attacked the United States tariff system.

PULP, WOOD. See PAPER AND WOOD PULP and FORESTRY.

PUPIN, MICHAEL IDVORSKY (1858–). An American physicist and university professor (see VOL. XIX). In 1925–26 Professor Pupin was president of the American Association for the Advancement of Science and of the American Institute of Electrical Engineers. In 1928 he was awarded the Washington Medal (engineering). He is the author of *From Immigrant to Inventor* (an autobiography, which was printed in six different languages, 1923), and *New Reformation; from Physical to Spiritual Realities* (1927).

PURDUE UNIVERSITY. A State technological institution founded in 1869 at West Lafayette, Ind. The number of students increased from 2341 in 1914 to 4150 in 1928, the members of the faculty from 185 to 478, and the library from 40,000 to 85,000 volumes. Revenue and appropriations for the support of the university were correspondingly increased during the period from $479,251 to $4,349,454.34. A department of forestry in the school of agriculture and the agricultural experiment station were established. Advanced military training was introduced into the junior and senior years of all schools. Buildings costing more than $1,700,000 were erected during the period. These included the armory, in 1918; the home economics building, in 1923; Stanley Coulter Hall for the biology department, in 1917; a recitation hall for the departments of education, history and economics, and mathematics; a veterinary building; a horticultural greenhouse; a campus greenhouse; a locomotive museum; Franklin Levering Cary Memorial Hall, a men's residence; headquarters for the department of horticulture, the department of poultry husbandry, the schools of chemical engineering and the school of electrical engineering, for a summer surveying camp; a heating and power plant; the American Railway Association draft-gear test building; the Ross-Ade Field buildings for the athletic offices; and buildings for the farm of the school of agriculture. President, Edward C. Elliott, Ph.D. LL.D.

PUTNAM, HERBERT (1861–). An American librarian (see VOL. XIX). In the World War, Dr. Putnam served as general director of the American Library Association's Library War Service. In 1929 he received the Roosevelt Medal for Distinguished Service, having completed 30 years as Librarian of Congress. In this connection, there were published *Essays Offered to Herbert Putnam by His Colleagues and Friends on His 30th Anniversary as Librarian of Congress, April 5, 1929,* edited by William Warner Bishop and Andrew Keogh (New Haven, 1929).

PUTNAM, NINA WILCOX (MRS. ROBERT J. SANDERSON) (1888–). An American author, born in New Haven, Conn., and educated privately. She began writing at the age of 11. Her books include *Esmeralda* (1918); *It Pays to Smile* (1920); *West Broadway* (1921); *Laughter Ltd.* (1924); *Say It with Bricks* (1923); and *Easy* (1924). She has been a frequent contributor of popular short stories to the leading magazines.

PUTZ, LEO (1869–). A German painter of allegorical subjects, fairy tales, and portraits who was born in Meran and studied in Munich and in Paris with Julian Bougereau and Benjamin Constant. He was a professor in the Munich Academy. He is represented in the galleries in Frankfort, Munich, and Budapest, and as the illustrator of many editions de luxe.

PYRITE. See SULPHUR.

PYROTECHNICS. See ORDNANCE; TRENCH WARFARE MATERIAL.

Q

Q-SHIPS. See VESSELS, NAVAL.

QUACKENBOS, JOHN DUNCAN (1848–1926). An American physician and authority on hypnotism, born in New York City. He took his degree in arts at Columbia University in 1868, and was graduated in medicine from the College of Physicians and Surgeons of Columbia in 1871. Until 1894 he taught rhetoric and history at Columbia, retiring then to devote himself to medical practice with special emphasis on mental and characterological anomalies and the application of hypnotism in their treatment. He published *Hypnotic Therapeutics*, a monograph (1908); *Body and Spirit* (1916); and *Rational Mind Cure.*

QUANTUM THEORY. See CHEMISTRY; PHYSICS.

QUARANTINE, PLANT. See ENTOMOLOGY, ECONOMIC.

QUARRIES, UNITED STATES. See STONE.

QUEBEC. A Canadian province with an area of 594,434 square miles and a population of 2,361,199 in 1921, a gain of 17.7 per cent over the 2,005,776 of 1911. An official estimate placed the population June 1, 1929, at 2,690,400. The rural population has continued to fall off, in 1921 only 44 per cent of the total population living in rural districts, as compared with 51.8 per cent in 1911. In 1921 males numbered 1,180,028 and females 1,181,171. In 1926, 93 per cent of the population were Canadian born and of these 82 per cent were of French, and 13.5 per cent of British, stock. By the 1911 census, 316,103 of the inhabitants were of British, and 1,605,339 of French, descent. There were 442,356 families in 1921, as compared with 307,304 in 1901. Populations of the largest cities in 1926 were: Montreal, 1,300,000 (490,504 in 1911); Quebec, the capital, 165,000 (78,710 in 1911); Hull, 35,233 (18,222 in 1911); Verdun, 42,247; Three Rivers, 35,000; Sherbrooke, 25,021.

Industry. Agriculture is the basic industry of the province. The total area under cultivation in 1927 was estimated at 6,877,900 acres and the value of the crops at $144,273,000. Hay and clover, oats, potatoes, buckwheat, barley, and spring wheat are the most important crops. Fruit culture is flourishing, as is the maple-sugar and -syrup industry which averages about $4,000,000 annually (1927, $3,105,924, as compared with $1,600,000 in 1913). In 1920, 17,252 acres were under tobacco, but the tillage fell off to 9808 acres in 1927. The live-stock industry continues to expand, milch cows increasing from 761,816 to 1,064,470; other cattle from 693,540 to 836,193; sheep from 602,751 to 852,439; swine from 661,768 to 808,706. Dairying, always an important industry, brought in $29,539,376 in 1927 in cheese, butter, and other products. Lumbering produced $16,431,280 worth of cuts of lumber in 1921. The manufacture of pulp and paper products leads the Dominion. In 1926 $59,218,576 worth of wood was used in the manufacture of wood pulp while paper products totaled $121,290,231. In 1926 the fish catch brought in $3,110,964; in 1913, $1,988,241. The mineral yields have only barely tapped the vast resources of the province. In 1927 the total mineral production was $29,211,000, as compared with $11,836,929 in 1914. Asbestos ($10,621,517 in 1927), cement ($4,535,386 in 1926), and limestone are the chief minerals. The industrial development of the Province has been marked, the census of 1926 showing 7164 establishments, with a capital investment of $1,216,975,958 ($378,441,000 in 1913), and $905,300,824 the value of the production ($406,167,950 in 1913). The number of employees was 180,659 and salaries and wages paid, $189,326,145. The leading industries in order are pulp and paper, wood, lath, etc., cottons, flour-mill products, leather, shoes, tobacco, butter and cheese, meat packing, clothing, shipbuilding, housebuilding, and rolling mills. The estimated water power of the province totals probably 8,459,000 horse power of which 2,064,723 horse power has already been developed, all by private capital.

Trade and Communications. In 1927 there were 4868 miles of railway, as compared with 4043 miles in 1914. Total imports for consumption in 1927–28 amounted to $305,065,264 ($187,301,493 in 1912–13); exports, to $362,860,712 ($147,723,907 in 1912–13).

Government. Revenues for 1913–14 were $9,000,377; expenditures, $8,624,368; by 1926–27, these had reached: revenues of $30,294,997 and expenditures of $29,078,703. The provisional figures for 1928 were: revenues, $31,000,000; expenditures, $28,000,000. While the Dominion subsidy has remained the same, larger revenues are derived from the succession and commercial-corporation taxes. In June, 1928, the funded debt was $58,827,532 ($24,579,166 in 1914). In 1926 Quebec had 8116 schools of all kinds, with 597,364 pupils and 22,868 teachers. All schools are sectarian. The total expenditure for all education in 1925–26 was $28,980,568, as compared with $9,255,771 in 1913. In the Dominion Parliament, representation is: House of Commons, 65, Senate, 24. Of all the Canadian provinces, Quebec is the only one in which women are not enfranchised or permitted to stand for the Legislature of the province.

QUEBEC. A port of entry of Canada and the capital of the Province of Quebec. The population at the census of 1926 was 126,000; in 1929 it was estimated to be 135,000. The area is 6380 acres. The port of Quebec, which is the terminal for 14 principal steamship lines, provides accommodation at one time for 22 large ocean-going vessels. The number of vessels entering the port increased from 601 with a total tonnage of 3,588,530 in 1922 to 1641 with a total tonnage of 8,340,617 in 1928. Port facilities include two dry docks which will accommodate the largest vessels afloat and two grain elevators, one of which has a 2,000,000-bushel capacity with a loading capacity of 60,000 bushels per hour. In 1929 a grain-storage annex with a capacity of 2,000,000 bushels was constructed. The amount of grain exported in 1928 amounted to nearly 10,000,000 bushels. The harbor, which extends 15 miles along each bank of the St. Lawrence River, is administered by a commission of three members appointed by the Dominion government under the supervision of the Department of Marine and Fisheries. In 1929, $13,500,000 was being spent by this commission for the extension of wharves and improvement of transportation facilities. In 1917 the Quebec Bridge, the largest cantilever bridge in the world, was completed at a cost of $25,000,000. The total length of the bridge is 3239 feet; its width, 88 feet; height above pillars, 310 feet; length of cantilever, 1800, length of centre span, 640 feet; height of centre span above high tide, 150 feet. The total weight of the metal structure is 66,480 tons. It carries a double-track railway and accommodation for foot traffic. Since the completion of the bridge, Quebec has become an important railroad centre; two transcontinental railways and six subsidiary lines radiate from the city. In 1928 voters approved an expenditure of nearly $4,000,000 to effect such urgent improvements as the widening of streets, the opening of new ways of communication between the various parts of the city, and the construction of a new bridge over the St. Charles River. Approximately 10,000 persons were employed in 1928 in Quebec's 225 industrial establishments and received $8,000,000 in wages; the value of products manufactured was $33,000,000. Quebec has 47 banks and branches; bank clearings in 1928 amounted to $361,754,089. Since 1921, 2556 new buildings valued at $30,555,072 have been erected. The assessed valuation of property in 1928 was $169,803,727; the net debt was $17,963,945.

QUEEN'S COLLEGE. A college for women at Charlotte, N. C., founded in 1771; nonsectarian in purpose, but under the direction of the Presbyterian Church. By the autumn of 1928, the enrollment had increased to 319, and the faculty to 32 members, including a vice president and assistant in modern languages who were added in 1927. The library contained 9000 volumes. A new building providing refectory and dormitory accommodations was added in the summer of 1927. The college income for the year 1927–28 was $130,000. President, William H. Frazer, D.D., Litt.D.

QUEENSLAND. A state of the Commonwealth of Australia occupying the northeastern part of the continent. Area, 670,500 square miles; population, in 1911, 605,813; in 1928, 914,471; average annual increase, 2.52 per cent. Brisbane, the capital, including suburbs, had 295,430 inhabitants in 1927. Of the total area of the state, 94 per cent still remains unpreempted. Gross production in the Province in 1926–27 totaled £54,418,413, divided as follows: agriculture, £12,181,917; dairying, poultry, and beekeeping, £5,456,336; pastoral, £15,927,429; mining, £1,787,527; forestry, fisheries, etc., £2,556,454; manufacturing, £16,508,750. Leading agricultural activities centre in the planting of maize, wheat, hay, and sugar cane. Pastoral pursuits continue to be important. The wool output in 1926–27 was 119,847,967 pounds, valued at £9,423,046 (136,878,270 pounds in 1912–13). Sugar in particular has shown increases, the yield in 1927 being 3,555,827 tons of cane, as against 1,135,126 tons in 1912–13. Total value of minerals in 1912, £4,175,355; in 1920, £3,462,214; in 1927, £1,787,527. Gold continues to decline, dropping from £1,128,868 in 1913 to £161,321 in 1927. Coal is the only mineral to show important gains. Imports for 1916–17 and 1927–28 were £6,263,102 and £11,758,358; exports for the same years were £14,542,270 and £21,854,945. Government accounts showed: revenues and expenditures for 1913, £6,378,213 and £6,372,097; the same for 1927–28 were £16,718,070 and £16,707,564. The debt mounted from £55,023,506 in 1914 to £111,733,969 in 1928. Here, as in New South Wales, the Labor Party continues the most powerful group. In 1922, as a result of continuous agitation, a referendum decided for the abolition of the legislative council.

QUEZON, MANUEL L. (1878–). A Filipino political leader and advocate of independence. Educated at San Juan de Letran College, Santo Tomas University, and the Dominican University, Manila, where he took a degree in law, he commenced the practice of law in 1903 and in 1904 was elected Governor of his native Province of Tagabas. He became successively a member and floor leader of the House of Representatives (1907), resident commissioner in the United States (1909), chairman of the Philippines Independence Mission, and president of the Filipino Senate, an office which he held continuously after 1916. Although he had served as a major in the native forces during the Philippine insurrection, he supported the United States during the World War. He was the leading opponent of the policies of General Leonard Wood during the term of the latter as governor general.

QUICKSILVER. The production of quicksilver was somewhat stimulated by the World War. In 1917 the world output reached a maximum of 4195 metric tons, though it declined to 2135 metric tons in 1921, as a result of the post-war depression. Since 1921 quicksilver prices have steadily improved, as has production with the exception of a slight recession in 1924. Output figures from the principal producing countries indicate that the 1917 record output has been surpassed by a considerable margin. Italy has been the largest producer of quicksilver in recent years, though closely followed by Spain. These two countries contribute between 80 and 90 per cent of the world's supply. The governments of both Spain and Italy are closely allied with the quicksilver properties and in 1928 the two interests combined to form a cartel for controlling production and prices.

The result of the high prices for quicksilver prevailing in recent years has been to stimulate production in the United States and other countries, and to encourage the use of substitutes for industrial purposes whenever possible. Commercial uses of quicksilver are numerous. One use that is increasing steadily in importance is the production of mercury-arc and mercury-vapor lamps and rectifiers. The uneven distribution of the world's supply of quicksilver appears to be working against the possibility of any general adoption of the Emmet-type mercury boiler recently developed by Dr. W. L. R. Emmet of the General Electric Company. Possible users of the mercury boiler appear to fear any great dependence on the foreign sources of supply. See BOILERS.

A feature of the recent increasing production of the United States has been the growing importance of the State of Nevada as a producer. Early in 1929, the output of the three largest producers in Nevada was estimated to be at a rate but slightly less than that of the entire State of California which has been the principal source of the domestic quicksilver supply. The production in 1928 amounted to 16,838 flasks of 75 pounds each with a total value of $2,052,215, being the largest output since 1919 when 21,415 flasks valued at $1,933,560 were produced.

AVERAGE PRICE OF QUICKSILVER IN NEW YORK IN DOLLARS PER FLASK OF 75 POUNDS
(From *Engineering and Mining Journal*)

1921	$ 45.45
1922	58.95
1923	66.50
1924	69.76
1925	83.13
1926	91.90
1927	118.16 [a]
1928	123.51 [a]

[a] Price quoted per 76-lb. flask.

The distribution is given in the accompanying table. In 1928, 15,583 flasks of mercury, valued at $1,572,017, were imported, compared with 24,650 flasks valued at $2,189,495 in 1927. Of the 15,583 flasks imported in 1928, 6189 flasks were derived from Spain, 5718 flasks from Italy, 1816 flasks from Mexico, 913 flasks from Belgium, 546 flasks from Germany, and 401 flasks from the United Kingdom. In 1927, 13,663 flasks came from Spain, 9089 flasks from Italy and 1898 flasks from other countries. Production in the United States plus imports indicated 32,421 flasks made available in 1928, compared with 35,926 flasks made available in 1927.

QUICKSILVER PRODUCTION OF THE UNITED STATES
(In flasks of 75 pounds)
(From *Mineral Industry*)

State	1926	1927	1928
California	5,726	5,748	6,711
Idaho	6	....	....
Nevada	197	425	2,905 [a]
Oregon	....	2,082	2,848
Washington	489	566	....
Alaska, Arizona, and Texas	1,224	2,455	4,374 [b]
Total	7,642	11,276	16,838

[a] In addition, 404 flasks were produced in Nevada from gold and silver.
[b] Includes Washington but not Alaska.

QUILLER-COUCH, kōōch, SIR ARTHUR THOMAS (1863–). An English author (see VOL. XIX). He was King Edward VII professor of English literature at Cambridge University since 1912, and a fellow of the Royal Society of Literature. His later works were *News of the Duchy* (1915); *On the Art of Writing* (1916); *Memoir of Arthur John Butler* (1917); *Mortallone and Aunt Trinidad* (1917); *Foe-Farrell* (1918); *Shakespeare's Workmanship* (1918); *Studies in Literature* (1918, 2d series, 1922); *On the Art of Reading* (1920); *Charles Dickens and Other Victorians* (1925); and *On the Art of Writing* (1928). In 1925 he edited *The Oxford Book of Prose.*

QUILTER, ROGER (1877–). A British composer, born at Brighton. Having received his general education at Eton, he studied music under I. Knorr at Hoch's Conservatory in Frankfort. He first attracted attention with his charming settings of the lyrics from *Twelfth Night* and *As You Like It*, which were followed by other lyrics from Elizabethan and Victorian poets. Several of the foremost English and American concert-singers included his songs in their repertories, and thus gave them great and deserved popularity. Besides songs, he wrote *Serenade*; *Three English Dances* and *Children's Overture* for orchestra; incidental music to a fairy play, *Where the Rainbow ends*, and to *As You Like It.*

QUINIDIN. See HEART DISEASE.

QUINN, ARTHUR HOBSON (1875–). An American university professor and historian of the drama. He was born at Philadelphia, Pa., and graduated at the University of Pennsylvania. He studied modern philology at the University of Munich (1897–98) and at the graduate school of the University of Pennsylvania (Ph.D., 1899), where he was successively instructor, assistant professor, and after 1908 professor of English. He was dean of the college faculty from 1912 to 1922. Since 1923 he has been a member of the board of the American National Theatre. He wrote *Pennsylvania Stories* (1899); *The Early Drama* (1917); *History of the American Drama from the Beginning to the Civil War* (1923); and *History of the American Drama from the Civil War to the Present Day* (1927). He has edited: George Eliot's *Silas Marner* (1900); *The Faire Maide of Bristow* (1902); *Representative American Plays* (1917); Emerson's *Essays* (1920); Mark Twain's *Prince and Pauper* (1921); and *Contemporary American Plays* (1923). Mr. Quinn acted as general editor of Harper's Plays and Playwrights' Series.

QUINN, EDMOND T. (1868–1929). An American painter and sculptor, born in Philadelphia. He was a pupil of the Pennsylvania Academy of Fine Arts and of Thomas Eakins, and in Paris, of Injalbert. He is represented in America by a statue of Zoroaster, at the Brooklyn Institute of Arts and Sciences; a bust of Edgar Allen Poe in Poe Park, New York; a statue of Edwin Booth in the character of Hamlet at Gramercy Park, New York; busts of Booth, Oliver Wendell Holmes, and Chancellor Kent in the Hall of Fame, New York, and the World War Memorial at New Rochelle, N. Y. He executed many portrait busts of prominent American men, and was a member of the council of the National Society of Sculptors.

R

RABAUD, Henri (1873–). A conductor and composer, born in Paris. He was trained under Massenet at the Paris Conservatoire and in 1894 won the Prix de Rome with a cantata, *Daphné*. In 1908–14 he was conductor at the Opéra Comique and in 1914–18 at the Grand Opéra. In 1915 he was also appointed conductor of the famous Concerts du Conservatoire. During the season of 1918–19, he conducted the Boston Symphony Orchestra and in 1920 succeeded Fauré as director of the Paris Conservatoire. His works comprise the operas, *La Fille de Roland* (Paris, 1904), *Le Premier Glaive* (Béziers, 1908), *Mârouf, Savetier du Caire* (Paris, 1914; New York, 1917); *L'Appel de la Mer* (Paris, 1924); two symphonies; a symphonic poem, *La Procession Nocturne*; *Divertissement sur des Chansons Russes*; *Eclogue*; an oratorio, *Job*; a Psalm for soli, chorus, and orchestra; incidental music to *The Merchant of Venice*, *Antony and Cleopatra*, and St. Pierre's *Paul et Virginie*; *Hymne à la France Éternelle*; a string quartet; and other compositions of chamber music.

RABIES. See Veterinary Medicine.

RACE BIOLOGY. See Eugenics.

RACE PROBLEMS, United States. Race problems are strictly not problems of race at all, since what are commonly termed such are not biological problems. They are rather problems of group conflict wherein the groups are characterized by racial, or more commonly, by national distinctions. Such social conflicts in the United States are those between the predominant whites with Negroes, Asiatics, and Indians, and between descendants of the older immigrants of predominantly north European origin with later comers of central and south European nationality and with Mexicans.

The period of the World War was one of intense national self-consciousness in which were aroused antipathies not only toward the enemy nations but toward all foreigners. By extension, this feeling aroused in the United States anew the bitter hostility toward Negroes. These sentiments were complicated by certain economic and social factors, notably the general prosperity of the war years which fostered a northward migration of Negroes, who were then in competition with northern whites. Although the economic crisis of 1920–21 brought this prosperity to an end for wage earners, many Negroes had by that time been absorbed in northern industry, and were developing a consciousness of their own worth. Since during the war years immigration from Europe was at a minimum, and Asiatic immigration having largely ceased, the supply of unskilled labor was drawn from Negroes and, somewhat later, from Mexicans. At the close of the War, the prosperity of the United States and the well-nigh hopeless outlook at home, caused Europeans to look again to emigration to America. Considerable apprehension was aroused in the United States over the possibility of being swamped with immigrants whose competition might undermine American wage levels. There was also a less rational fear of the formation of foreign colonies, which were looked on as endangering national unity. Panicky alarm brought pressure on Congress to pass in 1924 legislation restrictive to immigration. This had the effect of reducing immigration. At the same time, the Oriental problem was stabilized, to the satisfaction of the Western States most concerned, by restrictive land laws. See Immigration.

The years 1920–24 constitute a turning point in race relations in the United States. With the opening of the War in 1914 came a recrudescence of animosities; with 1920–24 came the stop-gap measures, and since that date, with the frictions removed, there has been considerable dwindling of the old antagonisms.

Mexican immigration on a large scale is too recent to provide a source of conflict. It cannot be said that the older race problems are satisfactorily solved; they have rather of recent years lain quiescent. It is rather interesting that the re-aroused antagonisms of the war years passed by the Indians. This was partly due to the fact that they form a decreasingly minor fraction of the population.

A latent source of fresh conflict lies in the increasing influx of Mexican laborers into the Southwestern States, said to amount at present to about 70,000 additions a year. Since their immigration is encouraged, largely by local agriculturalists, there being no quota restrictions, there may be anticipated a gradual pushing northward of the frontier of Mexican culture. While there is at present no rankling conflict, there are possibilities, as in the case of the replacement of Negroes in the Texas cottonfields by Mexicans.

An index of racial antagonism is found in current marriage laws. More than half the States have laws prohibiting marriage between members of diverse races. Of the 29, 14 are Southern States, six in the North and West. The majority of the miscegenation laws affect marriage with Negroes (all of the Southern States), seven of them with Mongolians (Mississippi, Missouri, and the Pacific and Mountain groups, except Washington), one (North Carolina) with Croatan Indians, while Nevada is most inclusive, forbidding marriage of whites with Ethiopians, Malays, Mongolians, and American Indians. Naturally, the operations of these laws as they affect Negroes, for example, depends on the definition of Negro. This is quite variable, but in general includes all persons with one-eighth or more of Negro blood.

There is some evidence that despite the increase of mulattos at the present time, that the white-Negro mixtures were largely in an earlier generation. That is, not only are the miscegenation laws effective in preventing intermarriage, but illegal matings seem to be on the decline. One reason for this is the growing group consciousness of the Negro, who is now more inclined to seek marriage among his own people.

An index of changing social conditions affecting the Negro can be inferred from the decrease in the number of lynchings and the increase in literacy.

LYNCHINGS

	Total	Negroes		Total	Negroes
1911	71	62	1921	64	59
——	—	—	1922	57	51
1916	54	50	1923	33	29
1917	38	36	1924	16	16
1918	64	60	1925	16	16
1919	82	75	1926	29	22
1920	61	53	1927	16	16

During 1921–27 lynchings were confined wholly to the Southern States, save for one in 1925 and four in 1926. The numbers for 1924, 1925, and 1927 are the smallest for any year since records were kept. There has been steady improvement since 1920.

Growth of sentiment against lynching in the South is evidenced by discussions in newspapers and formal resolutions of white groups. This was induced in part by the departure of vast numbers of Negroes to the North in the war years (see below). Efforts have been made, beginning in 1918, to have Congress pass a law making lynching a Federal crime. In 1920 the Dyer Bill was introduced in Congress; in 1921 it was killed by a filibuster of Southern Democrats; in 1922 it passed the House, but a Democratic filibuster in the Senate prevented its passage. In 1922 New Jersey and in 1923 Pennsylvania passed anti-lynching acts. It is noteworthy that Federal anti-lynching laws were proposed in the 1928 platforms of the Socialist, Republican, and Workers' parties.

Illiteracy is decreasing more rapidly among Negroes than in the country at large:

PERCENTAGE OF ILLITERATES

Negroes	Total population
1880—70.0%	17.0
1890—57.1	13.3
1900—44.5	10.7
1910—30.4	7.7
1920—22.9	6.0

In 1920 only 53.5 per cent of all Negro children were in schools; in 1924, 68.4 per cent.

A tremendous migration of Southern Negroes to the Northern States took place during the World War and the years immediately following. It is estimated that more than 400.000 moved north within three years, principally in 1916–17. Within a period of 18 months in 1917–18, Chicago alone received an accretion of 50,000. Increases in typical mid-Western industrial cities, between the census dates 1910–20, ran: Cincinnati, 51 per cent (10,000); Gary, 1284 per cent (5000); Detroit, 623 per cent (36,000); Chicago, 148 per cent (65,000). The suddenness of the migration was startling, but was not a unique phenomenon. There had been earlier sudden movements from the lower Mississippi into Kansas in 1879, and into Arkansas and Texas in 1888–89. What is easily overlooked is that these mass movements were merely high points in a large and continuous drift to the North over 50 years, following on the heels of white migration to the West. The factors were largely the same as in the earlier movements, namely, economic depression in the South and more potently an escape from social restrictions and tyranny. But the 1914–20 migration differed in the economic opportunity offered Negroes in the North; the sudden demand for unskilled labor due to cutting off of the European supply, coupled with an increase in wages. In 1915 Negro laborers in the South received 75 cents a day, skilled laborers $2 to $3.50. Fifty-six per cent received less than $2 a day, while in Pittsburgh, for example, 62 per cent found wages of $2 to $3. Labor depression in the South in 1914–15 was followed by great damage to the cotton crop in 1915–16 and the depression of its price in subsequent years. Unusual floods in 1915 aggravated the situation. Wages did not advance as fast as food stuffs. This provided the immediate stimulus, but an equally potent factor was relief from the injustice, inequality before the law, and peonage of the South.

The most striking feature of the Northern migration was its individualism. Letters from the North, rumors, lectures, labor agents, all had their part. Particularly effective was the circulation of the Chicago *Defender*, which rose from 50,000 to 125,000 within 1918. This paper set a definite date for the "Great Northern Drive," May 15, 1917; the week following saw the heaviest rush to the North. The impulse to leave was irresistible; they fled as from a curse. Professional men moved largely because their clientele was gone. Inevitably, these migrants were disillusioned in the North, friction and clashes resulted, but the net gain for the Negroes was large. Concentration of Negroes under wretched conditions in the South was replaced by wide distribution in the North, with better economic and social opportunities. The effect in the South was to depopulate whole districts and increase wages for those who remained. When the South realized its position, a new social attitude, as well as a new economic policy, was created. This took tangible form in appropriations for schools, sanitary improvements, better housing, etc. "For those who remained conditions were more tolerable, although there appeared to persist a feeling of apprehension that these concessions would be retracted as soon as normal times returned." (Scott, *Negro Migration During the War*, 1920).

A number of race riots occurred during the War and the several years following. In 1917 a bitter and destructive riot raged in East Saint Louis, Ill. Other clashes followed in Philadelphia, Chester, and Coatesville, Pa., Washington, D. C., Norfolk, Va., Chicago, Omaha, Nebr., Longview, Tex., Tulsa, Okla., and in rural Arkansas.

A most thorough report on one such clash is *The Negro in Chicago* (1922). Following the race riot of July, 1919, in that city, in which 23 Negro and 15 white lives were lost, and 537 were injured, Governor Lowden appointed a commission to inquire into its causes and particularly into the background of racial relations from which such clashes arise. This very careful analysis may be taken as exposing typical conditions. In Chicago, considerable unrest had been occasioned in industry by competition between white and Negro laborers due to the influx of Negroes from the South. The Negro population increased from 44,103 in 1910 to 109,594 in 1920, or 148 per cent. Most of this increase came during 1916–19. This increase developed a housing crisis; the Negroes overran the recognized Negro areas, and when they took houses in adjoining areas, friction ensued. A partisan political struggle had taken advantage of the solid massing of Negro voters, whose controlling influence on an unpopular side was resented. Venality and incompetence of the police, and their manifest unfriendliness to Negroes, were contributing factors.

In the actual clash, perhaps the most important factor was the organized gangs of white hoodlums, who, using this excuse for lawlessness, formed nuclei of attacking mobs. "But for them, it is doubtful if the riot would have gone beyond the first clash." Incitement to riot came with the stoning and drowning of a Negro boy: rumors of arming and atrocities on both sides spread rapidly, precipitating action. The riot continued spasmodically for a week and was subdued only by the effective control of the militia and a heavy rain. It is of record that the active participants were predominantly young, boys and men of fifteen to twenty-two, toughs bent on mischief. It is worthy of note that not one incident reported concerned a sex crime. One immediate result of the riot was the intensification of race consciousness, solidarity, suspicion, and antagonism, which several times in the ensuing year almost precipitated a repetition.

The commission, in making its recommendations, frankly recognizing that the inheritance of prejudice and suspicion of both races is not easily allayed, nevertheless suggested certain action to circumscribe clashes. Among the more important recommendations were a more effective organization of police and militia, greater fairness in arrests and trials, proper housing for Negroes, better schooling and recreational opportunities, a caution to the press in handling inter-race news stories and a request to print material to dispel prejudice, and an appeal to all groups to seek understanding of one another's problems and exercise restraint in action. It is obvious that these recommendations apply equally to all communities.

Negroes in the South still suffer for lack of educational opportunities. The total annual expenditure in the country (about 1924) was as follows: all public schools, $1,600,000,000, Negro public schools, $28,000,000 (1.8 per cent); all high schools, $400,000,000, Negro high schools, $9,000,000 (2.3 per cent). In the Southern States, the expenditures for Negro children averaged about 11 per cent of the total, although Negroes constitute upward of two-thirds of their population. Their teachers have, in general, preparation to teach only the third grade, are paid but a ninth or less of the salaries of similarly situated white teachers, and hold school but for five months a year.

The excuse for lynchings in the South is a charge of rape or attempted rape, or even a suspected attempt. It is commonly believed, not only in the South but over the country at large, that Negroes are predisposed to sex crimes, and that all lynchings are punishments of this offense. Statistics on the subject are instructive. In the two decades, 1883 to 1903, there were 1985 Negroes lynched in the South: rape was assigned as the cause in 675 cases, a third of the total. In the four-year period, 1914–18, there were 264 lynchings; 28 being on charges of rape, i.e., a ninth. However, of the 1985, 50 were Negro women; of the 264, 5 were women. The Congressional Committee on Immigration found that in New York State, the percentage of cases of rape was less for Negroes (0.5 per cent) than for native-born (0.8 per cent) or foreign-born whites (1.8 per cent). Further, in New York County, which is only a part of New York City, in 1917 there were 230 indictments for rape, of which not one was a Negro. Nine times as many whites were indicted for this crime in this single county as there were Negroes lynched in the whole country over a four-year period. Such conditions are not peculiar to New York, but general over the country.

A new and characteristic American Negro type appears in process of formation. The first serious general study of his physique in *The American Negro*, by M. T. Herskovits, appeared in 1928. Contrary to the picture given by the 1920 U. S. Census that 80 per cent of Negroes are of wholly Negro ancestry (8,802,577 in 10,463,131), this investigator found in the populations studied: unmixed Negro, 22 per cent; more Negro than white, 32 per cent; equally white and Negro, 17 per cent; more white than Negro, 15 per cent; other mixtures, as with Indians, 15 per cent. This author holds that a new Negro type has developed, characterized by traits intermediate between white-Indians and West African Negroes, although in thickness of lips, they approach the latter. It is more homogeneous than one would expect as the result of this amalgation; low variability of family lines indicates inbreeding, while high variability within families is witness to the diversity of descent. It appears that the mixture was several generations back, growing racial consciousness making for inbreeding. Selective mating is taking place; dark husbands seeking lighter wives. (See also Hrdlička, "Anthropology of the American Negro," *Amer. Jour. Phys. Anth.*, 1927, p. 205; Davenport and Love, *Medical Department, U. S. Army in the World War*, vol. 15; "Statistics," Part I "Army Anthropology" (1921). An encyclopædia on the Negro is the *Negro Year Book*, 1912 to date.

The Oriental problem in the United States is quite different, since it is based on a much smaller number of individuals, whose social and economic circumstances differ from those of the Negroes. Nevertheless, the problems have in common an increase in numbers of the unassimilated group and its marked localization. Orientals reside almost wholly in the Pacific States; the greater number in California. The following data show the changes in population in the decade 1910–20 (U. S. Census):

	United States		Pacific States	
	1910	1920	1910	1920
Chinese	71,531	61,639	46,320	34,265
Japanese	72,157	111,010	57,703	93,490

That is, there was a manifest increase in the total Japanese population, with a decrease of Chinese. This is also the case for the Pacific division taken separately: other divisions of the country show relative stability over the decade. These statistics also indicate the concentration on the west coast; in 1920 half the Chinese lived in California, Oregon, and Washington, 84 per cent of the Japanese. The Japanese are distributed in these three States roughly in the proportions, 3:1:1.

The Oriental problem had its inception in Chinese participation in the California gold rush and in Western railroad building. In 1882 they were excluded from entry and by 1890 their problem had passed. The exclusion policy was effective. The immigration of Chinese laborers was stemmed and their number in the country has declined. The resident population has scattered throughout the country, so that anti-Chinese feeling has become almost nonexistent. However, the resident Chinese are resentful of the manner in which they have been treated.

Japanese began coming in numbers in 1890. At first greeted with friendliness, opposition soon rose. This was wholly local until 1906, when it attracted national attention. In 1907 Roosevelt negotiated with Japan the so-called Gentleman's Agreement, whereby the latter undertook to issue no passports to laborers. This did not remedy the situation, since wives were still admitted, whereby the group increased by reason of their high birth-rate. A partial remedy was had in 1920 by the voluntary discontinuance of issuing passports to "picture-brides."

Japanese immigration has never been large when contrasted with that of other nations. It dropped from 15,803 in 1908 to 3111 the following year and 2720 in 1910, rose to 8929 in 1914 and 10,213 in 1918, then fell to 5809 in 1923, rose to 8801 in 1924, and was only 723 in 1925 and 654 in 1926. Emigration of Japanese followed a reverse trend; from 3431 departing in 1908, it rose to 4366 in 1910, dropped to 731 in 1913, remaining at that level to 1917, rising again to 1583 in 1918 and 4368 in 1922, whence it dropped again to 1208 in 1926. Emigration exceeded immigration in 1909 by 600 and in 1910 by 1600, while departures numbered more than half the arrivals in 1921 and were double the arrivals in 1925 and 1926.

Yet difficulties increased over this period and agitation against the Japanese continued on the part of the West coast whites. This reached a culmination with the rearousal of a narrow nationalism engendered by the World War. The earlier objections to Chinese had been on the grounds of low standards of living and consequent competition, but the newer objections were based on the desire neither to assimilate nor amalgamate with these people, coupled with a fear of their high fecundity. Nevertheless, economic motivation was indicated by the objections raised to their holding land (R. L. Buell, *The Development of Anti-Japanese Agitation*, 1922–23).

The attitude of the Californians in 1920 was well exemplified in a letter of Governor Stephens covering the transmission of a report by the State Board of Control to the U. S. Secretary of State. He recounted the doubling of the Japanese population in the decade 1910–20; their control of 458,056 acres of the best agricultural land in California (an increase of 412.9 per cent) and of 80–90 per cent of "certain essential food products" (such as tomatoes, spinach, potatoes, asparagus, and berries). The Japanese population tended to concentrate in colonies where they outnumbered the whites and where white children were taught in schools predominantly Japanese. Their fecundity far exceeded that of any other group in the country. The crux of the matter was that by reason of "economic standards impossible to our white ideals" they were "proving crushing competitors to our white rural populations." Further, Californians were determined to repress the formation of these groups because of "the ethnological impossibility of assimilating the Japanese people."

It was to the credit of Californians that no outrages had been perpetrated against the Japanese and that they had restrained their legislation on behalf of international amity. A Federal exclusion and registration act was recommended as the only relief. This document conveniently ignored the increase in departures and decrease of arrivals at the end of the decade; that Japanese constituted only 2.5 per cent of the total population of California and their holdings 4 per cent of all improved farm lands; and that their fecundity, natural in any young immigrant group, would materially decrease, as it has since.

The upshot of this agitation was Congressional investigations on the Pacific coast in 1920–21, the enactment of anti-alien land laws by the coast States (see E. G. Mears, *Resident Orientals on the American Pacific Coast*, 1928), and their exclusion by the Immigration Act of 1924. California adopted an anti-alien land law by overwhelming popular vote in 1920, which was soon followed by similar enactment in Oregon and Washington. These laws were amended in 1923 to prevent alien guardians holding land for their minor citizen children and to prevent cropping contracts. The Immigration Act barred alien wives of citizens, and the parents, wives, and minor children of domiciled alien Japanese. The act had the effect of reducing Japanese immigration to one-twelfth of its former volume. It also produced a change in their composition; proportionately more men than women entered and fewer departed, and these were drawn from older age groups.

"The Immigration Act of 1924 has been in effect too short a time to warrant any prediction as to its ultimate significance. But judging from two and a half year's experience of its operation one might hazard the conjecture that in its practical outcome the act will do for Japanese immigration what the Exclusion Act of 1822 did for Chinese immigration. That is, it will so reduce and select the stream of Japanese immigration that the Japanese problem in this country will cease to be of public concern. Already, there has been a noticeable decline in anti-Japanese sentiment. The Japanese residents of this country will, in all probability, as the years pass, become more widely distributed throughout the Union. Since the 1924 law went into effect, the percentage of Chinese and Japanese immigrants taking up permanent residence in the Pacific Coast States has shown a considerable decline." The Japanese are, however, resentful of this exclusion; they would prefer a policy of restriction as implying no discrimination beyond that accorded other nationals. This would be quite as effective as the present exclusion policy. (R. D. McKenzie, *Oriental Exclusion*, 1928).

Mexican immigration into the United States is increasing. The entries have been irregular; rising from 44.776 in 1919 to 75,988 in 1923, jumping to 105,787 in 1924, dropping to 49,729 in 1925, and rising again to 66,766 in 1927. These are the figures of the Immigration Commission, but undoubtedly many more crossed the border without registration. The total for 1928 was estimated at 70,000. The exclusion of Chinese stimulated the immigration of Japanese and their exclusion has in turn stimulated that of Mexicans. As already pointed out, this was also stimulated by the northward movement of Negroes.

Bibliography. A well-balanced view of these conditions is expressed in J. H. Oldham's *Christianity and the Race Problem* (1924); other books on the subject are E. G. Murphy, *The Basis of Ascendency* (1909); and A. M. Carr-Saunders, *The Population Problem* (1922). See EUGENICS; IMMIGRATION; INDIANS.

RACES, ORIGIN OF. See ANTHROPOLOGY.

RACES OF MAN. See ANTHROPOLOGY.

RACHILDE (1862–). The pseudonym of Mme. Alfred Valette, a French novelist who was born (Eymery) at Périgueux. She was an imaginative writer of the unusual. Her works include *Á mort* (1886); *L'Heure sexuelle* (1898); *La Tour d'Amour* (1899); *Dessous* (1904); *Le Meneur de Louves* (1905); *Son Printemps* (1912); *La délivrance*, a play (1915); *La découverte de l'Amérique*, short stories (1919); *Dans le puits* (1919); *Jarry* (1928); and *Le Prisonnier* (1928). Consult *Rachilde*, by Ernest Gaubert (1907).

RACHMANINOV, räk-mä'nē-nôf, SERGEI (VASSILIEVITCH) (1873–). A Russian composer and pianist (see VOL. XIX). For almost 10 years, beginning with the Russian Revolution, he abandoned composition, devoting his entire time to concert tours as a pianist in Europe, and especially in the United States, idolized on both continents. Why his creative impulse remained stifled for such a long period, is a matter of conjecture and greatly to be regretted, when all the real talents of the time, R. Strauss, Puccini, Sinding, Sibelius, and Elgar were deteriorating, just when music was in dire need of strong individualities to uphold the standard of true art in the general chaos of modernism. That Rachmaninov's genius would have been equal to the task is proven beyond doubt by the unmistakable individuality, the remarkable inventive power, the expressiveness of the thematic material and its logical, masterly development, the inherent beauty and massive strength manifested in the works up to 1915. Fortunately, these same qualities appear again in the new works which the composer, after his long silence, gave to the world in 1926, *Russische Gesänge*, for chorus and orchestra, and a fourth piano concerto in G minor.

RACIAL MINORITIES TREATIES. The protection of racial, linguistic, and religious minorities constituted one of the most difficult problems dealt with at the Peace Conference of Paris. Throughout the world, there was a tremendous agitation for national self-determination. The peacemakers of 1919–20 endeavored to enshrine the principle of nationality in the political and territorial resettlement of Europe, and to a large extent they succeeded (see PEACE CONFERENCE AND TREATIES); but so intermingled were different nationalities in various parts of the former empires of Russia, Austria-Hungary, and Turkey that it proved virtually impossible to draw frontiers for Poland, Czechoslovakia, Rumania, Serbia, Greece, etc., which would satisfy the legitimate ambitions of their own peoples and yet not outrage their neighbors. Ethnographic considerations had to be weighed, along with economic and strategic necessities and desires. A racio-religious problem like that of the Jews who were suffering persecution even during 1919 in various countries of Europe, particularly Poland, served to complicate the situation. The Jews were indeed promised a national homeland in Palestine, but even there they were in a minority. Meanwhile, what was to become of their kinsmen in Europe? These problems could not be solved by splitting up the world indefinitely. Not every tiny group could have its own flag and place in the family of nations. The formula of self-determination, carried to an extreme, would have been a *reductio ad absurdum.* On the other hand, the world had been so long and so sorely troubled by such repressive movements as the Anglicization of Ireland, the Russification of Poland, Finland, etc., that it would have been utter folly to hand over dissentient minorities to the tender mercies of nationalist patriots who despite their own thirst for national political independence and national cultural expression would tyrannize over "inferior races." Experience had amply demonstrated that newly emancipated or unified nations were the first to deny emancipation or unification to others.

The Great Powers which dominated the Peace Conference did not intend to have their sovereignty impaired by pledges regarding the equitable treatment of minorities within their own boundaries, but neither were they entirely willing to underwrite a settlement affecting other states in which the oppression of submerged nationalities should constitute too great a menace. They argued that as it was their efforts that had largely won the War, it was their duty and privilege to dictate the peace, and as they were consenting to the resurrection or augmentation of Poland, Rumania, Czechoslovakia, Jugoslavia, etc., and were transferring large numbers of people of different races, languages, and religions from those of the majority, they had the right and were in duty bound to see that states which they were so conspicuously aiding should not be in a position by unjust or tyrannical treatment of such minorities to imperil the peace of the world. During the stormy eighth plenary session on May 31, 1919, President Wilson took the lead in defending the attitude of the Great Powers, much to the dismay and discontent of the smaller powers. Rumania and Jugoslavia hotly resisted the exaction of such pledges as were contemplated and even refused for several months to sign the Treaty of St. Germain, but eventually (December, 1919), they were partly coerced, partly conciliated, into signing. (See PEACE CONFERENCE AND TREATIES.) During 1919 and 1920, the Great Powers negotiated a series of treaties with the Balkan powers and Succession States which elicited pledges to respect and preserve political, religious, cultural, and economic rights of dissentient groups.

In the case of Poland (treaty signed June 28, 1919), special protection was deemed necessary for the Jews, who constituted one-seventh of the population. The new Poland came to include also about 2,000,000 Germans and 3,000,000 Ruthenians, in the province of Galicia, who were to be similarly protected. In the case of Czechoslovakia, there were some 3,000,000 Germans, 750,000 Magyars, and 460,000 Ruthenians, not to mention the religious minorities comprising about 1,000,000 Protestants, 500,000 Greek Catholics, and 350,000 Jews. In the case of Rumania, there were several million Magyars, Germans, Serbs, etc., and a large element of Jews (750,000). In Jugoslavia special provisions were made for the Moslems. In addition, there were incorporated in this new state about 450,000 Germans, 450,000 Magyars, 150,000 Rumanians, and some Bulgarians. Italy, which acquired not only the Italian-speaking population of irredentist Trentino and Trieste but also about 300,000 Austro-Germans in the Tyrol and a like number of Jugoslavs near the Adriatic, was not obliged to make any pledges. Greece, however, being a small power, was forced to promise special treatment for minorities in Macedonia, Thrace, etc. Clauses protecting minorities were inserted in the treaties with Austria, Bulgaria, Hungary, and Turkey; and subsequently Germany, as a result of the Upper Silesian settlement, was compelled to subscribe to the principal parts of the Polish Minorities Treaty for at least 15 years as regards those parts of Upper Silesia definitely awarded to her.

The minorities treaties were alike in all essentials, differing only from state to state as special provisions were made to meet exceptional circumstances. In general, they removed all restrictions on the use of languages, on the exercise of any religion not injurious to public welfare, and on the press and right of free speech, free assemblage, and free association, etc. All languages were to be given adequate facilities before the courts. All racial, linguistic, and religious minorities were to have the right to establish, manage, and control, at their own expense, charitable, religious, and social institutions and schools. The national government, i.e., the dominant majority in the state, might make instruction in its official language obligatory in all schools, only providing it offered adequate and reasonable facilities for other languages used by the people within its frontiers.

These stipulations were primarily guaranteed by the Great Powers, but they were also declared "objects of international concern over which the League of Nations has jurisdiction." Any member of the Council was empowered to call attention to infractions of a minority treaty, and disputes as to law and fact might in certain instances be referred to the Permanent Court of International Justice for final decision. When it came into existence, the League of Nations assumed control. It was early decided that under ordinary circumstances, when the Secretariat received a petition from a minority, it was to communicate it to the government concerned before passing it on to the Council, in order to allow the government to examine the charges and to state its position. The whole matter was then to be studied by a Council committee, and if action were deemed necessary, the council was authorized to take suitable measures for the observance of treaty obligations. Czechoslovakia very soon won an honorable renown by the readiness with which she gave all necessary information to the League regarding her treatment of minorities and her whole-hearted fulfillment of treaty pledges. But the attitude of Poland and Rumania did not prove to be so coöperative.

In addition to watching over the observanace of Minorities Treaties signed at the Peace Conference, the League obtained declarations from various Powers, on their admission into the League, with regard to the protection of minorities. On Sept. 22, 1921, Albania signed a declaration promising besides other things to provide "an electoral system giving due consideration to the rights of racial, religious, and linguistic minorities," to give full detailed information, and to "take into account any advice it might receive from the League of Nations with regard to the question." Similar declarations were obtained in 1921 from Lithuania and in 1922 from Estonia and Latvia. In the case of Finland, the Council resolved (Oct. 2, 1921) that under existing internal laws, minorities were protected, and a declaration was needless. The Great Powers made no pledges regarding themselves, but the third assembly of the League (1922) formally "expressed the hope that states not bound to the League by any legal obligation, such as that contained in the Minorities Treaties, would nevertheless observe in their relations with racial, religious, or linguistic minorities, at least the same degree of justice and tolerance as is required by the treaties watched over by the Council." See LEAGUE OF NATIONS.

RACING. Thoroughbred racing, the "sport of kings," with an origin traceable to the ancient Greek and Roman chariot races, rates as a preëminent sport in Great Britain, France, the United States, Canada, Cuba, and Mexico. The historic English Derby, the French Grand Prix, and the Kentucky Derby continue year after year to attract their thousands to the courses where they are contested, while countless other thousands of turf followers now listen in to the detailed radio descriptions afforded of these racing classics. At various intervals, agitation against the "betting evil," correlative to racing, has culminated in legislation directed toward curbing, if not obliterating, betting, but the usual wagering continues in some form or other. The Calcutta Sweepstakes, as the "pool" on the English Derby is known, yields more than a $1,000,000 annually. This famous English stake was first competed for in 1780, the purse of 50 sovereigns being offered by the twelfth Earl of Derby for three-year old colts. Diomed, owned by Sir C. Bunbury, proved the first winner. In connection with the running of the English Derby, it is interesting to note that Steve Donoghue, as jockey, has scored six victories in this fixture, beginning with the year 1915. The record for the Derby, as fixed in 1921 (about 1 1-4 miles), was set by Call Boy in 1927 and equalled by Felstead in 1928, the time being 2 minutes, 34 2-5 seconds.

The Grand Prix, run at the Longchamps course, near Paris, had its inception in 1863 and the Kentucky Derby, run at Churchill Downs, Louisville, Ky., began in 1875. The best time accomplished in the Kentucky Derby was that of Old Rosebud, carrying 114 pounds in 1914, 2 minutes, 3 2-5 seconds. With the weight set at 126 pounds, Bubbling Over turned in the fastest time, 2 minutes, 3 4-5 seconds, in 1926.

RADBURN. N. J. See CITY AND REGIONAL PLANNING.

RADCLIFFE COLLEGE. A college for women at Cambridge, Mass., founded in 1879. Instruction is given by members of the Harvard University faculty. Most of the courses of study are identical with courses of study offered in Harvard and all of the courses are of the same grade as those given in Harvard. The enrollment increased from 628 in 1914 to 1109 in 1928 including 323 graduate students. The faculty was increased during the same period from 136 to 215 members and the library from 32,000 to 65,000 volumes. Due largely to an endowment campaign held in 1921, the productive endowment of the college was increased from approximately $1,000,000 in 1914 to $4,815,286 in 1928. Briggs Hall, a dormitory, was completed in 1925. President, Ada Louise Comstock, LL.D., Litt.D., L.H.D.

RADEK, rä′dĕk, KARL BERNGARDOVICH (1885–). A Russian Communist leader and publicist, born in Lemberg. He joined the Polish Social Democratic Party in 1904, was on the staffs of Polish and German radical papers (1906–13), and distributed Communist and anti-war propaganda from Switzerland and Stockholm during the World War. A devoted lieutenant of Lenin, he was one of the Soviet negotiators of the Brest-Litovsk Treaty. He then served successively as director of the central European section of the People's Commissariat for Foreign Affairs, secretary of the Communist International (1920–23), principal of the Communist University for Workers of the Orient (1926–27), and principal of Sun Yat-sen University in China. Joining the Trotsky opposition to the Stalin régime, he was exiled to Tobolsk in January, 1928. His writings, some of them under the name of Arnold Struthahn, include *Die Entwicklung des Socialismus von der Wissenschaft zur Tat* (1919); *In den Reihen der deutschen Revolution* (1909–19); *Gesammelte Aufsätze und Abhandlungen* (1921); *Wege der russischen Revolution* (1922); *Nach Genua und Haag* (1922); *Lenin, sein Leben, sein Werk* (1924).

RADIATION. See ASTRONOMY.

RADIĆ, STEFAN (1871–1928). A Jugoslavian political leader. In the nineties, he was imprisoned several times for his opposition to the Hungarian government. He strove for Croatian autonomy, and in 1904 founded the Peasant Party and wrote *The Croatian Thought* (1903–04) in the hope of enlisting the intellectuals in this movement. During the World War, his party was pacifist. Between 1919 and 1925, Radić spent most of his time either in prison or traveling in Europe, but in March of the latter year the party recognized both the Serbian dynasty and the Constitution, having heretofore refused to participate in the government. In November, 1925, he became Minister of Education, and although he remained in office only until April, 1926, he controlled the cabinet until February of the following year. He stood strongly for decentralization of power and the lessening of the Serbian influence in it, and after his election to the Skupština in September, 1927, he practically prevented legislation, due to his opposition to measures of Serbian origin. On June 20, 1928, he was shot in the Skupština by a Radical Serbian member, and died from the wounds on August 8. See JUGOSLAVIA, under *History*.

RADIOACTIVITY; RADIOACTIVE ELEMENTS. See CHEMISTRY; PHYSICS.

RADIO COMMUNICATION. See BROADCASTING; PHYSICS; RADIO TELEPHONY.

RADIO COMPASS. The well-known directive characteristic of an antenna made in the form of a flat loop was used in the Bellini-Tosi radio compass which had some application in marine navigation. Two one-turn loops were arranged on the ship's rigging, the turns being at right angles to each other. They terminated in the radio room, in two coils at right angles, inside of which there was a third rotatable coil; this coil served as the input circuit for the radio receiver. As it was rotated the strength of received signal increased and decreased, being zero twice and maximum twice for each revolution. When suitably corrected, it served to show the direction from which a signal was being received, and hence to locate the ship, in direction, with respect to the transmitting station. By picking up signals from two shore stations, the positions of which are marked on his chart, the navigator was able to determine his ship's position. The simple rotatable loop antenna, about three feet square, is now used more extensively than the Bellini-Tosi arrangement. The loop is mounted above the radio room on shipboard and its position is adjustable by the operator. After its corrections have been applied (different, of course, for each ship), its indications may be relied upon to within a degree or less.

Refraction of radio waves by sunset conditions, shore lines, etc., of course directly affect the accuracy of the radio-compass bearing. This can only indicate the direction of the waves, as they pass the loop antenna; if they have been bent by obstruction or atmospheric conditions, the apparent bearing of the station is wrong to the same extent. The radio compass has proved of inestimable value in several sea disasters; in the rescue of the steamship *Florida* by the *America* in 1928, the latter ship was able to find the *Florida* by radio-compass bearing even when the *Florida* did not know her own position.

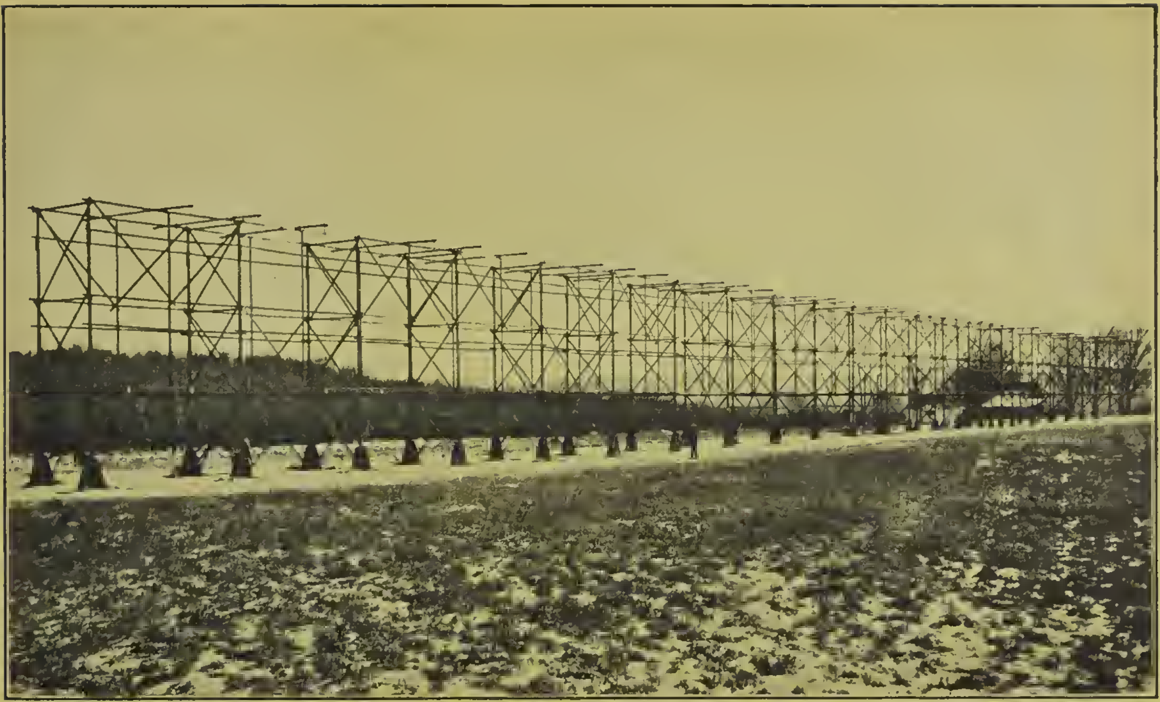
RADIO INSTRUCTION. See EDUCATION IN THE UNITED STATES.

RADIO TELEGRAPHY. At the present time, the spark telegraphy apparatus of the early radio sets has been largely supplanted by continuous-wave transmitters and receivers. In the merchant marine, there are still some spark sets, using either *synchronous* or *quenched* spark gaps. This type of set generally uses a 500-cycle alternator sparking twice per cycle, thus giving the received signal a musical note of 1000 vibrations per second. Glass condensers (Leyden jars) or mica condensers are used for storing the energy, which is transformed into high-frequency oscillations. A capacity of about .01 microfarad is used per kilowatt rating of the set. A well-constructed and installed spark set gives a signal with a decrement as low as 0.1, which permits reasonably sharp tuning.

In the better class of merchant marine, and in naval vessels, interrupted continuous wave (I. C. W.) has been much used. In this scheme, a three-electrode vacuum tube (triode) is arranged in a regenerative circuit, to produce continuous oscillations which are supplied to the antenna. In the plate circuit of the triode, the 500-cycle alternator (from the old spark set) is used for power supply. As the triode will generate oscillations only when its plate is positive, this scheme puts into the antenna groups of oscillations, one group for each positive alternation of the alternator. Such a transmitting set gives a signal which is received as a pure 500-cycle musical note. The tuning of such a signal, in the receiving set, is much sharper than is the spark signal and so produces less interference.

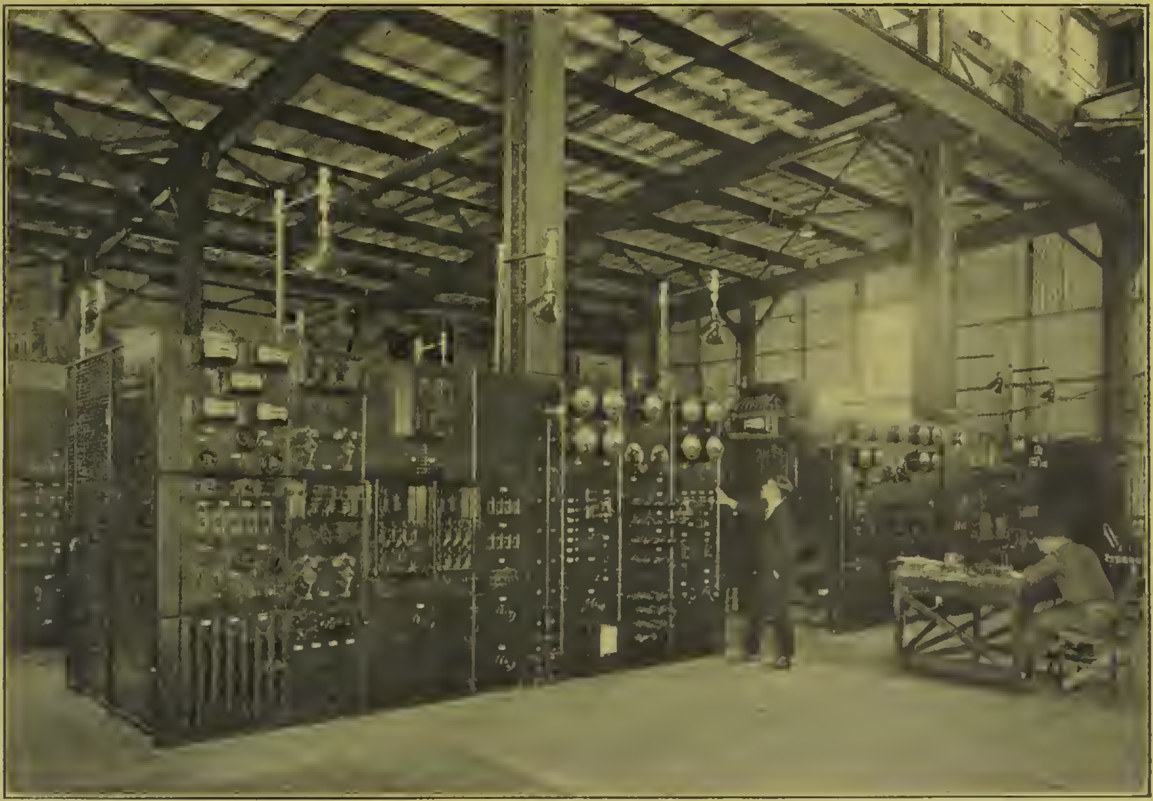
In all of the transoceanic radio-telegraph channels today, continuous-wave transmission is used. The frequencies used are generally between 20 and 30 kilocycles per second and the power used is ordinarily about 200 kilowatts. Some idea of the size and power of these low-frequency long-distance transmitters can be gained from the accompanying table, which gives data from typical stations:

Station and Call Letters		Frequency in KC	Antenna current in amperes	Effective height in meters
Nauen	POZ	23.4	390	145
Bolinas	KET	22.9	420	51
Monte Grande	LPZ	23.6	610	150
Ste. Assise	UFT	20.8	380	180
Ste. Assise	UFU	15.0	475	180
La Fayette	LY	15.9	475	180
Cayey	NAU	33.8	150	120
Malabar	PKX	19.0	500	320
Cavite	NPO	19.3	180	120



American Telephone & Telegraph Co.

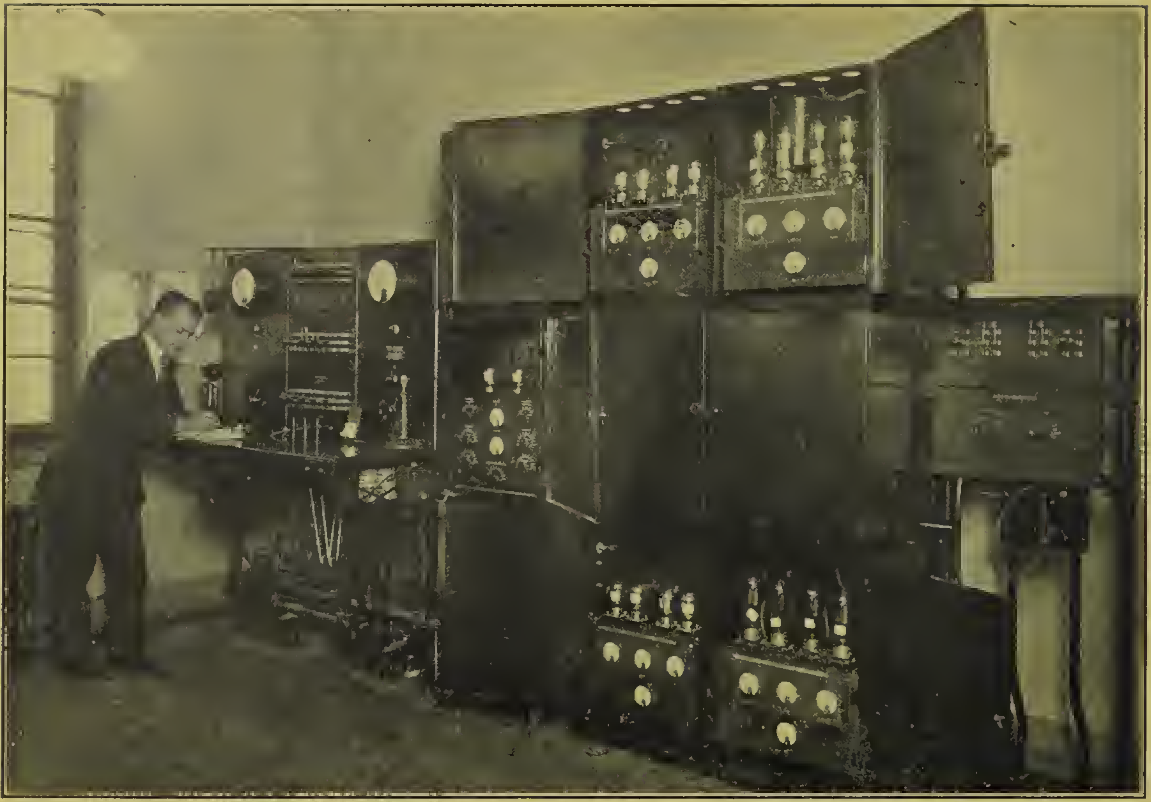
One of the Receiving Antennas of the High-frequency Transatlantic Channel at Netcong, N. J. Wires on the front and back sides of the structure make up the antenna.



Radio Corporation of America

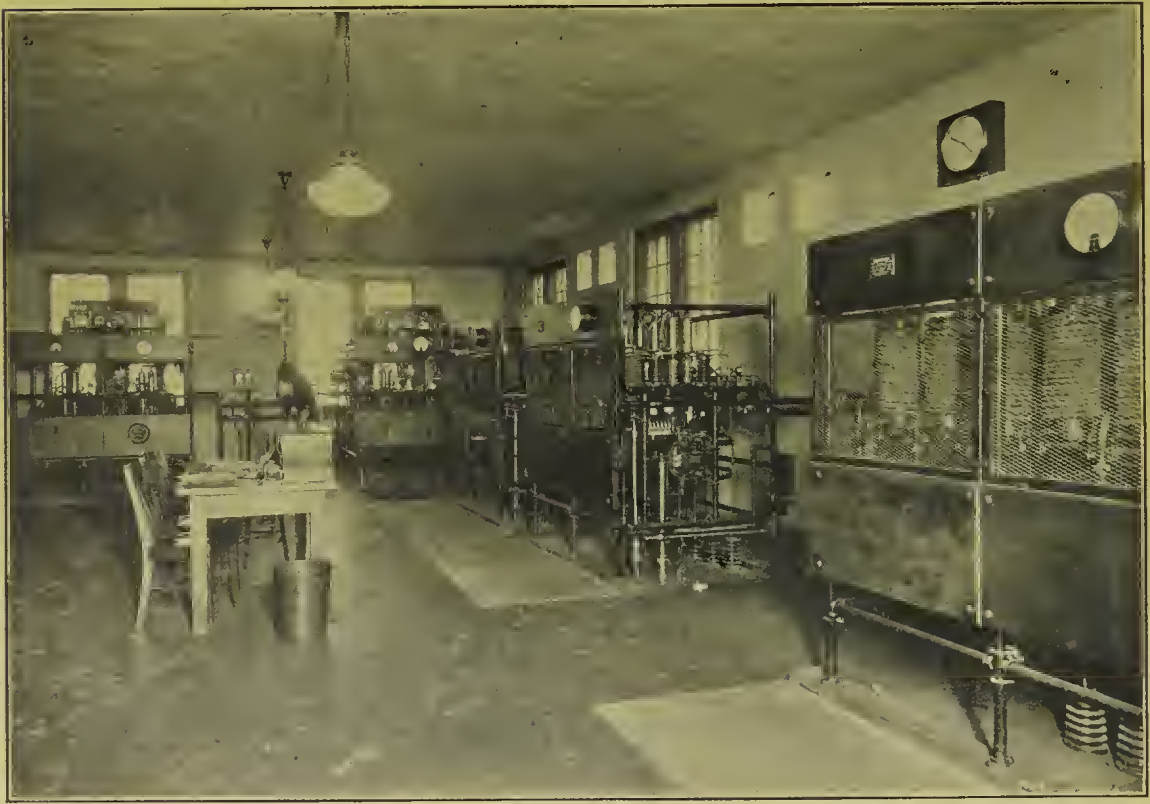
Interior of the power house of the Radio Corporation of America Communications Company's Transoceanic Station at Rocky Point, Long Island, N. Y.

TRANSOCEANIC RADIO COMMUNICATION



Radio Corporation of America

Control room and wire line apparatus at WJZ at Bound Brook, N. J. owned by the Radio Corporation of America.



Radio Corporation of America

Interior view of power house of WJZ at Bound Brook, N. J., showing modulators and transmitters.

These stations all are outside of the United States. The high-powered low-frequency stations in the United States are operated either by the U. S. Navy or by the Radio Corporation of America. The latter company has its transmitting station at Rocky Point near New York City, where several antennæ and sets of transmitting apparatus carry on telegraphic communications with stations in practically every country of Europe, as well as South America.

The high-frequency power for these continuous-wave stations is obtained from (1) the oscillating arc, (2) saturated iron-core frequency doublers, (3) inductor alternators, or (4) oscillating triodes. The stations of the U. S. Navy use the arc, those of the Radio Corporation use an inductor alternator designed by Fessenden and improved by Alexanderson. German stations use iron-core frequency doublers or the "reflection" alternator of Goldschmidt, and the French stations use either arcs or inductor alternators of French design and manufacture. In the European stations owned by the Radio Corporation, so-called Alexanderson alternators, of 200-kw. rating, are used.

It seems possible that all of these methods of generating power may be superseded by high-powered triodes arranged in regenerative circuits. Using glass or quartz bulbs, the triode had an upper capacity limit of about 1 kw. but with Housekeeper's development of the large copper-glass seal, it became possible to utilize the copper wall of the triode as plate. This permitted water cooling of the plate and at once made possible triodes of 100- or even 1000-kw. capacity. The present standard sizes of these water-cooled triodes are either 5 or 20 kw.

These large triodes are generally arranged as amplifiers, getting their grid excitation from smaller triodes which themselves are excited from smaller ones. The small self-excited triode, which actually serves to fix the frequency of the station, has its frequency set by a small piece of piezo-electric quartz. There are three types of filaments used in the modern triode, pure tungsten, thoriated tungsten, and oxide-coated filaments. For tubes of high power and high voltage, pure tungsten filaments are generally used as it is possible to "outgas" them much more thoroughly than the other types. For low-powered tubes, both diodes (two-element vacuum tubes or rectifiers) and triodes, either thoriated filaments or oxide-coated filaments are used. These are superior to pure tungsten with respect to the electron emission per watt of power. The oxide-coated filament gives about .03 ampere emission per watt of filament power, the thoriated tungsten about .02 ampere per watt, and the pure tungsten about .003 ampere per watt.

The modern vacuum tube is evacuated by pump (sometimes of the mercury-vapor ejector type) to about 10^{-4}–10^{-5} mm. of mercury, the pumping being continued while all parts of the tube are heated. The tube is then sealed off from the pump and a small piece of volatile metal (such as magnesium) is evaporated, inside the bulb, and condenses on the walls. This freshly condensed metal acts as a sponge on the residual gases, increasing the vacuum to about 10^{-6} mm. of mercury. This procedure is called the "clean up" and the material is called the "getter."

In recent years, short waves, lower than 100 meters, have been found suitable for transmission over tremendous distances. It seems that there is a layer of partially ionized air, about 120 miles above the earth's surface, which serves to reflect these short waves, and so carry them around the earth.

A 5-kw. station sending out a 40-meter wave, gives a signal decreasing with distance from the station which would become inaudible at about 80 miles. This would be the limit of the so-called ground wave. Then for hundreds of miles no signal would be heard; at about 2000 miles distance, on a winter night, the signal would be again picked up and would be heard with readable intensity up to about 10,000 miles. The silent zone, between 80 and 2000 miles, is called the *skip distance* of the station.

When using short waves, it is possible to use a collection of antennæ at both transmitter and receiver, to act as mirrors. At the transmitter, the array of antennæ serve to concentrate most of the station's energy in a comparatively narrow beam, perhaps 30 degrees wide; this directive action of the transmitter increases the amount of power available at the receiver. The receiving antenna is placed at the focus of a set of antennæ acting like a parabolic mirror, and thus receives much more power than would a simple antenna. A few kilowatts of short-wave power, with directive antennæ, serve to give quite reliable telegraphic communication half around the world.

The receiving set for telegraphy consists of a set of radio-frequency amplifying triodes, a detector, and some audio frequency amplifiers. For continuous-wave reception, an oscillating receiving triode is necessary to produce a *beat frequency* of audible pitch, between the signal and locally generated H.F. current. This *heterodyne* method of reception (due to Fessenden) is much more sensitive than if a spark-wave or I. C. W. signal is being received, with a non-oscillating triode. It is the superiority as regards sensitiveness, as well as selectivity, which accounts for the almost universal use of continuous-wave telegraphy today.

For the long-wave telegraph receiving stations, a special form of antenna is used, called the *wave antenna*. It consists of a wire, several miles long, supported a few feet high and pointed in the direction of the desired signal. The end nearer the transmitting station is grounded through a resistance equal to the *surge resistance* of the line and the receiving set is connected between the other end and the ground. By using several different tuned receivers, it is possible to get six or more messages at the same time from one antenna. Such an antenna has a high ratio of signal-to-static, so that it is reasonably free from atmospheric and other disturbances.

At present, practically all the radio telegraphic traffic of the United States is handled and controlled by the Radio Corporation of America. This is really a patent-holding concern, which, with government sanction, has obtained practically a monopoly on all important radio patents. The formation of such a combine was thought wise by government officials, so that radio development might progress in the United States without continual interference from patent litigation. It is practically impossible today for a company to carry on any radio traffic, unless licensed to do so by the Radio Corporation. From its licenses alone, this company has an annual income of several million dollars.

Piezo-electric Oscillator. Rochelle salt and quartz are quite active piezo-electrically; if compressed, electric charges collect on their surfaces and if a charge is put on their surfaces they change shape. This action of quartz is now used almost universally to control the frequency of an oscillating triode. A small piece of quartz, about as big as a dime, properly cut from a quartz crystal, is loosely held between two small insulated metallic plates, one of which is connected to the filament of a triode and the other to the grid. The plate circuit contains a tunable circuit (coil and variable condenser in parallel) and when the frequency of this circuit is about the same as the natural vibratory frequency of the quartz, the triode circuit will oscillate *at the natural mechanical frequency of the quartz.* For the piece of quartz mentioned, this frequency is about 300 kilocycles. Such piezo-electric oscillators are employed to excite larger tubes and these excite others until, finally, an electrical output of perhaps 100 kilowatts is being accurately controlled as to frequency, by a dime-sized bit of quartz.

The characteristics of quartz are very permanent, and but little affected by temperature, so that a properly constructed piezo-electric oscillator, suitably controlled for temperature, may be depended upon as a frequency standard to a few thousandths of 1 per cent. Such an oscillator has been transported from country to country, for international comparison of frequency standards.

RADIO TELEPHONY. By modulating the amplitude of the wave of a continuous-wave transmitter with the voice, radio telephony is possible. The engineers of the American Telephone & Telegraph Co. were the first to accomplish radio telephony over appreciable distances; in 1915 they used the United States government antenna at Arlington, Va., excited it by a battery of several hundred triodes, and succeeded in "talking" as far as Paris, to the east, and San Francisco and Honolulu, to the west. Since then, radio telephony has gone forward until today any telephone subscriber in America can talk directly to nearly anyone of the subscribers in Europe.

The first really commercial use of the radio telephone was for the purpose of enabling the subscribers of Catalina Island, off the California coast, to talk with those on the mainland. This commercial link was later discontinued, as it was found possible to use a cable instead, and of course this gave greater secrecy.

Starting experimentally in 1923, a radio telephone channel was developed between the United States and England. The 200-kw. output of the transmitter is controlled by a few microwatts of power from the microphone of a subscriber perhaps several thousand miles away. By eliminating the "carrier" wave and transmitting only one "side band," the 200-kw. output is made several times as effective as it would otherwise be. By using a directive receiving antenna and locating this at a place where atmospheric and other disturbances are exceptionally low, it is estimated that the effectiveness of the 200-kw. input to the transmitting antenna is increased 30,000 times over what it would be if none of these special features were used. That is, the received signal is as distinct as it would be from a 6,000,000-kw. transmitting station, sending out carrier and both side bands, using non-directive receiving antenna, in a place with normal atmospheric disturbance, etc. With the development of special cables, which promise telephony across the Atlantic, it seems questionable if transoceanic radio telephony will be greatly extended. The main application of the radio telephone will evidently be in the field of radio broadcasting. See Broadcasting.

RADITCH, Stephen. See Radić, Stefan.

RADIUM AND RADIUM MINERALS. Radium is a metal with a white metallic lustre. It has been isolated only once or twice, and few persons have seen it. It is ordinarily obtained from its ores in the form of sulphate, chloride, or bromide, and is usually sold and used in the form of these salts. All these are white or nearly white substances. Radium, radium salts, and radium minerals generally are not luminescent. Tubes containing radium salts glow mostly because they include impurities which the radiations from the radium cause to give light. Radium is found in nature in such exceedingly small quantities that it is never visible even when the material is examined with a microscope. Radium ore ordinarily carries only a small fraction of a grain of radium to the ton; radium will never be found in large masses, because it is formed by the decay of uranium, a process that is wonderfully slow; and radium itself decays and changes to other elements so rapidly that it does not accumulate naturally in visible masses.

Original radium minerals, such as uraninite, samarskite, and brannerite, are black and have a shiny fracture and a high specific gravity. They are rarely found in commercially valuable quantities. Pitchblende, which has the same composition as uraninite and the same general appearance except that it shows no crystal form, occurs in veins. It has been found in a few places only—in Bohemia, southern Saxony, Cornwall, Belgian Congo, and Gilpin County, Colorado. When these minerals break down through weathering, other radium minerals are formed from them, such as autunite, torbernite, carnotite, and tyuyamunite.

Carnotite and tyuyamunite are the most abundant of these minerals, though the bulk of the world's radium production comes from the pitchblende ores of the Belgian Congo. Both cornotite and tyuyamunite are bright yellow in color and are powdery, finely crystalline, or, rarely, claylike in texture. Carnotite is a hydrous potassium-uranium vanadate. Tyuyamunite is similar in composition but contains lime instead of potash. The greatest known deposits of these two minerals are in southwestern Colorado and southeastern Utah, where both are associated with fossil wood and other vegetation in friable, porous, fine-grained sandstone. Small quantities of carnotite have been produced near Olary, South Australia. The only other deposits that yield tyuyamunite in notable quantity are those of Tyuya-Muyun, in the Andijan district, Fergana government, central Asiatic Russia (Russian Turkestan), where tyuyamunite occurs with rich copper ores in a pipe in limestone (see below).

Radium Industry. An important radium industry was started in the United States during the World War, utilizing the carnotite deposits in Utah. This, however, was rather short-lived, as by 1922 the cheap production of radium from the rich altered pitchblende deposits near Elizabethville in the Belgian Congo controlled by the Union Minière du Haut Katanga Company, rendered it impossible to work at a profit the carnotite deposits of Colorado and Utah. As a result of this changed condition, capital amounting to several million dollars invested in mines, plants for the isolation of radium, vanadium, and uranium, and for the manufacture of apparatus for the handling of radium was rendered nonproductive.

The United States Radium Company in 1923 made an effort to isolate radium in the United States, but only on a small scale; while the Standard Chemical Company operated on an experimental basis its mill in Colorado for the concentration of the vanadium-bearing sandstone associated with the carnotite deposits.

The price of radium had been $120,000 a gram, but in 1922 it had fallen to $70,000 per gram. American companies, after closing down their own mines, undertook to market the African product and up to 1924 that material ruled the market. The Katanga ore was shipped to Oolen, about 40 miles from Antwerp, Belgium, where it was treated at the plant of the subsidiary company. This single plant was said to have a capacity of 3 grams of radium (element) per month, which was about the total capacity of all the plants that once operated in the United States.

Reports of productive activity in the mining of radioactive ores come sporadically from Russia, Czechoslovakia, Portugal, Madagascar, and Cornwall. Record of the isolation of radium from these ores is lacking, however, and it appears that their utilization is largely in the manufacture of apparatus for making radioactive drinking water, radioactive pads, and salves, besides luminescent watch and clock dials and house numbers.

Radium from Belgian Congo ores continues to dominate the world market. The Union Minière du Haut Katanga releases no information as to the amount of its radium production, but it does publish in its annual company report the amount of radium sold each year. Information from this source indicates that sales of radium produced from the Katanga ores in recent years have averaged slightly more than 20 grams annually. The retail price appears to be well maintained at around $70,000 per gram.

RAILWAYS. As in the history of a country there is some one personality or fact which gives the keynote to an understanding of the various events which take place, thus we speak of the Elizabethan period in English history, so with the railways, the situation in 1929 and the years immediately preceding it are best understood in the light of the Transportation Act. This act was passed in 1920. It is entitled "An Act to Provide for the Termination of Federal Control of Railroads and Systems of Transportation: To Provide for the Settlement of Disputes Between Carriers and their Employees; To further Amend an Act entitled 'An Act to Regulate Commerce approved Feb. 4, 1887, as amended and for Other Purposes'." The act is often spoken of as the Esh-Cummings Bill, being the result of a bill introduced in the United States House of Representatives by Representative Esh and another introduced into the United States Senate by Senator Cummings of Iowa. The provisions for the termination of Federal control are mainly of historical importance, although to a certain extent the workings of these provisions give a more or less permanent trend to the course of railway history.

The Transportation Act provided that the Interstate Commerce Commission should make such rates as would yield the carriers as a whole in a given section of the country a fair rate of return. The commission also was given the power and authority to put a value on the railroads' properties and all that was earned by any certain company above 6 per cent on the commission's valuation of its property was to be divided into two equal parts. One of these parts was to go to the Government, the so-called recapture of excess earnings. Many railroad companies were subject to recapture of earnings under the commission's method of valuation which was to use 1914 prices as a basis for arriving at valuation. The railways contended that present prices, not 1914 prices, should be used as a basis of valuation, and as explained more fully below, the St. Louis & O'Fallon case was used as a test and was decided in 1929 by the Supreme Court of the United States. The majority opinion of the Supreme Court held that the Interstate Commerce Commission had not given due weight to present prices and had exceeded its authority by using 1914 prices. The effect of the O'Fallon decision was to make railroad earnings not subject to recapture by the Government in most cases. This interpretation of the Transportation Act by the Supreme Court tended to restore the credit of the railroads. In effect, the courts in the O'Fallon case gave the railroad companies the same right to the ownership in unearned increment in values that the common law gives to other owners of property.

After the United States entered the World War, it was found necessary for the Government to operate the steam railways of the country as a single system. On Dec. 26, 1917, President Wilson issued a proclamation fixing Jan. 1, 1918, as the date on which the executive branch of the United States government should take charge of the operation of the principal roads of the Union. William G. McAdoo, Secretary of the Treasury, was appointed Director General of Railroads, and on January 1, took over the properties. On Jan. 28, 1918, Congress passed a law embodying the terms under which the Government operated the railway properties. The operation of the railways by the Government has been criticized adversely by railway men, and to a certain extent, by the public in general. It is fair, therefore, to record in connection with government operation, that the railway executives themselves had an opportunity to show what they could do in coöperation in operating the larger railway companies of the country as a whole. They failed to give satisfactory operation and to perform the transportation service to the country during an emergency in a satisfactory manner. They claim that their failure was in large part due to contradictory priority orders of the Government. There is unquestionably some reality in this excuse.

The intolerable situation was created in which a trainload of munitions having a priority order, a trainload of food also having a priority order, and a trainload of troops provided, of course, with their priority order, had to be moved over a busy stretch of railway which could accommodate only one of these trainloads at a time. Furthermore, there was the alternative of government operation if unified private operation proved unsatisfactory, whereas, after the Government had been tried, there was no other untried alternative left, and when it was found unsatisfactory there was a saving determination to grin and bear it, which was not in the public mind during the experiment of private coöperative operation. As a matter of history, the final effort to avert government operation may be recorded. Five railway men, Fairfax Harrison, president of the Southern Railway, Samuel Rea, president of the Pennsylvania Railroad, Julius Kruschnitt, chairman of the executive committee of the Southern Pacific, Hale Holden, president of the Chicago, Burlington & Quincy Railroad, and Howard Elliott, formerly president of the New York, New Haven & Hartford Railroad, were appointed by the Association of Railway Executives to operate the railways of the country as a whole. The meeting at which this committee was appointed was held in Washington, Apr. 11, 1917, when the executives pledged themselves to follow the orders of the committee regardless of competitive conditions. Most of the executives called meetings of their boards of directors, and had their action in thus delegating their authority to a committee confirmed by the Board.

Transportation Act. The Transportation Act provided that the railway properties should be turned back for operation to the corporations which owned them as of Mar. 1, 1920. It provided that government-owned boats and all other transportation facilities on the inland canal and coastwise waterways acquired by the United States under the Federal Control Act, except transportation facilities constituting parts of railways or transportation systems over which Federal control was assumed, were transferred to the Secretary of War, so that lines of inland water transportation established by the President during Federal control should be continued in operation by the Secretary of War and contracts made during Federal control, as well as appropriations, were to be made by the Secretary of State. The Transportation Act mentions specifically transportation facilities, owned by the United States and included within any contract made by it for operation on the Mississippi River above St. Louis, to be operated by the Secretary of War.

Such facilities, however, were made subject to the provisions of the Interstate Commerce Act "in the same manner and to the same extent as if such transportation facilities were privately owned and operated and employed solely as merchant vessels shall be subject to all other laws regardless of liabilities governing merchant vessels whether the United States is interested therein as owner in whole or in part, or holds any mortgage, lien, or interest therein." Beside appropriations already made, $200,000,000 was appropriated to be used in the winding up of Federal control. It was found necessary to make a separate contract between the Government and each one of the railroad companies. An attempt was made to standardize this contract on the basis of the annual rental equal to the average annual net operating income for the three years ended June 30, 1917. The majority of the railroad companies signed this standard contract, but others refused to sign it and were operated during the entire period of government operation with the basis of their rental undetermined.

The Government's Railroad Organization. The director general formed a staff which included an assistant director general and divisions of law, finances and purchases, operation, traffic, capital expenditures, labor, public service and accounting, and an actuary to the railroad administration. The country was divided at first into three regions—eastern, northwestern, and southwestern. A. H. Smith, president of the New York Central, was made director of the eastern region; R. H. Aishton, president of the Chicago & North Western, was made director of the northwestern region; and C. H. Markham, president of the Illinois Central, was made director of the southwestern region.

It was soon found necessary to expand this organization, and the country was divided into seven regions. The eastern region included the territory bounded on the north by Canada, on the west by Lake Michigan and the Indiana-Illinois State line, and on the south, roughly, by the Pennsylvania Railroad line, from Philadelphia to Chicago. The Allegheny region took in the Pennsylvania Railroad as far west as Pittsburgh, the Baltimore & Ohio line, as far west as Pittsburgh, and the other lines in that territory, which included New Jersey, the greater part of Pennsylvania, Delaware, Maryland, and the northern part of West Virginia. The Pocahontas region included the principal bituminous-coal roads, the Norfolk & Western, Chesapeake & Ohio, and other roads in Virginia, the larger part of West Virginia, and part of Kentucky. The southern region included all of the Southeastern States from the North Carolina-Virginia State lines south to the gulf, and west to the Mississippi.

The northwestern region included the territory bounded on the north by Canada, and on the east by Lake Michigan, and on the south by a line running irregularly from Chicago to the southern boundary of Oregon, and on the west by the Pacific. The central-western region was bounded on the north by this southern line of the northwestern region, on the east by the Illinois-Indiana State line, on the south by a line zigzagging southwest from Cairo, Ill., to the southern boundary of New Mexico, and on the west by the Pacific. The southwestern region was bounded on the north by this southern boundary of the central-western region, on the east by the Mississippi, and on the south and west by the Gulf of Mexico, and Mexico.

In his instructions to regional directors, Director General McAdoo said, "Broadly speaking, I wish to give you power to direct railroad operations in your territory so as to handle traffic with the least congestion, the highest efficiency, and the greatest expedition. . . . I have put upon you responsibility for the entire operating situation." Notwithstanding this responsibility, however, the regional directors were not given the authority to appoint officers actually in charge of the operation of the railroads in their territory. The director general appointed "Federal managers" and "general managers" Each was in charge of a particular railroad. The difference in titles is a difference in the size of the road managed, and presumably in the salary. Thus, a Federal manager was appointed for the New York, New Haven & Hartford, while a general manager was appointed for the Central Vermont.

In making his appointments, both for the central administration and the regional administrations, the director general selected railroad men of long experience and marked ability. Thus, Carl Gray, of the division of operation, was chairman and president of the Western Maryland, and formerly had been president of the Great Northern. Edward Chambers, director of the division of traffic, was vice president of the Atchison, Topeka & Santa Fe, and Robert S. Lovett, director of the division of capital expenditures, was chairman of the executive committee of the Union Pacific. One of the ablest of railroad lawyers, Walker D. Hines, chairman of the board of the Atchison, Topeka & Santa Fe, was appointed assistant director general. As regional directors, there were A. H. Smith, president of the New York Central, C. H. Markham, president of the Illinois Central, Hale Holden, president of the Chicago, Burlington & Quincy, and B. F. Bush, president of the Missouri Pacific, and other lines.

In the appointment of Federal and general managers, in general, the chief operating officer of the road under the old corporate management was appointed under the government organization. In cases where the president of the road was its chief operating officer, rather than the controlling interest in the management of the company, he was appointed Federal manager. Thus, E. J. Pearson, president of the New York, New Haven & Hartford, was made Federal manager of the road.

On the other hand, in instances where the president of the company was an executive, rather than an operating officer employed by the board of directors, he did not enter the government service, but remained as an officer of the corporation. Thus, Samuel Rea, president of the Pennsylvania, did not become Federal manager of the Pennsylvania, but remained an officer of the corporation, and Elisha Lee, who had been general manager of the Pennsylvania lines east of Pittsburgh, was appointed Federal manager. The line of cleavage between the men who remained corporate officers and those who were appointed Federal managers might form the basis of immensely interesting study, not only in railroad development, but in the economic development of a great American industry.

Mr. McAdoo fixed the salary of regional directors and Federal and general managers high enough to command the services of the long-experienced, successful, and able railroad officers. On the other hand, he did not take into his organization men to whom a salary, even of $50,000 a year, was not of paramount importance, and, it may be mentioned, men whose services could not be measured by a salary, however great, have had an important part in the development of American railways. The value of an E. P. Ripley to the Atchinson, Topeka & Santa Fe, of an L. F. Loree to the Delaware & Hudson, or a Samuel Rea to the Pennsylvania is something that cannot be purchased for so much a year.

The regional directors were given authority to operate the roads in their territory, subject only to general orders from the central administration. The actual responsibility of operating the roads, however, fell on the Federal and general managers. Furthermore, general orders included orders dealing with wages and working conditions. Thus, the authority of the Federal manager was in part taken away by the regional director, and in part undermined by the central administration in its dealings direct with labor. In the opinion of probably the majority of railroad officers, high and low, this separation of authority from responsibility proved a great weakness in the railway organization.

In addition to providing for the payment of compensation (rental) for the period of government operation to railways with whom a specific contract was made, the Transportation Act also provided for compensation for rental of railways with which no specific contract had been made by the Government. Very briefly summarized, the Transportation Act, in addition to providing for the return of the railway properties to the private corporations for operation, provides:

> Section 208 (a) All rates, fares, and charges, and all classifications, regulations, and practices, in anywise changing, affecting, or determining, any part or the aggregate of rates, fares, or charges, or the value of the service rendered, which on February 29, 1920, are in effect on the lines of carriers subject to the Interstate Commerce Act, shall continue in force and effect until thereafter changed by State or Federal Authority, respectively, or pursuant to authority of law; but prior to September 1, 1920, no such rate, fare, or charge shall be reduced, and no such classification, regulation, or practice shall be changed in such manner as to reduce any such rate, fare, or charge, unless such reduction or change is approved by the Commission. [Interstate Commerce Commission.]
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> (b) All divisions of joint rates, fares, or charges, which on February 29, 1920, are in effect between the lines of carriers subject to the Interstate Commerce Act, shall continue in force and effect until thereafter changed by mutual agreement between the interested carriers or by State or Federal authorities, respectively.

There are two terms often used in a discussion of the government operation of railways which should be defined, and are defined in the Transportation Act. One is the guaranty period and means the six months beginning Mar. 1, 1920. During this period, under which the railway properties were operated by the privately owned corporations, the Government guaranteed net equal to the net under the operation by the Government. Thus, if the annual rental of a given railway, that is, the sum which the corporation received for the use of its property, was $5,000,000, and which it could use for the payment of interest on its bonds and dividends on its stock, was not fully earned during the private operation in the six months from Mar. 1, 1920, to Sept. 1, 1920, the Government made up the difference.

The rental was the average annual net earned under private operation for the "test period," or the three years ended June 30, 1917.

Besides the Transportation Act, there was passed in February, 1920, an amendment to the Interstate Commerce Act, originally passed in February, 1887. The provisions of this amendment and of the original act were applied to common carriers and the term "common carrier" was defined as including all pipe-line companies, telegraph, telephone, and cable companies operated by wire or wireless, express companies, sleeping-car companies, and all persons, natural or artificial, engaged in such transportation or transmission as aforesaid as common carriers for hire.

Most important are certain provisions in the amendment to the Interstate Commerce Act. This amendment provides that a railway may not abandon any part of its line or the operation thereof until permission has been obtained from the Interstate Commerce Commission which may issue a "certificate that the present or future public convenience and necessity permit of such abandonment." In like manner, the Interstate Commerce Commission's approval of new construction or extension of a line must be obtained before new construction or extension may be undertaken. The permission for building a new line or an extension is called a certificate of convenience and necessity, which certificate is granted or withheld by the Interstate Commerce Commission, after an investigation which may be conducted by an examiner appointed by the commission as to the proposed new construction or extension.

The Interstate Commerce Commission, by the amendment of 1920, is given jurisdiction over the divisions of a through rate, thus establishing a new principle in the regulation of railway rates. Thus, if a freight rate between Boston, Mass., and Atlanta, Ga., is participated in by the New York, New Haven & Hartford, the Pennsylvania Railroad, and the Southern Railway, not only does the Interstate Commerce Commission have the power to fix the through rate but also to decide what proportion of the through rate shall go to each. The importance of giving the commission jurisdiction over the division of the through rate is great, because it apparently establishes the commission's jurisdiction over what was considered, prior to 1920, as a matter of private bargain, in which the shipper's interest was not affected. Thus, there is implied, at least, a responsibility on the part of the commission for the welfare of individual railway companies, as distinguished from the public's interest as shipper or traveler.

A very important section of the Transportation Act may well be quoted placing the burden of reasonable rates as a whole on the commission. In the amendment to the Act to Regulate Commerce, passed in February, 1920, Section 15A (2) provides:

> In the exercise of its power to prescribe just and reasonable rates, the Commission shall initiate, modify, establish or adjust such rates so that carriers as a whole (or as a whole in each of such rate groups or territories as the Commission may from time to time designate) will, under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment, earn an aggregate annual net railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation: *Provided*, That the Commission shall have reasonable latitude to modify or adjust any particular rate which it may find to be unjust or unreasonable, and to prescribe different rates for different sections of the country.
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> (3) The Commission shall from time to time determine and make public what percentage of such aggregate property value constitutes a fair return thereon, and such percentage shall be uniform for all rate groups or territories which may be designated by the Commission. In making such determination it shall give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation: *Provided*, That during the two years beginning March 1, 1920, the Commission shall take as such fair return a sum equal to 5½ per centum of such aggregate value, but may, in its discretion, add thereto a sum not exceeding one-half of one per centum of such aggregate value to make provision in whole or in part for improvements, betterments or equipment, which, according to the accounting system prescribed by the Commission, are chargeable to capital account.

For the purposes of the above provision, the Interstate Commerce Commission is given an appropriation and authority to make a physical valuation of the railway properties. Two methods of valuation were suggested. One, the historical cost of the property; and the other, the present cost of reproduction. The commission found that the historical cost of the railways of the country was almost impossible to determine. No uniform system of accounts had been in use and the railway companies' records were not considered to be of sufficient accuracy to permit determining from them the historical cost of the properties. An attempt, therefore, was made by the valuation section of the commission to determine the cost of reproduction new less depreciation. In making such valuation, methods are of the utmost importance. The methods used by the Interstate Commerce Commission were almost universally objected to by the railroad companies. One fundamental method was adopted on a scale of prices in determining the present value of railway property as of the period prior to 1914. In the commission's decision, Finance Docket No. 3908, it says:

> As hereinafter indicated, we arrive at a basic single-sum value as of June 30, 1919, of $850,500. The value exclusive of land and working capital is $750,000. Using the latter figure as a base merely for purposes of comparison and applying thereto the ratios referred to herein as indicating the average rise in wages and prices over the 1914 level for the years immediately following June 30, 1919, and adding to the result $100,500 to cover land and working capital, the rate-making values for the respective recapture periods are shown to be as follows:

Period ended	Ratio	Rate-making value
June 30, 1919	100	$ 850,500
Dec. 31, 1920	230	1,825,500
Dec. 31, 1921	195	1,563,000
Dec. 31, 1922	157	1,278,000
Dec. 31, 1923	174	1,405,500

> Different compilations yield different ratios, and those developed by the carrier are greater than the bureau's ratios. If, as is urged by many members of railroad counsel, current cost of reproduction virtually determines "fair value," the rate bases of the O'Fallon for the respective recapture periods would be not less than the amounts shown in the above table. Using these bases, it would have been necessary in 1920, disregarding other changes, to have increased the element in the rates and charges representing return by 114.64 per cent, in order to have given the owners of the property the return to which they are entitled. This would have been in addition to increases made necessary by higher operating costs. In 1921 there would have been a reduction of 14.38 per cent in this element; in 1922 a further reduction of 18.23 per cent; while in 1923 there would have been an increase of 9.98 per cent. The variations in the rate levels so required would have been about 30 per cent of these percentages, assuming an operation ratio of 70; but even so, there would have been large fluctuations.
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> Let us consider the effect of applying this doctrine of current reproduction cost to all railroad property in the United States. For convenience in calculation and for want of an accurate figure, we shall assume 18 billions as the value at 1914 unit prices of structures existing on June 30, 1919. The aggregate value which we used in *Ex Parte 74* at the time of the general rate increase of 1920 was $18,900,000,000 for all property used for transportation purposes. But taking 18 billions as a base and applying the bureau's ratios, the value of precisely the same structures would have become 41.4 billions in 1920, 35.1 billions in 1921, 28.3 billions in 1922, and 31.3 billions in 1923. In other words, assuming a static property, there would have been a gain of 23.4 billions in 1920, a loss of 6.3 billions in 1921, a further loss of 6.8 billions in 1922, and a gain again of 3 billions in 1923. These huge "profits" and "losses" would have occurred without change in the railroad property used in the public service other than the theoretical and speculative change derived from a shifting of general price levels. To put it still more graphically, by the application of the current reproduction cost doctrine the assumed base of 18 billions would have been increased in 1920 by a sum greater than the present national debt (about 19 billions), and the transportation burden upon the people of the country would have been correspondingly increased without the investment of a single dollar by those who would reap the benefits.

The amendment to the Act to Regulate Commerce not only instructed the Interstate Commerce Commission to fix aggregate rates yielding a fair return on the value which the commission found for railway properties, but also provided that net railway operating income in excess of 6 per cent. of the valuation fixed by the commission should be divided equally between the Government and the private corporation. One-half of the excess over 6 per cent should be paid to the Government to be used in making loans to railways which were unable to obtain loans from private bankers on satisfactory terms. The other half of the so-called excess earnings was to be retained by the railway company but to be set aside until the aggregate of such excess earnings should equal 5 per cent of the total cost of the property.

The fair interest return for 1922 was fixed by the Interstate Commerce Commission at 5¾ per cent. According to a compilation made by H. H. Copeland & Son, New York, up to the end of 1928, the commission had found a final value for rate-making purposes of 171,267 miles of railway Class I roads out of a total mileage of 174,108, Class I roads, operated at the end of 1927, or 98.4 per cent of the total Class I railroad mileage. All of the important properties, such as the New York Central and Pennslyvania Railroad, have been valued. No important one of these railway companies has accepted the valuation placed on it by the commission, but taking one of the largest, in point of view of mileage and transportation service performed, the Pennsylvania, the commission has not allowed such rates as would yield 5¾ per cent on its valuation, even on as economically managed a property as that line holds. The ratio of net railway operating income of the Pennsylvania Railroad to the investment in road and equipment is given in the company's annual report for 1927 as follows:

Year	Per cent	Year	Per cent
1920	Del.	1924	3.74
1921	1.88	1925	4.66
1922	3.72	1926	4.80
1923	4.07	1927	4.58

In 1928 the O'Fallen case was decided by the Interstate Commerce Commission, in which the commission found that two short railways—the Merchants Railway of St. Louis and the St. Louis & O'Fallen Railway had earned in excess of 6 per cent on the value of their properties as determined by the commission. In its decision, the commission pointed out that although the amount of money involved in the O'Fallen case was not great, the principles involved affect tremendous property values. This case was appealed from the Interstate Commerce Commission's decision to the United States Federal Courts. An appeal was taken to the Supreme Court, and the case came up for argument in January, 1929. The basic principle involved is a comparatively simple one, but even using the St. Louis & O'Fallen case as a test case where it was thought that the great mass of confusing elements which would have been involved in the valuation of such a railway system as the Pennsylvania were not present, yet the case as presented to the Supreme Court in 1928 was not as simple as here stated. Without legal technicalities and refinements, the case appears to be somewhat similar to this: Under the Interstate Commerce Commission's method of valuation, a given piece of railway is valued at $20,000 per mile. This value is arrived at by taking the value of the rails at $28 at ton, 1914 price, the value of the right of way through a town at $10,000, again 1914 price, the cost of labor of laying ties and rails at 35 cents an hour, also 1914 price, the cost of building a station at $4000, the brick, bricklayers' wages, etc., all being figured at 1914 prices. The railway's contention is that the present value of this mile of railway should be arrived at by taking $40 or $42 a ton as the cost of rails, 60 cents an hour as the cost of laying ties and rails, $20,000 as the cost of right of way through a town, $8000 as the cost of a station building, using present, not 1914, prices for brick, bricklayers, painters, carpenters, etc. Some conception of the importance of this case to the railways may be had by taking the value of all the railways of the United States at $18,900,000,000 under the commission's method of valuation and at least 50 per cent higher, or $28,350,000,000, and at 6 per cent on $18,900,000,000, the commission's valuation would give $1,134,000,000 while 6 per cent on $28,350,000,000 would give $1,701,000. Net railway operating income is the net earnings of a railway company after paying expenses of operation and rentals of rolling stock and of leased properties, and after paying taxes. It is therefore of tremendous importance to the holders of railway securities, directly and indirectly, that is, depositors in savings banks and holders of life-insurance policies, a considerable part of the funds both of which institutions are invested in railway securities, whether earnings available for interest charges and dividends on railroad securities are $1,134,000,000 or $2,101,000,000. In 1929 the United States Supreme Court held that for the purposes of recapture of railroad earnings under the Transportation Act, the Interstate Commerce Commission in valuing the railroads had not given due weight to present prices. This so-called O'Fallon decision, while it did not direct the Interstate Commerce Commission to raise freight and passenger rates, did, to a large extent, make all the railroad companies free from recapture of earnings by the Government.

Important Provisions of the Amendment to the Act to Regulate Commerce and the Transportation Act. Beside providing that rates, as a whole, shall be fixed by the Interstate Commerce Commission so as to yield a fair return, the amendment to the Act to Regulate Commerce and the Transportation Act provided that before a new extension is built, or a new railway project is undertaken, the commission may issue a certificate of public necessity and convenience and without such certificate it shall be unlawful to undertake new railway construction.

The commission also may give its approval or disapproval to the issue of railway securities and the sale of these issues by the railway company to its own security holders or to its bankers. By withholding its approval, the commission can make an issue of railway securities illegal. It undertakes to pass on the price at which securities shall be sold by the railway company.

In working out this law, especially in the five years preceding 1929, there was considerable discussion of whether the commission should require competitive bidding for railway securities. The contention of those in favor of competitive bidding was that municipalities and States sold their securities by competitive bidding and that it was feasible for the railways to do so. On the other hand, those opposed to competitive bidding likened the relations between a railway company and its bankers to that between an individual and his lawyers, or his doctor. It was pointed out that a man who was involved in a possible lawsuit did not shop around for a cheap lawyer who would take his case but rather paid the fee of the lawyer who had handled his business regularly heretofore; or, in the same way, a man who was sick did not advertise for bids by the doctors but called in his regular doctor regardless of whether or not some other doctor would have taken the case for a somewhat lower fee. The argument that goes in favor of regular bankers would have been conclusive had the ethics of the relationship between bankers and railways been as high as the opponents of competitive bidding for railway securities assumed that it was. There was, however, one instance on a large scale which tended to show that this relationship was not regarded by railway bankers in the same light in which the higher type of lawyer regarded his relationship with his regular client.

The Chicago, Milwaukee & St. Paul, a system of railways owning 11,523 miles, and which in the past had a very high credit, having paid 7 per cent on both $100,000,000 of common stock and on the same amount of preferred stock, built an extension during 1905 and 1906 from its Western terminus in the Dakotas to the Pacific coast. This extension was by far the largest piece of new railway construction undertaken in recent years. The credit of the Chicago, Milwaukee & St. Paul was used to finance the project. The new road, however, known as the Chicago, Milwaukee & Puget Sound, went through a territory which was productive of almost no local traffic. The line closely paralleled the Great Northern and the Northern Pacific, and on through business was competitive with these long-established railways. The new road was also competitive to some extent with the Canadian Pacific and National Railways of Canada.

The Chicago, Milwaukee & St. Paul had an issue of $46,000,000 in 4½ per cent bonds due June 1, 1925. The regular bankers of the road who had sold its securities to finance the extension to the Pacific coast were Kuhn, Loeb & Co. This firm of bankers did not undertake to finance the extension or refinance the $46,000,000 due June 1, and convention prevented other banking houses from offering to extend or refinance the bonds falling due on that date. The president of the Chicago, Milwaukee & St. Paul apparently regarded himself as representative of the bankers rather than trustee for the stockholders. At any rate, he made no efforts, or at least no efforts which were successful, to interest other bankers in the extension of the bonds due June 1, but, on the other hand, concurred in an application made for receivership by a supply company prior to June 1, when a comparatively small amount of interest was due and the counsel for the president advised that if this interest was paid and the $46,000,000 due within a few months could not be paid, the payment of the small amount of interest due might be considered a preferential payment by which the president would make himself personally liable for damages.

Whether or not the Interstate Commerce Commission could have invited other bankers to refinance the bond issue due June 1, 1925, is a question that is hardly open for serious debate after the commission's own success in rejecting the specific bid for equipment trust certificates made by a banking house on the ground that the price at which the railway company sold the securities to its bankers was, in the commission's opinion, too low. At any rate, the Interstate Commerce Commission did not avail itself of the opportunity presented for constructive work in preventing a railway receivership. After the receivership had taken place in April, 1925, the commission instituted an investigation before an examiner into the receivership of the Chicago, Milwaukee & St. Paul. Up to January, 1929, no comprehensive report of the commission's investigation had been made public. In the meantime, however, the same bankers who had failed to refinance the maturing bonds of the Chicago, Milwaukee & St. Paul reorganized the railway property under the name of the Chicago, Milwaukee & Pacific. The stockholders were compelled to subscribe for new securities if they wished to retain their stock interest in the company or rather to exchange their stock interest in the old company for a stock interest in addition to the bonds which they subscribed for in the new company; the bonds which they received for their so-called assessment were well secured and a hardship was worked on the stockholders only if it was inconvenient or impossible for them individually to put more money into the railway company in which they already had a part of their savings invested. The assessment was in the nature of what would be called, if the government of a small European country had made it, a forced loan. The powerlessness of the small stockholder in a railway is well illustrated in the case of the Chicago, Milwaukee & St. Paul. The proceeds of the assessment against stockholders was used to pay off a loan of $60,000,000 to the Government. The outstanding illustration of the failure of the Interstate Commerce Commission to effect any radical improvement in the relationship between railway companies and their bankers was possibly the most historically important aspect of the Chicago, Milwaukee & St. Paul receivership.

Consolidations. In the amendment to the Interstate Commerce Act which amendment was passed in February, 1920, it is provided that:

> (4) The Commission shall as soon as practicable prepare and adopt a plan for the consolidation of the railway properties of the continental United States into a limited number of systems. In the division of such railways into such systems under such plan, competition shall be preserved as fully as possible and wherever practicable the existing routes and channels of trade and commerce shall be maintained. Subject to the foregoing requirements, the several systems shall be so arranged that the cost of transportation as between competitive systems and as related to the values of the properties through which the service is rendered shall be the same, so far as practicable, so that these systems can employ uniform rates in the movement of competitive traffic and under efficient management earn substantially the same rate of return upon the value of their respective railway properties.
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> (5) When the Commission has agreed upon a tentative plan, it shall give the same due publicity and upon reasonable notice, including notice to the Governor of each State, shall hear all persons who may file or present objections thereto. The Commission is authorized to prescribe a procedure for such hearings and to fix a time for bringing them to a close. After the hearings are at an end, the Commission shall adopt a plan for such consolidation and publish the same; but it may at any time thereafter, upon its own motion or upon application, reopen the subject for such changes or modifications as in its judgment will promote the public interest. The consolidations herein provided for shall be in harmony with such plan.
>
> (6) It shall be lawful for two or more carriers by railroad, subject to this Act, to consolidate their properties or any part thereof, into one corporation for the ownership, management, and operation of the properties theretofore in separate ownership, management, and operation, under the following conditions:
>
> (a) The proposed consolidation must be in harmony with and in furtherance of the complete plan of consolidation mentioned in paragraph (5) and must be approved by the Commission.
>
> (b) The bonds at par of the corporation which is to become the owner of the consolidated properties, together with the outstanding capital stock at par of such corporation, shall not exceed the value of the consolidated properties as determined by the Commission. The value of the properties sought to be consolidated shall be ascertained by the Commission under section 19a of this Act, and it shall be the duty of the Commission to

proceed immediately to the ascertainment of such value for the properties involved in a proposed consolidation upon the filing of the application for such consolidation.

(c) Whenever two or more carriers propose a consolidation under this section, they shall present their application therefor to the Commission, and thereupon the Commission shall notify the Governor of each State in which any part of the properties sought to be consolidated is situated and the carriers involved in the proposed consolidation, of the time and place for a public hearing. If after such hearing the Commission finds that the public interest will be promoted by the consolidation and that the conditions of this section have been or will be fulfilled, it may enter an order approving and authorizing such consolidation, with such modifications and upon such terms and conditions as it may prescribe, and thereupon such consolidation may be effected, in accordance with such order, if all the carriers involved assent thereto, the law of any State or the decision or order of any State authority to the contrary notwithstanding.

No comprehensive plan of consolidation was promulgated by the Interstate Commerce Commission, although the commission employed Prof. William Z. Ripley, of Harvard University, to prepare a tentative plan of consolidation, which he did, dividing the railways of the continental United States into twenty-one systems. The commission promulgated this plan with some modifications of its own as a tentative plan and in 1928 was engaged in drawing up a comprehensive plan, in accordance with which, presumably, the railway companies could work for consolidation.

The contrast between the situation in the United States and that in England is striking. Following the War, the English railways were returned to the private owning corporations under a plan for amalgamation into four large systems. "Amalgamation" is the English term which roughly corresponds with the American "consolidation." The English genius for getting things done practically and with substantial justice was manifest in the case of the railway consolidations. There were at the beginning of 1929 four large English railway companies—the London & North Eastern, the Great Western, the London, Midland & Scottish, and the Southern. These large systems have absorbed the smaller railway companies, with some exceptions, and in general, the scheme of English amalgamation has worked and is working, in 1929. On the other hand, the American Interstate Commerce Commission has failed to outline a plan for consolidation into a limited number of systems, and in 1929, there was before Congress the Parker Bill, which would relieve the commission of the necessity for drawing up such a plan.

Under private initiative, two important attempts have been made to form consolidations, both of which have been disapproved by the Interstate Commerce Commission. One was in the East and was advocated by the Van Schweringen Brothers, of which O. P. H. Van Schweringen is the most active member. They originally proposed the consolidation of the New York, Chicago & St. Louis Railway Company, called the Nickel Plate, with the Erie Railroad, the Chesapeake & Ohio, and the Père Marquette. The commission disapproved of this plan for various reasons, among which was the manner in which the consolidation was to be effected. The Van Schweringens bought the controlling stock of the Chesapeake & Ohio from the H. E. Huntington Estate, voted the stock to have themselves elected directors, and then as directors voted to lease the Chesapeake & Ohio to the Nickel Plate. The minority stockholders brought suit in the courts to prevent the consolidation and in the meantime the Van Schweringens and their associates had gained control of the Erie and the Board of Directors of the Erie voted to lease that property to the Nickel Plate. Pressure was brought to bear upon the minority stockholders to consent to the plan approved by the majority stockholders, but in a long decision, the commission refused its approval of the consolidation. This decision was handed down by the commission in 1926. Later on, application was made by the Chesapeake & Ohio to lease the Erie and the Père Marquette. The commission refused its approval of the lease of the Erie, but approved the lease of the Père Marquette. A rehearing of the Erie case has been asked for and final disposition of the case had not been made and accepted by the beginning of 1929.

The other important merger case was known as the Loree-Kansas City Southern case. The Kansas City Southern is a road with $50,959,000 of stock outstanding and a total of $62,696,800 of bonds. This company acquired a substantial stock interest in the St. Louis Southwestern, and the Missouri, Kansas & Texas. The Kansas City Southern runs from Kansas City south to Port Arthur, Tex., on the Gulf of Mexico. The St. Louis Southwestern runs from St. Louis southwest into Texas connecting Galveston, Houston, and Dallas, Tex., with St. Louis. The Missouri, Kansas & Texas runs from Kansas City and St. Louis southwest, serving some of the same Texas cities served by the St. Louis Southwestern. One of the chief objectors to the proposed consolidation was a man who had bought the so-called orphan line of the Missouri, Kansas & Texas, which had been sold at auction separately at the time that the Missouri, Kansas & Texas was reorganized following a receivership. He testified before the Interstate Commerce Commission that he had hoped and expected to sell his short line to the Missouri, Kansas & Texas, and that the proposed consolidation did not take this or other short lines into the consolidation. The commission refused its approval of the proposed consolidation in part on the ground that the Kanas City Southern was the smallest of the three companies and that for it, operating 841 miles of railway, to lease the Missouri, Kansas & Texas, operating 3189 miles of railway, was economically unsound, and because the consolidation did not provide for taking care of the short lines in the territory in which the consolidated company would operate. Apparently, an impasse has been arrived at between the Interstate Commerce Commission and the men who have been trying to effect consolidations, on the question of short lines.

It is well recognized that a railway system can be made profitable or unprofitable through a wise or unwise purchase of short lines in the process of expansion. Thus, the Atchison, Topeka & Santa Fe, under the very wise direction of E. P. Ripley, bought or built only lines that were profitable and added to the system's earnings. On the other hand, the early system of the Southern Railway was an illustration of how a large system could be brought almost to the verge of bankruptcy through the purchase of unprofitable short lines, which cost more to maintain and operate than they contribute in net earnings to the parent system. The Interstate Commerce Commission apparently interprets the consolidation provisions of the amendment to the Interstate Commerce Commission Act to be a mandate for forcing on the larger railway companies with good credit the problem of development of the short-line railways. In the Southwestern merger case, an attempt was made to leave out these unprofitable lines on the theory that their inclusion would defeat the purpose of the consolidation, which of course was to form a profitable railway company.

Erie and New York, New Haven & Hartford. Even a brief record of the years from the outbreak of the World War in 1914 to the end of 1928 should include a reference to the great change in credit position of the New York, New Haven & Hartford and the Erie Railroad. The main line of the former runs from just outside New York City through New Haven, Conn., and Providence, R. I., to Boston, Mass. The system covers southern New England with a network, and in all the company operated, on an average during 1928, 2074 miles of railway. This means road miles, thus a mile of double track or four tracks is only counted as one mile of railway. The company paid dividends at the rate of 4 per cent on its common stock in 1928. In 1923 the New York, New Haven & Hartford earned $133,940,586 gross, and the railway operating income after the payment of expenses, rentals, and taxes, was $13,277,728 net. In 1927 the company earned $139,824,315 gross, and the railway operating income was $25,235,284 net. The very complete change which has come about in the credit of the company is reflected in the price of its common stock, which, in January, 1924, was quoted on the New York Stock Exchange at $20. In January, 1929, it was quoted at $87. In 1924 there was a possibility, at least, of the New York, New Haven & Hartford necessarily going through a receivership. By the beginning of 1929, apparently the management of the property had so completely overcome its operating difficulties that there was every prospect for a continued profitable operation.

New Construction. The *Railway Age* of New York has compiled each year since 1893 a comprehensive and intelligent record of the new mileage of railways built in the United States and in Canada. The following table, taken from the annual statistical number of the *Railway Age* for January, 1929, gives the road mileage built in each year, 1914-1928, inclusive:

NEW LINES OF RAILWAY COMPLETED IN THE UNITED STATES

1914	1,532	1922	324
1915	933	1923	427
1916	1,098	1924	579
1917	979	1925	644
1918	721	1926	1,005
1919	686	1927	779
1920	314	1928	1,025
1921	475		

It will be noted that the largest number of miles built since 1916 was in 1928, both in the United States and in Canada; in the latter, the new mileage was as follows:

NEW LINES OF RAILWAY COMPLETED IN CANADA

1914	1,978	1922	145
1915	718	1923	655
1916	290	1924	615
1917	207	1925	414
1918	135	1926	335
1919	433	1927	310
1920	305	1928	723
1921	252		

Of the 1928 total, the Canadian National Railways built 291 miles and the Canadian Pacific, 378 miles.

In the period since the War, the development of railways in the United States has been intensive rather than extensive. The *Railway Age* compiles also a record of railway mileage equipped with automatic signals. This record shows the following figures, the figure for 1914 being taken from records of the Interstate Commerce Commission, the later figures being those compiled by the *Railway Age:*

1914	3,294	1922	1,254
1915	1,296	1923	2,019
1916	1,891	1924	2,515
1917	2,482	1925	2,726
1918	1,934	1926	4,992
1919	1,923	1927	5,127
1920	546	1928	3,121
1921	830		

Two important developments of the years just prior to, and including, 1928 have been, first, the installation of distant switches controlled by a tower-man permitting a train to take a passing siding at the direction of a tower-signalman and, second, the installation of switching yards with so-called car retarders which are manipulated from a tower, thus reducing the possibilities of accident due to human error under the old method by which a switchman rode on each individual freight car and applied the hand brakes to bring his car to a stop at approximately the point to which it had been switched either by gravity or by a switching locomotive.

Equipment Prices. It is interesting to note the trend of prices of railway equipment. In 1914 the average price per pound of locomotives was about $6.837; in 1927 it was $17.415 per pound. In 1914 the average price for all-steel cars was around $2.49 per pound and in 1927, $4.62. For composite wood and steel cars, the average price was $2.37 per pound in 1914 and $4.95 in 1927. The price for all-wood cars was $2.25 per pound in 1914 and estimated to be $4.45 per pound in 1927. To give some idea of the weight of locomotives and cars used on railways in 1928, a few typical examples are given: Thus, in 1928 the Chicago & North Western ordered 12 locomotives weighing on an average of 395,000 pounds; the Erie ordered 35 locomotives averaging 461,470 pounds; the Southern Pacific ordered 10 locomotives averaging 614,600 pounds. In 1928 the Chicago & North Western ordered 23 suburban coaches averaging 99,600 pounds each; the Erie, 25 suburban coaches averaging 101,500 pounds each; the Southern Pacific, five passenger coaches averaging 143,000 pounds each. It must be remembered of course that prices of railway equipment vary from year to year and from month to month within the year and also vary according to the amount of business on hand with the equipment builders.

A typical locomotive ordered by the Southern Pacific in 1928 was of the 4–6–2 type; that means there were four wheels on the front truck, six drivers, and two wheels under the cab. The tractive force of this locomotive was 43,660 pounds. It was equipped with a booster, which is an auxiliary engine giving it additional tractive effort, for use principally in starting. The total tractive force with the booster was 53,000 pounds.

In 1928 considerable progress was made in equipping refrigerator cars with cooling devices other than ice. The application of solid carbon dioxide, the so-called dry ice, as a substitute for water ice in the refrigerator cars was experimented with but up to the end of 1928 had not reached the stage of practical commercial application.

Julius H. Parmalee, director of Railway Economics, writing in the *Railway Age*, summarizes the results of railway operations in 1928 as follows:

> 1. Freight traffic for the year was almost exactly the same as in 1927. The traffic for the first six months was about four per cent below that of the corresponding period of 1927, while the traffic of the second six months was about four per cent above 1927.
>
> 2. Passenger traffic declined in every month of 1928, the decrease for the year being about six per cent.
>
> 3. Operating revenues declined less than one per cent. There was a large decline during the first six months, and an increase during the second six months. The gross revenues of 1928 were less than in 1923, 1926 and 1927, but were greater than in any other preceding year.
>
> 4. Operating expenses were reduced by economical management and by the increased efficiency methods, to the extent of 3.2 per cent, bringing the total expenses of the year below that of any preceding year since 1922.
>
> 5. The operating ratio, which stood at 72.6 per cent in 1928, was lower than any year since 1917, and marked a real achievement on the part of the railways with respect to their ability to control their expenses.
>
> 6. Net railway operating income amounted to $1,180,000,000, which was an increase over 1927 of 95 millions, but was less than in 1926 by 53 millions.
>
> 7. Railways earned a rate of return on property investment of 4.65 per cent in 1928. This rate was higher than in 1927, but lower than in 1925 and 1926.
>
> 8. The railways attained maximum levels of performance in at least nine factors of efficient operation, and reached a high level of performance in many of the other factors.
>
> 9. General railway efficiency in 1928 was on a higher level than in any year since the War, as indicated by an index of the principal significant factors of railway efficiency.

RAILWAYS, ELECTRIC. See ELECTRIC RAILWAYS.

RAINIS, JANIS (1865–). Pseudonym of Janis Pliekšans, a Latvian poet and dramatist. Considered the chief representative of classic and social literature in Latvia, he is the author of ten volumes of poetry and four volumes of translations from the literature of many languages. His play, *The Sons of Jacob* was presented in London in 1924. His other dramatic works include *Pusidealists* (1904); *Uguns un nakts* (*Fire and Night*) (1907); *Induls un Arija; Joseph und seine Brüder* (1921); *Das goldene Ross* (1922). His collected works, *J. Raina kopoti rakfti*, were published in two volumes (1912–14). Among his volumes of poetry are *Wehtras sehja* (1905); *Tāļas noskaņas zilâ vokarâ* (1909).

RAISA, ROSA (1893–). A Russian dramatic soprano, born at Bielostok. To escape the horrors of the Jewish persecutions, her parents fled (1907) to Naples, where she received her musical education at the Conservatory under Barbara Marchisio. She made her début at Parma (Sept. 6, 1913) in Verdi's *Oberto, Conte di San Bonifacio*, during the Verdi centenary celebration under Campanini, the director of the Chicago Opera Association. Campanini engaged her the next year for Chicago, where she remained as one of the principal stars and a prime favorite. She has appeared with brilliant success also in London, Rome, Buenos Aires, Montevideo, Rio de Janeiro, São Paulo, and New York. Toscanini chose her to create the rôle of Asteria in the world première of Boito's *Nerone* (Milan, May 1, 1924). In 1920 she married the operatic baritone Giacomo Rimini.

RAISULI, rī-sōō'lē, ACHMED BEN MOHAMMED (1868–1925). A Moroccan bandit and political leader (see VOL. XIX). Instigated by Germany, he led a revolt against the French government in Morocco in 1918 and continued active until 1923, when he surrendered. He was also a leader in the Riff Rebellion against Spain in Spanish Morocco. In 1924 he opposed Abd-el-Krim Early in 1925, he was taken prisoner by the latter, and died in prison. See MOROCCO.

RÁKOSI, rä'kȯ-sĕ, JENÖ (EUGEN) (1842–1929). A Hungarian author (see VOL. XIX). He continued to publish his radical paper *Budapesti Hirlap* from 1881 to1925, when he joined the editorial staff of *Pesti Hirlap*. Consult *Eugen Rákosi der Journalist*, by F. Popp (1925).

RAMON Y CAJAL, rȧ-mōn' ē kȧ-Häl', SANTIAGO (1852–). A Spanish histologist (see VOL. XIX). He retired as professor of normal histology and pathological anatomy at the University of Madrid in 1922. He was honored by numerous European and American universities and learned societies and, while he was still alive, a monument in his honor was erected at Zaragoza. His later works include *Estudios sobre la degeneración y regeneración del sistema nervioso* (2 vols., 1913–14), and *Recuerdos de mi vida* (3 vols., 1901–17).

RANDOLPH-MACON WOMAN'S COLLEGE. An institution for women at Lynchburg, Va., under the auspices of the Methodist Episcopal Church, South, founded in 1893. The number of students registered increased from 610 in 1914 to 853 in 1927–28, the faculty members from 47 to 65 in 1928–29, and the library from 12,500 to 30,000 volumes. The total yearly income was increased from $183,227 in 1914 to $565,512 in 1927–28, and during 1928 the college completed a campaign for increased endowment which brought the invested funds up to more than $1,200,000, as compared with $376,500 in 1914. A Phi Beta Kappa chapter was installed in 1916 and a Pu Gamma Mu chapter in 1925. A number of new buildings were added to the plant, including the Smith Memorial Student Building, Webb Dormitory, the president's home, and an observatory, and in 1928 a new library to cost $150,000 was under construction, while $50,000 was pledged by the Presser Foundation of Philadelphia toward the erection of a Fine Arts Building for which the college was to raise an additional $50,000. President, Dice Robins Anderson, Ph.D., LL.D.

RANGE. See ARTILLERY.

RANGSTRÖM. (A. J.) TURE (1884–). A Swedish composer and conductor, born in Stockholm. In 1905–07 he studied singing with Julius Hey in Berlin and Munich, and then composition with J. Lindegren in Stockholm, where he settled as teacher of singing and critic of the *Svenska Dagblad* (1907–09), *Stockholms Dagblad* (1910–14), *Dagens Nyheter* (1920–21), and again of the *Stockholms Dagblad* after 1927. In 1922–25 he was conductor of the Orkesterförening in Gotenburg. In 1919 he was elected member of the Royal Music Academy of Stockholm. His principal works are the operas *Die Kronbraut* (Stuttgart, 1919; Stockholm, 1922) and *Middelalderlig* (Stockholm, 1921); two symphonies; several orchestral suites: *Dithyrambe, Ein Herbstgesang, Ein Mittsommerstück, Es singt das Meer, Intermezzo drammatico* for orchestra; *Ballade* for piano and orchestra; two suites for violin and piano, No. 1, *In modo antico*, No. 2, *In modo barocco; Rhapsodie* for string-quartet; incidental music to Isben's *Brand* and Strindberg's *To Damascus.*

RANKIN, JEANNETTE (1880–). An American public official, born in Missoula, Mont., and educated at the University of Montana and the School of Philanthropy in New York City. She engaged in social work in Seattle and took an active part in woman-suffrage work; she was field secretary of the National American Woman Suffrage Association. In 1917 she was elected to Congress as Representative-at-large from Montana and was the first woman ever seated in that body. She was defeated for reëlection in 1920.

RANSDELL, Joseph Eugene (1858–). A United States Senator (see Vol. XIX). He was reëlected to the Senate in 1918 and 1924 for the terms 1919–31. He has been a member of the Senate committees on agriculture, civil service, commerce, interoceanic canals, and printing. One of the organizers (in 1919) of the National Merchant Marine Association, he has served as its president.

RANSOME, Frederick Leslie (1868–). An American geologist, born at Greenwich, England, and educated at the University of California. He was assistant in mineralogy and petrography at Harvard and entered the service of the United States Geological Survey where from 1900 to 1923 he was geologist, in charge of various sections of Western areal geology (1912–16) and later of metalliferous deposits. During the World War, Dr. Ransome was connected with the National Research Council. He was treasurer of that organization and of the National Academy of Sciences in 1919–24. He was professor of economic geology at the University of Arizona, 1923–27, and after 1927 held a similar professorship in the California Institute of Techology at Pasadena. In addition to being associate editor of *Economic Geology*, he is the author of many official monographs on the geology of western mining districts and papers in scientific journals.

RAPALLO. Treaty of. See Germany, under *History;* Italy, under *History;* Fiume-Adriatic Controversy; Peace Conference and Treaties.

RAPID TRANSIT. Notwithstanding the World War and the unsettled condition of the various countries following the Armistice, there was no single question that aroused more general interest in and about large cities than the provision of adequate urban and suburban transit facilities. This was due in large measure to the phenomenal growth of the large cities, and the concentration of activities and industries in certain districts at a distance from available housing facilities.

The problem was not entirely one of new or additional subways; there were cities where elevated railways were constructed in the period under consideration, and also cities where important readjustments and at times relocations of surface traffic were demanded so as to relieve in a measure the congestion which prevented the proper handling of the traffic especially at the times of peak load and when the streets were thronged with vehicular and pedestrian traffic. Indeed the subway idea has been slow in spreading to other cities from the few big centres where subway building has been undertaken.

The troubles were not only of construction. Since 1914 costs of operation, due particularly to increased cost of materials and labor, have mounted so that in many American lines what was considered the standard fare of five cents has become inadequate to meet even operating costs, while in some parts of the United States the operation of interurban or suburban lines is no longer possible due to the competition of motor vehicles both public and private. In New York City in 1919, the New York City Railways and the Brooklyn Rapid Transit Company went into the hands of a receiver, while the Interborough Rapid Transit Company later was saved only by careful financing.

So serious was this situation in the United States that in 1920 when the report of a Federal Electric Railway Commission, appointed by President Wilson, May 31, 1919, was issued, it was frankly stated that the electric railway industry was without financial credit and was not properly performing its public function. The reason for this was given as early financial mismanagement, various economic causes accentuated by high price levels of labor and materials, and the failure of the five-cent fare to provide revenues adequate to meet operating costs, maintenance, and necessary extensions. See Electric Railways.

Throughout the United States there was a movement toward government operation and ownership, which often was revealed in oppressive measures of regulation that interfered with the efficient and profitable conduct of the various utilities. See Municipal Ownership.

New York City Subways. The years after 1914 witnessed important developments in New York, but also a disintegration of the existing system of surface lines and a great delay on the part of the municipal authorities in developing plans for additional lines much needed and in providing means to carry them into effect. The so-called Steinway Tube under the East River from 42nd Street, Manhattan, to Long Island City was opened in 1915 as a part of the Interborough Rapid Transit system. The dual subway system was further developed and the various lines of the New York Municipal Railways including the Broadway subway were opened in 1917 and 1918 and were extended from time to time; but the complete development of the dual system along the lines originally laid out was long delayed on account of the hostility of the New York municipal government, which was favorably disposed toward city-owned and -operated transit facilities and absolutely opposed to any increase of fare over the time-honored five cents.

The carrying capacity of the elevated railways was extended by the building of third tracks over which express trains were run to take care of the heavy traffic at morning and night. On Jan. 1, 1929, New York City had in operation 602.6 miles of subway and elevated main track, or a total of 214.8 route miles. Including sidings, special work, and yards, the total trackage was 730.7 miles. Of the main tracks, 340.6 miles were operated by the Interborough Rapid Transit Corporation and 288.7 miles by the Brooklyn-Manhattan Transit Corporation, a successor to the New York Municipal Railroad, with 26.7 miles of the total under joint operation of the two companies. The Interborough system included 118.1 miles of company-owned and 222.5 miles of city-owned main track; the B. M. T. system, 147.1 miles of company-owned and 141.6 miles of city-owned main track.

In the meantime, the delay due to difficulties between the State-appointed Public Service Commission for the First District (New York City) and the city authorities as well as the five-cent fare issue continued to hold up much needed additional subway construction. All lines were badly overcrowded, but little was actually accomplished to relieve the situation. Finally, in 1924 the New York City Board of Transportation took over subway building under the "police power" of the State Transit Commission.

The election of 1925 was practically a "subway election" and afterwards work was begun on the much needed north and south line (so-called Eighth Avenue Line) in Manhattan, and on various other projects included in a new municipal-owned subway system. Of the 54.79 route miles constituting the first unit of the city's new system, in 1929 there were under construction 37 miles of subway in the Boroughs of Manhattan, Bronx, Brooklyn, and Queens, estimated to cost approximately $305,000.000. This work included two tunnels under the East River and one under the Harlem River. Construction of the Eighth Avenue line, extending 12.3 miles from Fulton Street to 212th Street, had been practically completed and contracts awarded for the operation of the line, which is expected to begin in the spring of 1931. Equipment, including 300 steel cars, block signals, and six substations for power transmissions, was ordered in August, 1929. Other sections of the new system under construction included 2.16 route miles of the Fifty-Third Street-Long Island City line; 5.71 miles of Brooklyn cross-town line; 2.63 miles of Houston-Jay Street line; 7.31 miles of Cranberry-Culver line; 5.85 miles of Bronx Concourse line; 11.66 miles of Long Island City-Jamaica line; 4.97 miles of Schermerhorn-Fulton Street line, and 2.2 miles of Sixth Avenue line. The question of the operation of the new subways had not been decided in 1929. It seemed probable that the city would operate them and also take over and operate all or part of the existing privately owned subways on the five-cent fare basis, with the taxpayers shouldering the operating deficit. Up to September, 1929, the Board of Estimate and Apportionment of New York City had authorized the expenditure of a total of $388,000,000 for construction and equipment of that part of the first unit of the new system which was under contract. Of the route mileage under construction 19.67 miles was in Manhattan, 5.23 miles in the Bronx, 16.87 miles in Brooklyn, and 13.02 miles in Queens.

Plans tentatively adopted 1929 for the second unit of the new subway system call for the construction of an additional 100.12 route miles and 294.81 track miles of line, to cost $438,400,000. Of this total, 11.87 route miles, costing $126,800,000, would be built in Manhattan; Bronx, 19.04 route miles, costing $78,000,000; Brooklyn, 16.84 route miles, $114,500,000; Queens, 52.37 route miles, $119,100,000.

Boston. The Boston Transit Commission ceased to exist on June 30, 1918, after 24 years of existence during which it had developed a comprehensive traction system for that city and had supplied all of the facilities called for, or rather all that means were available for constructing. After the elevated railways had been constructed and the subway from Tremont Street to Cambridge, the next section, the Boylston Street subway, running through the Back Bay District to the junction of Commonwealth Avenue and Beacon Street, was opened on Oct. 3, 1914. Following this came the section to Andrew Square, Dorchester, which was opened in 1918 and which was further extended in 1925. In addition, there were completed the Washington Street and East Boston subways, so that Boston had a well unified system of subways while in 1928 an extension of the Boylston Street Subway was authorized at a cost of $5,000,000, half to be met by the Boston Elevated Road and half by the City of Boston. Operation of the Boston Elevated Road passed into the control of a Board of Trustees on July 1, 1918, and to meet deficiencies in revenue, the fare was raised from five to seven cents on August 1, and later in the year to 8 cents. Even this was insufficient to meet operating costs, as was a 10-cent fare adopted later.

Philadelphia. Rapid transit development has been an important feature in Philadelphia. An existing subway ran east and west under Market Street, terminating in a short north and south elevated line along the river front, and on Apr. 26, 1915, the city voted a bond issue to provide for the construction of a subway which would cross under the older one at the City Hall and extend north and south under Broad Street. There was also involved an elevated line to Frankford which was completed in 1919. The next elevated line to be built was the Woodland Avenue section of the Darby route. The construction referred to as gradually completed, however, did not meet the requirements and in 1923 a general and comprehensive plan was under consideration of which various extensions of the subway routes and elevated lines were decided on. By 1928 the new subway north from City Hall had been completed, the first train going into service on September 1, and was under operation on a temporary and tentative plan pending a decision as to final arrangements. Work was being actively pushed on the line south from City Hall.

Chicago. The City of Chicago, with its surface and elevated railways, has experienced a congestion of traffic no less than other American cities, but little has been done beyond discussion and the preparation of plans.

Detroit. The City of Detroit, which in 1922 had purchased the street railway lines of the Detroit United Railway Company and added 72 miles of new track to the system, was so near its debt limit that little could be done in the way of bond issues for providing funds for developing increased transit facilities or improving then existing conditions. In 1929 a rapid transit subway plan which had been under consideration for several years was submitted to the voters but failed of adoption.

Cincinnati. In 1915 plans for an extensive rapid transit system involving a belt line surrounding the city were adopted, and in the following year a bond issue for this purpose was authorized. The execution of the project was postponed on account of the World War until 1921, when the subway portion was put under active construction using for part of the route the abandoned Miami and Erie Canal, thus decreasing construction costs materially. The loop as planned was about 16.45 miles in length and consisted of 2.45 miles of subways; 9 miles in the open cut with bridges or subways at intersecting streets; 0.2 miles of tunnel; 3.4 miles of concrete trestle, and 1.4 miles of concrete elevated structure. The line begins at Fountain Square and extends north in subway to Walnut Street, where it joins the canal and thence west in subway to Plum Street, where the line turns north in subway to Brighton whence a circuit is made returning to the starting point. Another important development in Cincinnati was the construction of a large doubled-decked terminal for interurban electric cars which served also as an annex to a large office building. This terminal was connected by a viaduct with the Covington Bridge over the Ohio River. There was also accommodation here for the Newport cars which crossed on the Newport or Central Bridge and running on the surface entered the first floor of the terminal. See CINCINNATI.

St. Louis. With the development of its suburbs and the congested condition of traffic in its business district, the city of St. Louis was forced to take under consideration some plan in which the street railways would be extended and rerouted and conditions relieved as by the construction of a subway loop. The City Plan Commission, the Department of Public Utilities, and other organizations were considering this problem in its many bearings, but no actual construction work had been started up to 1929.

London. At the time of the outbreak of the World War in 1914, the various city and suburban railway lines in and about London were engaged in various improvements and extensions. The suburban lines such as that of the London and Northwestern from Euston to Harrow were electrified, and the electrification of the line between Hammersmith and Earls Court of the District Railway Company vastly increased the daily number of trains. The general plan was to tie in as far as possible the suburban lines with the urban tubes and to adopt electrification as rapidly as possible. Naturally, the War interfered with the immediate execution of many of the projects planned, but with the return of peace such plans were set on foot as the connection of the Central London line with the suburban system of the London and Southwestern Railway, so as to afford an alternative route from the Hammersmith district into the city and to extend it as far as the suburban district of Ealing. The most notable improvement, perhaps, was the reconstruction of the City & South London line, the first and smallest of the many tubes which had been built in London. This tunnel was increased to standard dimensions so that its traffic could be exchanged with the Hampstead line and provide for through traffic between the northern and southern districts of London. The scheme of extension undertaken also involved a connection between the City & South London Railway and the Charing Cross, Euston & Hampstead Railway extending from Euston to Mornington Crescent, and the extension of the Hampstead Railway from Golders Green to Edgeware. In addition to the important passenger routes, an electrically operated underground rapid transit mail railway was built to connect the chief post offices and trunk-line depots in the London district. The tubes have an inside diameter of 9 feet and contain a track of 2-foot gauge over which trains of motor cars are operated by a remote-control system. Still more recently, the Piccadilly Circus station of the London Electric Railway Company has been rebuilt and the work of bringing the London tubes into a more complete and up-to-date system has continued.

Madrid. In 1919 the City of Madrid completed and put into operation the first 3 miles of its subway system extending from the northern part of the city to Puerta del Sol, the centre of the business district. This was followed by construction carrying the line to the station of the eastern and southern railways. In 1929 there was opened an extension of 1.15 miles, making the total length six miles. This extension is built under a main thoroughfare and has three stations. Its maximum grade is 3 per cent. The track is laid with 80-pound rails, but these are 59 feet long instead of 36 feet, as on the older part of the line. Their joints also are welded solid, expansion joints being provided at intervals of approximately 1000 feet.

Barcelona. In 1924 there was completed in Barcelona, the commercial capital of Spain, the first subway system, which was designed to connect the surface railways entering the city from the east and west. On Apr. 12, 1924, there was a temporary setback when a portion of the vault in the centre of the mediæval city fell, causing a large breach in the street and the footways above, but the work was prosecuted with such vigor that it was opened in December. In 1928 a royal concession was granted for building a subway between Barcelona and Badalona, an important manufacturing city 5.6 miles from the metropolis, to be completed within four years at an estimated cost of 50,000,000 pesetas.

Sydney, Australia. An interesting transit scheme has developed for Sydney, New South Wales, which involve both underground and elevated lines and a combination of new urban facilities with those of existing routes. The urban and suburban railways were electrified and extended into and around the city so as to form a city loop, from which railways lead to the western and eastern suburbs served by a street railway service system. This new work was being undertaken in connection with the electrification of the suburban steam railways terminating at the Central Railway Station on the city side of the harbor, and at Milson's Point. From there, passengers would be brought into the city and distributed over four underground and two open-air stations on the city loop. The first part of this work was opened in 1926. See TUNNELS; BRIDGES.

Tokyo Subway. The first city of the Orient to adopt the subway as a means of rapid transit opened its first work late in December, 1927. Only 1½ miles long and equipped with 10 all-steel cars, this line, built like the New York subway, doubtless marks the beginning of such construction in the East. It connects two sections of Tokyo, Ueno and Asakusa, for which surface facilities had proved inadequate, and is privately owned.

RASKOB, JOHN J. (1879–). An American capitalist and political leader. He was born at Lockport, N. Y. and received a public-school and business-college training. He rose from assistant treasurer to vice president and member of the finance committee of the E. I. duPont de Nemours Company of Wilmington, Del., becoming also vice president and chairman of the finance committee of the General Motors Corporation. In 1919 he was a member of President Wilson's Industrial Conference. During the presidential campaign of 1928, although previously a Republican, he served as chairman of the Democratic National Committee.

RASMUSSEN, räs'mus'sen, KNUD (JOHAN VICTOR) (1879–). A Danish Arctic explorer (see VOL. XIX), who, after 1912, made five expeditions in North Greenland and the American Arctic. His acquaintance with the Eskimos furnished material for some unusually interesting books which include: *Liv i Grønland*

(1915); *En Grønlands Drom* (1915); *Min Rejsedagbog* (1915); *Sermerssnakut Tunnliarnilerssomtit* (1916); *Nye Mannesker* (1919); *Grønland lands Polhavet* (1919); *Myter og Sagn fra Grønland* (1921), which in the English translation is called *Eskimo Folktales* (1921); *In the Home of the Polar Eskimos* (1923); *Myter Og Sagn fra Grønland* (3 vols., 1921–25); *Fra Grøland til Stille havet* (1926); and *Across Arctic America* (1927).

RASPUTIN, rå'spōō-tēn', GREGORY (1871–1916). A Russian monk and royal favorite (see VOL. XIX). Through the Czarina, he exercised an unwholesome influence over appointments to ecclesiastical posts and, during the first years of the World War, over the national and foreign policies of the Czar. The wide publicity which his immoral conduct and his relations with the royal family received had an increasingly alarming effect upon the public morale. During the night of Dec. 31, 1916, he was murdered by influential enemies, headed by Prince Yussupov, and his body thrown into the Neva River, where it was found the following day. Consult *Rasputin and the Russian Revolution,* by Princess Catherine Radziwill (1918); *Rasputin,* by Prince Felix Yussupov (1927); and *Rasputin: The Holy Devil,* by René Fülop-Müller (1928). See RUSSIA, under *History.*

RATHENAU, rä'te-nȯ, WALTER (1867–1922). A German political economist and statesman, born in Berlin, and educated in the German technical schools. In 1899 he established the first factory for electrochemical specialties in Germany. He rose rapidly as an industrial organizer and leader and became in 1915 president of the all-powerful Allgemeine Electrische Gesellschaft. During the years 1908 and 1909, he served as an economic representative of the German government in the East African colonies. When the World War broke out, he was in charge of official organization of the food supply, but did not remain in office more than a year. After the German revolution, having identified himself with the radical parties, Rathenau was appointed Foreign Minister (1921). He went to the Genoa Conference with a policy of conciliation between Germany and the Allies. Although he negotiated a treaty of friendship with the Russian Soviet government (the Treaty of Rapallo), his Genoa mission did not accomplish its purpose. In June, 1922, he was assassinated at the instigation of reactionary groups, who could not forgive either his radical policy or his Jewish ancestry.

Rathenau was one of the few German leaders who combined a remarkable ability at industrial organization with philosophic grasp of the cultural needs of modern societies. His writings range from speculative philosophy of the type called professional to the problems of industrial efficiency, and they pass by the highly treacherous shoals of social and economic policy. His *Von Kommenden Dingen* (1918) and *Was Wird Werden,* translated as *In Days to Come* (1921), combine prophetic vision with a scientific understanding of sociological intricacies. His other works include *Gesammelte Schriften* (3 vols., 1918); *An Deutschlands Jugend* (1918); *Kritik der dreifachen Revolution* (1919); *Die neue Wirtschaft* (1919); *Nach der Flut* (1919); *Die neue Gesellschaft* (1919; Eng. trans., *The New Society,* 1921); *Autonome Wirtschaft* (1919); *Kaiser* (1919); *Demokratische Entwicklung* (1920); *Cannes und Genua,* four speeches on reparation (1922); and *Der Neue Staat* (1922). His *Collective Writings* were published in two volumes (1918 and 1925), while his *Speeches* appeared in 1924.

RAVEL, MAURICE (1875–). A French composer, born at Ciboure, Basses-Pyrénées. He received his musical training at the Paris Conservatoire under C. de Bériot (piano), A. Gédalge (counterpoint and fugue), and G. Fauré (composition). In 1901 he won the second Prix de Rome with a cantata, *Myrrha.* In 1920 he was made Chevalier of the Legion of Honor. In 1928 he made a tour of the United States, appearing as pianist and conductor. As a composer, he is one of the most prominent of the impressionists, second perhaps only to Debussy. While he does not shrink from daring harmonies, unresolved dissonances, and complicated rhythms, his themes are more pregnant and definite than those of most impressionists. His talent appears to best advantage in the finely wrought details of works in the smaller forms, especially in the compositions for piano. He wrote the operas, *L'Heure Espagnole* (Paris, 1911; Chicago, 1920), *La Cloche Engloutie* (not yet produced), *L'Enfant et les Sortilèges* (Monte Carlo, 1925), and *Pour ma Fille* (Paris, 1927); the ballets, *Daphnis et Chloë, La Mère l'Oye,* and *Adelaide ou le Langage des Fleurs* (all in Paris, 1912), and *Portrait d'Enfant* (Paris, 1926); an overture, *Shéhérazade; Rapsodie Espagnole;* a choregraphic poem, *La Valse;* a piano concerto on Basque themes; *Trois Poèmes* (Mallarmé), for voice, piano, two flutes, two clarinets, and string quartet; *Shéhérazade,* for solo voice and orchestra; some chamber music; songs; and piano pieces, among which the *Valses Nobles et Sentimentales* are particularly fine.

RAW'LINSON, HENRY SEYMOUR, FIRST BARON OF TRENT (1864-1925). A British soldier educated at Sandhurst. He entered the army in 1884 and served in India, Burma, the Sudan, and in the South African War (1899–1902). In 1914 he was director of recruiting, but soon entered active command. During the heavy fighting of the Somme (1916), he commanded the 4th Army, the next year was made a general, and for a short time in 1918 was a member of the Allied War Council. Later in that year, he reorganized the broken 5th Army, and then returned to the command of the 4th, driving the Germans over the Hindenburg line. He received many decorations, both British and foreign, and in 1919 was raised to the peerage. In the same year he was commander of the British forces in northern Russia, and in 1920 he became commander-in-chief of the Army in India, and a member of the Executive Council of the Governor General, positions which he held until his death. He wrote *The Officers' Note-book.* Consult *The Life of General Lord Rawlinson of Trent, from His Journals and Letters,* edited by Major General Sir Frederick Maurice (1928).

RAY, CHARLES (1891–). An American actor, born in Jacksonville, Ill., best known for his work in motion pictures. He began his career on the legitimate stage in small parts in stock and vaudeville. *The Coward*; *The Deserter*; *The Dividend*; *The Pinch Hitter*; and *The Clodhopper* were his best film pieces up to 1920, when he incorporated his own company and produced George Cohan's *Forty-five Minutes From Broadway;* James Whitcomb Riley's *The Old Swimmin' Hole;* Charles Van Loan's *Scrap*

Iron; Charles Hoyt's *A Midnight Bell*; and a number of other comedies.

RAYON. The artificial silk industry on a commercial scale dates from about 1889 as a result of the work of Chardonnet and other investigators in the chemical treatment of cellulose so as to render it capable of being spun in a colloid state into fibres later solidified. Such a material has many of the properties of silk fibre, including gloss, lightness, fineness, and susceptibility to dyes. Known at first as artificial silk, the name of rayon came to be applied to any one of a group of chemically produced textile fibres or the yarn or tissue made therefrom. The term rayon, which previously had been used in France, came into general use in the United States and Great Britain about 1924, in which year it was adopted and approved by the National Retail Dry Goods Association and other trade asociations. Rayon now began to figure no longer as a substitute, but as a distinct fabric with certain properties which manufactures and consumers were quick to appreciate. The yarns gradually were improved and developed so that richer and more useful fabrics could be woven.

In 1928 the world's production of rayon was estimated at about 347,940,000 pounds distributed as shown in the accompanying table taken from the *Textile World* (New York). It will be seen that in 1928, as in previous years, the United States led in the world's production. Furthermore, it is quite apparent that rayon manufacture is quite generally distributed throughout the world. In fact, in addition to its own production, the United States imported during 1928 rayon valued at $15,500,158, in which figured yarns, threads, and filaments to the amount of 12,742,418 pounds, valued at $10,905,531.

IMPORTS OF RAYON YARNS INTO THE UNITED STATES
From *Commerce Reports*

Country	1927 Quantity Lbs.	1927 Value	1928 Quantity Lbs.	1928 Value
Austria	425,630	$ 292,026	156,883	$ 129,491
Belgium	585,815	432,025	868,164	611,120
Canada	49,460	40,774	1,773	1,961
Czechoslovakia	1,238	1,213	56	148
France	2,863,509	2,286,685	2,194,823	1,999,887
Germany	2,603,123	2,523,070	2,638,542	2,768,814
Hungary	20,123	27,526	36,358	56,219
Italy	6,760,408	5,612,694	4,728,585	3,552,800
Netherlands	2,627,529	2,163,087	1,548,594	1,244,828
Switzerland	243,479	220,170	538,676	501,963
United Kingdom	53,773	63,467	20,395	34,120
Other countries	1,637	1,756	741	438
Total	16,235,724	$13,664,493	12,733,590	$10,901,789

WORLD PRODUCTION OF RAYON BY COUNTRIES
From *Textile World*

Country	1926	1927	1928
United States	62,575,000	75,050,000	97,700,000
Great Britain	25,500,000	38,803,000	52,000,000
Italy	35,000,000	36,000,000	45,000,000
Germany	26,000,000	31,000,000	43,000,000
France	15,500,000	21,000,000	30,000,000
Holland	13,500,000	16,500,000	18,000,000
Belgium	13,100,000	13,500,000	15,000,000
Switzerland	8,000,000	10,340,000	12,000,000
Japan	5,500,000	8,000,000	14,000,000
Poland	2,000,000	4,000,000	6,500,000
Austria	3,500,000	3,500,000	4,000,000
Czechoslovakia	2,800,000	3,500,000	3,000,000
Spain	300,000	1,000,000	1,500,000
Hungary	(a)	(a)	660,000
Canada	2,250,000	2,600,000	3,750,000
Brazil	(a)	(a)	800,000
Sweden	(a)	(a)	330,000
All others	1,555,000	2,075,000	700,000
Total	219,080,000	266,868,000	347,940,000

[a] Included in "all others."

UNITED STATES RAYON PRODUCTION, IMPORTS, AND AMOUNT AVAILABLE FOR CONSUMPTION [a]
From *Commerce Reports*
(*In thousands of pounds*)

Year	Approximate domestic production	Imports for consumption	Total available for consumption
1911	320	1,800	2,120
1915	4,111	3,000	7,111
1920	10,240	1,480	11,720
1921	15,000	3,276	18,276
1922	24,406	2,116	26,552
1923	36,447	3,029	39,506
1924	38,494	1,954	40,448
1925	51,902	5,441	57,343
1926	63,648	9,351	72,999
1927	75,555	15,045	90,600
1928	97,901	12,117	110,018

[a] Source: United States Tariff Commission for years 1913 to 1922, inclusive; production figures for 1924. 1926. and 1928 are estimates of the *Daily News Record* of New York City; while for 1923, 1925, and 1927 official census figures are used; other figures are from records of the Bureau of Foreign and Domestic Commerce.

The American rayon production is approximately 100 per cent greater than that of the nearest foreign competitor, yet at the same time there are extensive imports of rayon yarns into the United States, the total in 1927 amounting to 16,235,724 pounds, valued at $13,664,493, and in 1928, to 12,733,590 pounds, valued at $10,901,789.

In the American industry, four processes are used to treat the cellulose, which is obtained from cotton linters or wood pulp, usually spruce, and is the basic raw material. In 1928 the distribution of the American production by processes was as follows: viscose, 84 per cent of the total; nitrocellulose, 9 per cent; cellulose acetate, 5 per cent; and cuprammonium, 2 per cent.

The rayon industry in the United States dates from about 1911, when, as the accompanying table indicates, the approximate domestic production was 320,000 pounds with 1,800,000 pounds imported for consumption. For 10 years, the capacity of the American plants increased rather slowly with an average annual gain of approximately 1,000,000 pounds, but after 1921 the industry began to expand and by 1923 there were six large and well-organized manufacturing corporations with an output in excess of 35,000,000 pounds. By 1925 the annual output had increased from about 15,000,000 pounds in 1921 to almost 52,000,000 pounds during the four year period. In 1926 there was an increase of 12,000,000 pounds followed by a gain of 12,000,000 and 22,000,000 pounds during 1927 and 1928, respectively, or a total gain for three years of 46,000,000 pounds. The 1929 production was estimated at approximately 125,000,000 pounds.

At the biennial census of manufactures in

1928 taken by the U. S. Department of Commerce, the establishments engaged primarily in the production of rayon and allied products in 1927 reported, for that year, a total output valued at $109,888,336, an increase of 24.8 per cent, as compared with $88,060,962 for 1925, the preceding census year. The production in 1927 was made up as follows: Yarns, 75,555,439 pounds, valued at $106,468,752; allied products (sheets, etc.), 2,053,204 pounds, valued at $3,076,835; and waste, 2,985,390 pounds, valued at $342,749. This industry classification embraced establishments engaged primarily in the production of rayon yarns and of allied products in the form of sheets, etc., but does not cover establishments manufacturing rayon yarns into finished products, such as textiles. In 1927 there were 19 establishments employing 26,341 wage earners engaged in the production of rayon and allied products, as against 14 establishments and 19,128 wage earners during the previous census year, 1925. The wages paid in the rayon industry in 1927 amounted to $28,649,441, an increase of 24.7 per cent over 1925, and the cost of materials, factory supplies, containers for products, fuel, and purchased power totaled $25,747,792, a gain of 39.3 per cent. Of the 19 establishments reporting for 1927, three each were located in New Jersey and New York, two each in Ohio, Pennsylvania, Tennessee, and Virginia, and one each in Connecticut, Delaware, Maryland, New Hampshire, and West Virginia. The statistics for 1927 and 1925 are summarized in the accompanying statement.

RAYON MANUFACTURE IN THE UNITED STATES
(From *U. S. Census of Manufactures*)

	1927	1925	1923
Number of establishments	19	14	81
Wage earners (average number) [a]	26,341	19,128	14,401
Wages [b]	$28,649,441	$22,975,605	$16,383,987
Cost of materials, factory supplies, containers for products, fuel, and purchased power [b]	$25,747,792	$18,477,965	$12,093,522
Materials, supplies, and containers	$22,743,855	([c])	....
Fuel and power	$3,003,937	([c])	([c])
Products:			
Total value [b]	$109,888,336	$88,060,962	$59,051,916
Rayon:			
Yarns—			
Pounds	75,555,439		
Value	$106,468,752		
Waste—			
Pounds	2,985,390	51,902,491	
Value	$342,749	$88,007,873	
Allied products (sheets, etc.)—			
Pounds	2,053,204		
Value	$3,076,835		
Other products	....	53,089	....
Production, by process:			
Total, pounds	80,594,033		
Viscose	70,560,808	No data	
Other—nitrocellulose, acetate, and cuprammonium	10,033.225		
Value added by manufacture [d]	$84,140,544	$69,582,997	$46,958,394
Horse power	122,406	66,966	25,424

[a] Not including salaried employees.

[b] The amount of manufacturers' profits cannot be calculated from the census figures for the reason that no data are collected in regard to a number of items of expense, such as interest on investment, rent, depreciation, taxes, insurance, and advertising.

[c] Not reported separately.

[d] Value of products less cost of materials, factory supplies, containers for products, fuel, and purchased power.

Additional statistics on rayon production for the United States are given in the accompanying table, also from the *Textile World*, which shows comparative figures with earlier years, as well as the production for 1928 and estimates for 1929. These statistics indicate that the industry was in the hands of large and efficient corporations and the increase in production and capacity since its establishment had been rapid and marked. On the technical side, the leading features of the modern American rayon industry have been the development of yarns of subdued lustre, and the increased production of multifilament rayon. The leading consumers in 1928 were the manufacturers of underwear who were taking practically a third of the country's production. Next came the manufacturers of cotton goods, who used rayon in combination with cotton yarns, accounting for some 20 per cent; the manufacturers of hosiery took a slightly smaller amount, with manufacturers of silk goods in fourth place, other industries absorbing the remainder of the production. The various consumers were calling for improved and finer yarns; and technical advances due to the research chemist and engineer continued.

UNITED STATES RAYON PRODUCTION
Estimate by *Textile World*

	1924 Lbs.	1925 Lbs.	1926 Lbs.	1927 Lbs.	1928 Lbs.	1929 Lbs.
The Viscose Co.	28,000,000	35,000,000	37,000,000	41,000,000	54,000,000	66,000,000
Du Pont Rayon Co.	4,000.000	6,761,560	10,900,000	15,100,000	18,231,000	22,800,000
Tubize Artificial Silk Co.	4,250,000	5,200,000	7,000,000	7,500,000	8,500,000	10,500,000
Celanese Corp.	....	1,500,000	2,500,000	3,500,000	5,000,000	6.000,000
Industrial Rayon Corp.	2,000,000	2,250,000	3,400,000	3,450,000	4,250,000	6,500,000
American Bemberg	....	....	....	....	2,100,000	3,000,000
American Glanzstoff	....	....	....	....	350,000	4,000,000
Skenandoa Rayon Corp.	....	....	....	....	1,150,000	1,250,000
Belamose Corp.	....	675,000	875,000	1,400,000	1,380,000	1.700,000
Delaware Rayon Co.	....	....	....	500,000	1,500,000	2,000,000
Acme Rayon Corp.	....	322,665	400,000	500,000	740,250	1,000,000
Other firms	600,000	500,000	500,000	2.100.000	500,000	1,000.000
Total	38,850,000	52,209,225	62,575,000	75,050,000	97,701,250	125,750,000

REA, Samuel (1855–1929). American engineer and railroad president (see Vol. XIX). In 1917 the American Railway Association appointed him a member of the special commission on national defense of the Railroads War Board. He was also director of railroads under the authority of the Committee of Public Safety of Pennsylvania. He gave his yacht to the United States government for patrol duty in the Atlantic during the World War. He retired from the presidency of the Pennsylvania Railroad in 1925.

READ, Sir (Charles) Hercules (1857–1929). A British anthropologist (see Vol. XIX). He retained his position as keeper of British and mediæval antiquities and ethnography at the British Museum until 1921 and served as president of the Royal Anthropological Institute and of the Society of Antiquaries of London in 1908–14 and again in 1919–24. He was a fellow of the British and other European academies.

READING. A city of Pennsylvania. The population rose from 96,071 in 1910 to 107,784 in 1920 and to 115,400 in 1928, by estimate of the U. S. Bureau of the Census. Three concrete viaducts have been constructed since 1916; one over the Schuylkill River and the Pennsylvania Railroad tracks at Penn Street; another over Schuylkill Avenue and River Road; and the third, the Lindbergh Viaduct, across a deep valley owned by the city as park area. A concrete bridge was also erected over the river at Bingaman Street. The school-building programme has included the constrution of two junior high schools at a cost of $1,500,000 and of the new Cosmopolitan High School, which cost $1,500,000. Additions were made to two hospitals and a third was built. A Y. W. C. A. building and a museum and art gallery have been erected. Since the appointment of a city-planning commission, the electric, gas, water, sewer, and trolley systems have been extended. The number of industrial establishments increased from 386 in 1914, with output valued at $53,232,000, to 396 in 1927 with output valued at $102,812,400. Bank clearings in 1928 amounted to $223,752,000. The assessed valuation of property in 1927 was $164,269,000; the net debt was $9,814,000.

READING, rĕd′ĭng, The Rt. Hon. Rufus Daniel Isaacs, First Marquis of (1860–). An English jurist (see Vol. XIX), Lord Chief Justice of England from 1913 to 1921. He headed the Anglo-French Loan Mission to the United States (1915), and returned as Special Envoy (1917), and High Commissioner and Special Ambassador (1918–19). From 1921 to 1926, he was Viceroy of India, at the end of his term becoming first Marquis of Reading. After 1926 he was captain of Deal Castle. He was chairman of the board of directors of the *Daily Chronicle*. Consult *Lord Reading*, by C. J. C. Street (1928).

RECLAMATION, Land. Reclamation of land for agricultural use offers larger opportunity for increasing food production than any other single operation, since throughout the world there are large areas that can be made productive by some one of the processes embraced by this term.

World-wide figures for the areas susceptible of reclamation are not available. The *Year Book of the United States Department of Agriculture* for 1921 gave the area of arid land susceptible of reclamation as 30,000,000 acres, and the area of wet land susceptible of drainage as 90,000,000, making a total of 120,000,000 acres, or an area equaling about 25 per cent of the area of improved land in the United States, or about 33 per cent of the present crop area in the United States. To this can be added a considerable but not definitely known area of land now subject to overflow but capable of reclamation by diking. Probably it is safe to say that the crop production of the United States can be increased at least one-third by land reclamation. In the absence of definite information, it seems probable that the same estimate may be applied safely to the world as a whole. For the United States, the Census of 1920 shows the area actually irrigated in 1919 to be 19,191,716 acres; the area in existing irrigation enterprises 35,890,811 acres; and the area drained in 1920 65,495,038 acres, of which 44,288,238 acres were reported as "improved" land, according to the Census definition.

The United States, about 1850, granted the swamp lands then belonging to the Federal government to the States in which they were situated, in order that the States might provide for their reclamation. As a consequence, the Federal government has not participated in swamp-land reclamation, otherwise than by this grant of land. In the case of irrigation reclamation, the United States government has helped to promote development, first by removing so far as possible the obstacles to development by non-governmental agencies, and later by government financing and construction. In 1902 the Reclamation Law was enacted. This set aside the receipts from the sale of public lands as a reclamation fund to be used in the construction of irrigation works, to be repaid by the water users, replaced in the fund, and used again. As reported by the Census of 1920, the acreage irrigated in 1919 by works built under this law was 18,254,569 acres, or about 6.5 per cent of the total area irrigated in that year. The amount expended under the law at that time was reported as $129,509,819, which is 18.6 per cent of the total investment in irrigation for the United States. Interest is not charged on deferred payments, which, if added, would make the actual cost to the Government greater than that reported, the remission of interest being, in effect, a subsidy to land reclamation. Only a small part of the money invested in this work by the Government has been repaid, but the receipts from other sources have been added to the reclamation fund, so that the amount available for the year 1923 was about $10,000,000. The failure of water users to repay construction costs led to the appointment of a commission to investigate and recommend changes in the law or its administration (1923–24). It was felt that the relations between the Government and the water users should be governed by contracts that can and will be carried out, rather than continue under nominal obligations that are ignored.

Drainage reclamation in the United States has taken place almost entirely under State laws for the creation of special improvement districts that have the power to issue bonds to obtain funds for construction, and to levy and collect assessments to meet payments of principal and interest on bonds and operating expenses. These districts are organized under public supervision, but otherwise receive no public aid. The States containing arid land have enacted similar laws for the organization of irrigation districts, and have, in most cases, attempted to aid in the sale of bonds by certifying such bonds as legal investments for public and trust funds, but they have not assumed any legal liability for the payment of bonds or interest, except in the case of Oregon, where the State pays the interest on the bonds of approved districts for periods of from two to five years. There have been many proposals for extending to drainage reclamation the system of Federal aid in irrigation. On the other hand, there was a growing objection to further subsidy to land reclamation.

For many years in the United States, the rate of expansion in the area of reclaimed land used for agriculture has been decreasing. The average annual increase in the area irrigated from 1900–10 was about 669,000 acres; while the average annual increase from 1910 to 1920 was but 476,000. Annual figures are available for the government projects only. On these, the rate of increase had been falling off sharply, even during the boom years of the War, and the year 1922 showed an actual decrease in acreage as compared with 1921. The decreasing rate of expansion was due, to a large extent, to increased cost of water supply. The Census of 1890 showed an average cost of $7.95 per acre; that of 1900, $9.04; that of 1910, $15.85; and that of 1920, $26.81. These figures do not represent correctly the increase in cost; this is shown by averages based on the increases in total cost and the increases in total area, from one census to another. Averages based on such figures are as follows; 1890, $7.95; 1900, $10.05; 1910, $20.05; 1920, $65.60. Comparing these costs with that of 1890, the percentages of increase are 1900, 26.4; 1910, 152.2; 1920, 725.2. In the future, construction will be increasingly difficult and increasingly costly except for general changes in price levels.

Increased food supplies can be obtained in several ways other than by reclaiming lands largely unproductive. This increasing cost of reclamation will tend to force expansion into other lines. Nevertheless, the possibility of expansion by reclamation exists, and such expansion will take place as the pressure of population on food supply becomes more intense. In the United States, the attempt was to make reclamation self-supporting, except for the subsidy represented by relief from interest on deferred payments. Other countries very generally considered reclamation of sufficient importance to justify considerable public subsidies. Italy had provisions for the payment of a part of the cost by the national government, a part by the provinces, a part by those who were to use the water. The British government, in India and Egypt, built and operated reclamation works without provision for direct repayment of cost, but secured its return through taxation of the products grown. In some cases, it was expected that the taxes would pay interest on the cost, such projects being classed as "productive"; while in other cases, such a return is not expected, and the projects are classed as "protective," or "famine" works. In either case, the water users were not under contract to pay any set amount for their water supply, but were to pay according to the products grown. In Australia, however, the state governments have carried on reclamation on the plan adopted in the United States, where the land reclaimed is expected to make a direct repayment of the cost, in addition to being subject to the same taxes as other farm land. Generally, this plan of financing has not been successful, and investors in reclamation enterprises operating on this basis, whether they were public or private, have lost heavily, while the eventual water users have acquired a water supply at less than cost.

In 1926 Congress passed a readjustment act which practically wiped out some $25,000,000 then owed. The *Engineering News-Record* (New York), however, attacked the situation as it existed in 1928 on the ground that the abuses which had grown up under the Reclamation Act of 1902 "should be stopped to prevent the further use by private interests of politics as a means of financing nonpaying business enterprises." It remarked, "To the Western Congressman, the reclamation debt is a mere formality; the only thing that counts is that reclamation projects shall be built with government money." The payments back to the fund in 1928 from the communities benefited by irrigation constructions showed considerable improvement, but the general situation is still unsatisfactory.

RECLAMATION BUREAU, UNITED STATES. See DAMS.

RED CROSS, AMERICAN. The period following the outbreak of the World War brought many opportunities to this volunteer reserve emergency organization to fulfill its purpose of relieving distress in times of peace and war. Its outstanding achievements during this period were naturally those relating to war relief. At the outbreak of the War, the Red Cross had a registered enrollment of 5500 nurses and a large corps of surgeons, besides an equipment for the purchase and transportation of supplies. It was able, therefore, during the latter part of 1914 and through 1915, to send to Europe surgical and sanitary units, each comprising 3 surgeons and 12 nurses, together with the necessary supplies, for war hospital work and the relief of noncombatants; thus rendering greater continuous service than was ever given in a foreign war by any Red Cross of a neutral country. In addition to its services in the War, the Red Cross extended relief in 1915 in Mexico, Colon, Panama, and in Haiti, as well as to sufferers from floods in Texas and Arkansas; and throughout the year 1916 carried on European war relief, to some extent military, but chiefly civil. For this purpose, it received $700,000 during the year, and in addition, extended relief in Serbia, Lithuania, Armenia, and Syria.

The department of military relief in 1916 did efficient service in the establishment of base hospitals and in rescuing wounded combatants. Important progress was made also in the organization of Red Cross units from the staffs of physicians and nurses in civil hospitals; 21 base hospitals were created for the United States Army, and four others were authorized; while on June 1, a national committee on Red Cross medical service, composed of 47 distinguished American physicians and surgeons, was created.

With the entrance of the United States into the War, increased concentration was required of all the forces of administration and relief; and the entire work was placed on a war basis. A central committee was formed in 1917, with William Howard Taft as chairman, which effected many important changes, the most important being the appointment of a War Council of the Red Cross by President Wilson, with Henry P. Davison, of J. P. Morgan & Co., as chairman. The result of the reorganization was to broaden the scope of the American National

Red Cross so as to include the United States and the Allies. From that time on, work was carried on in two important divisions: the service in America and that in Europe. Immediately after its organization, the council undertook a most successful campaign to raise $100,000,000 to finance its activities. For relief work in foreign countries, about $50,000,000 was appropriated; for work in the United States, about $3,000,000. The membership of the society, which was about 5,000,000 at the beginning of 1917, increased to approximately 22,000,000 at the end of the year. By 1918 the work of the Red Cross had reached a high point of efficiency. In the United States, canteens and rest stations were established and maintained at 700 railroad and embarkation points, at a cost of nearly $8,000,000. Sanitary conditions around the camps were improved, and emergency supply hospitals were provided; 50 base hospitals were organized, of which 49 were sent to Europe; 45 ambulance companies, with 124 men each, were turned over to the Army; over 32,000 nurses were enrolled, of whom over 20,000 were assigned to war duty with the Army and Navy, and 10,000 were sent overseas. Sixty-three homes for convalescent soldiers were provided.

During the year 1918, nearly $40,000,000 was spent in France alone, of which $15,000,000 was spent for relief of soldiers, and the remainder for civilian relief. Eight hospitals for American soldiers only were built, equipped, and operated, besides many others equipped and operated for French civilians. Hospitals were also built and maintained in England, Belgium, and Italy. In Serbia, 50,000 destitute persons were supplied with food, clothing, and medical supplies; much work was done by the Rumanian Commission following the defeat of the Rumanian Army in 1918; nearly $4,000,000 was contributed to the American committee for Armenian and Syrian relief; a commission was sent to Palestine with four medical units; and arrangements were made for equipping a hospital there. In addition to its war work, the Red Cross continued to give regular disaster-relief work in the United States, China, Guatemala, and elsewhere.

With the conclusion of the War, great readjustments were necessary in the administration of the society. Various foreign commissions were successively closed out, and in May, 1919, a committee of liquidation began to scale down equipment and activities. Late in 1919, however, there were still 1100 Red Cross workers in Europe, and the report of the War Council made in that year disclosed the following record of its activities: contributions received in material and money amounted to $400,000,000; its members, including adults and children totaled 31,000,000; Red Cross workers, 8,100,000; tons of relief supplies shipped overseas, 101,000; foreign countries in which the Red Cross operated, 25, French hospitals given material aid, 3780; refugees aided in France, 1,726,000. There remained at the beginning of 1919 a balance of $127,000,000, of which $41,000,000 was in cash and $53,000,000 in supplies. Relief work continued during the year in Albania, Belgium, Czechoslovakia, Germany, Italy, North Russia, Poland, Rumania, Serbia, and Siberia and the Red Cross took a leading part in the formation of the League of Red Cross Societies, with headquarters at Geneva. National Red Cross societies in the United States, Great Britain, France, Italy, and Japan in 1919 inaugurated a world-wide fight for the prevention of disease and the promotion of health.

The outstanding activities during 1920 were the fulfillment of obligations to the veterans of American participation in the World War and to their families, and the completion, as far as it was possible, of relief work among the war-exhausted peoples overseas. At the end of the fiscal year 1920, there were 7,000,000 instances in which help had been extended to men or to their families, involving expenditures of $20,000,000. Although foreign relief was carried on extensively in all countries in which it operated in 1919, by the end of the year, operations were confined to Poland, Serbia, Montenegro, Albania, Turkey, and southern Russia, the most extensive work being carried on in Poland in a fight against typhus. In western Europe and the Baltic states, 300,000 civilian poor were relieved. Total expenditures for relief during the year amounted to about $70,000,000.

The following year saw a marked expansion of peace-time activities at home and a contraction of activities in foreign fields, with the result that operating divisions were reduced from 14 to 9. There was increased activity in public health and nursing service and effective disaster relief at home and abroad, with a concentration of effort on child-welfare work, chiefly medical, in foreign countries. In relief work among famine sufferers in China, the Red Cross spent $1,200,000 and, it is estimated, saved more than 600,000 people from starvation. During 1922, monetary assistance amounting to $2,500,000 was given to disabled ex-service men and women; $1,200,000 was expended for medical and hospital supplies for distribution by the American Relief Administration in Russia; $2,000,000 was devoted to the completion of the child-welfare programme in Europe; and $2,000,000 to the completion and liquidation of general relief operations abroad.

The outstanding emergency operation of 1923 was the relief work for nearly 900,000 refugees in Greece, comprising those who had been driven out of Asia Minor, for which up to June 30, when the work was closed, $2,500,000 had been spent. In September of 1923 the Red Cross contributed largely to the relief of Japanese earthquake sufferers, over $5,000,000 being contributed within 2 weeks and 10 shiploads of supplies being forwarded to Japan. Work continued among the Russian refugees in and around Constantinople and among sufferers from earthquakes in Chile and Persia, as well as among ex-service men, and special attention was given to work in widely scattered rural communities, $9,738,448 being spent during the year in relief work.

The outstanding domestic disaster of 1924 was the northern Ohio tornado and the Red Cross functioned in relief operations there and in foreign fields among earthquake sufferers in Japan, $11,922,782 being raised for the latter work. The Society rendered service as a relief agency in 192 disasters of various kinds by the end of its fiscal year in 1924. Contributions for relief were made in 90 disasters in 1925 amounting to $1,922,782, the outstanding domestic disaster being the great Mid-West tornado of March 17, which required relief measures for approximately 25,000 persons. In 1926 relief was extended in 90 disasters of which 62 were domestic and 28 foreign, involving expenditures of $3,924,902; for the assistance of more than 300,000 people.

The fiscal year ending June 30, 1927, was one of unprecedented disasters which called forth the relief agencies of the Red Cross, the average being one disaster in every five days, and two were of unusual violence and magnitude. From mid-September until Christmas, 1926, relief was extended in Florida following the most disastrous hurricane in the history of the United States. Next, the Mississippi flood called forth the Society's relief machinery along a "front" of 1000 miles which extended inland from 50 to 150 miles east and west, and affected 8 states and more than 600,000 persons, who depended upon the Red Cross for their very sustenance. At the same time, assistance also was given in 21 other disasters affecting 12 states, which brought the total number of disasters, in which the Red Cross rendered aid, up to 111 for the fiscal year, 91 of these being in the United States and 20 in foreign lands. In only two of these instances, the Florida hurricane and the Mississippi flood, did the Red Cross make a nation-wide appeal. Total expenditures by national headquarters and Red Cross chapters for disaster relief up to the end of June, 1927, in the United States alone, reached $8,216,893, in addition to nearly $20,000,000 which was collected for relief in the case of the two disasters named.

The fiscal year ending June 30, 1927, brought the Red Cross opportunities for rendering service in 88 disasters of major size, of which 66 were in the United States and its insular possessions. A large staff of workers was called forth in the autumn of 1927 to assist flood victims in New England and rehabilitation work in that region was not completed before the summer of 1928. Floods in tributaries of the Mississippi River in the spring of 1928 left 250,000 people homeless and called for an extension of relief work in addition to that being carried on in the Mississippi Valley. Other floods and tornadoes swept through Middle Western States, causing great damage and considerable loss of life. Tornadoes during the year numbered 29; floods, 13; fires, 24; hailstorms, 4; mine explosions, 3; and earthquakes, 4. Monetary relief was given following earthquakes which hit Smyrna, Turkey, Corinth, and Bulgaria, and assistance was given in disasters in Mexico, Jerusalem, Switzerland, Austria, etc. The West Indies hurricane which occurred after the close of the fiscal year made it necessary for the Red Cross to issue a nation-wide appeal for a relief fund and called forth the relief agencies of the society. The total expenditures for disaster relief for the fiscal year ending June 30, 1928, was $16,544,258.

Other important work of the society during the period 1914–1928 included the establishment of the Life Saving Service which completed 14 years of service in 1928, when enrollment reached 173,506 men, women, and children; volunteer work in chapters in making garments and surgical dressings; first-aid instruction; welfare service; and American Junior Red Cross work, which in 1928 had an enrollment of 6,629,252 children. Senior Red Cross membership on Aug. 30, 1928, was 4,058,949. The President of the United States is the president of the society, and national headquarters are at Washington, D. C.

REDFIELD, Edward Willis (1869–). An American painter (see Vol. XIX). He won the gold medal of the Carnegie Institute in 1914, was on the jury of awards of the Panama-Pacific Exposition in 1915, and won the first prize of the Wilmington (Del.) Society of Fine Arts in 1916, the Carnegie prize from the National Academy of Design in 1918 and 1922, the Altman Prize from the National Academy of Design in 1919, the Stotesbury Prize from the Pennsylvania Academy of Fine Arts in 1920, and the Saltus Medal, National Academy of Design, 1927. One of his pictures, "Sycamore Hill," was in Carnegie Institute.

REDLICH, rât'lĭk, Joseph (1869–). An Austrian legal scholar (see Vol. XIX). A member of the Landtag from 1907 to 1918, he became in October of the latter year Finance Minister in the Lammasch cabinet. In 1926 he was called to a professorship at Harvard University where he had lectured in 1910. His later works include *Das österreichische Staats und Reichsproblem* (2 vols., 1920 and 1926); *Österreichische Regierung und Verwaltung im Weltkrieg* (1925), and *Kaiser Franz Joseph von Österreich* (1928).

REED, David Aiken (1880–). A United States Senator, who was born at Pittsburgh, Pa., graduated at Princeton (1900), and received the LL.B. degree at the University of Pittsburgh in 1903. In that year, he began the practice of law at Pittsburgh. He was chairman of the Pennsylvania Industrial Accidents Commission in 1912–15. In the World War, he served as major of the 311th Field Artillery, A. E. F., winning the Distinguished Service Medal and membership in the French Legion of Honor. Having resumed law practice at Pittsburgh, in 1922 he was appointed by the Governor of Pennsylvania to fill an unexpired term as United States Senator and in the same year was elected as a Republican for the full term 1923–29. He was reëlected in 1928 for the term ending in 1935. In the Senate, he has been chairman of the Committee on Military Affairs and has also been a member of the committees on finance, foreign relations, immigration, and rules. Since 1923 Senator Reed has been a member of the American Battle Monuments Commission.

REED, James A. (1861–). An American legislator (see Vol. XIX), former United States Senator from Missouri. He was first elected for the term beginning Mar. 4, 1911, and was reëlected in 1916 and again in 1922. He opposed in the Senate many of President Wilson's policies, including the League of Nations and the Versailles Treaty, and Wilson in effect repudiated him as a member of the party. He was a candidate for the Democratic nomination for the Presidency in the early part of 1924, but withdrew following his defeat in the Missouri primaries in March. He failed of renomination for the Senate in 1928.

REED COLLEGE. A coeducational institution of higher learning at Portland, Oregon, founded in 1911. The enrollment increased from 280 in 1916 to 353 in 1928, the faculty during the same period from 21 to 35 members, and the library from 12,000 to about 40,000 volumes. In 1928 productive funds amounted to $1,750,336.15 and annual income to $96,443.39. Various changes were made in the requirements for admission and the curriculum of the freshman and sophomore years was reorganized in 1921. The Mann cottage for women was built in 1920 and the Commons-Union was completed in 1923. Norman Frank Coleman, LL.D., succeeded the late Richard Frederick Scholz as president in 1925.

REESE, Albert Moore (1872–). An American zoölogist, born at Lake Roland, Md., and educated at the Johns Hopkins University. He was professor of biology at Allegheny College (1901–02); instructor (1902–03) and associate professor (1903–07) at Syracuse University; and professor of zoölogy (1907–) at the University of West Virginia. He published numerous papers on the habits and embryology of the American alligator and *Introduction to Vertebrate Embryology* (1910); *The Alligator and its Allies* (1915); *Outline of Economic Zoölogy* (1919); and *Wanderings in the Orient* (1919).

REFLEX. See Action; Animal Psychology.

REFORMED CHURCH IN AMERICA. Composed originally of settlers from Holland and known until 1867 as the Reformed Protestant Dutch Church in North America, the denomination has since become largely intermixed with elements from many other nationalities. It adheres to the doctrines of the Belgic Confession and the Heidelberg Catechism; in 1837 it indorsed the Westminster Catechism. The form of government is of the Presbyterian type, with four classes of officers: ministers, teachers (or professors), elders, and deacons. Administratively, the church is divided into consistories, classes, provincial synods, and the General Synod, the latter operating through a board of direction. In 1929 the Reformed Church in America reported 739 churches, 846 ministers, 87,132 families, 159,662 communicants, and approximately 200 foreign and 200 domestic missionaries. For 1915 the comparative figures were: 718 churches, 750 ministers, 71,000 families, 127,000 communicants, and more than 100 foreign missionaries. The church in 1929 was maintaining foreign missions in Japan, China, India, Arabia, and Mesopotamia, the latter jointly with the Presbyterian Church of the United States and the Reformed Church in the United States.

The value of property used for purposes of worship was placed at more than $38,000,000 in the Federal religious census of 1926. The church maintains seminaries at New Brunswick, N. J., and Holland, Mich., and also Hope College, Holland, Mich., and (since 1916) Central College, Pella, Iowa, formerly under Baptist auspices. Schools are conducted for Indians in Oklahoma and New Mexico, for the mountain people of Jackson County, Ky., and for Negroes at Brewton, Ala. Rutgers University, at New Brunswick, N. J., is historically affiliated with the denomination, although entirely independent of ecclesiastical control. In 1917 the church assumed control of the denominational periodical, the *Christian Intelligencer*. A 5-year programme called the Progress Campaign was initiated in 1918, resulting in the formation of the Progress Council in 1923. Benevolent giving doubled in the years 1918–21 as a result of this movement and has since made further gains. In addition to the synods of New York, Albany, New Brunswick, and Chicago, a fifth, the Particular Synod of Iowa, was formed in 1919 as a result of the growth of the denomination in the Middle West and three new missionary stations were established in Mesopotamia after the World War. Ferris Seminary at Yokohama, Japan, was destroyed by the earthquake of September, 1923, but was replaced by a new building dedicated in 1929.

In 1928 the denomination celebrated the 300th anniversary of the arrival in America of its first minister, the Rev. Jonas Michaelius. The ceremonies were held in the Church of Saint Nicholas, New York City, in June. A $1,000,000 endowment fund for ministerial pensions was raised in connection with the celebration. The Rev. Dr. Daniel A. Poling, pastor of the Marble Collegiate Church, New York City, was elected president of the session of the General Synod in June, 1929. Consult Brown, *History of the Reformed Church in America* (1928); Demarest, *Tercentenary Studies* (1928); Romig, *The Tercentenary Year* (1929); Corwin, *Manual of the Reformed Church in America* (5th ed., 1922).

REFORMED CHURCH IN THE UNITED STATES (German Reformed). A Protestant denomination, founded by early German immigrants to the United States from the Rhine provinces and Switzerland, which accepts the Heidelberg Catechism as both a confession of faith and book of instruction. The government is presbyterial in form and both liturgical and free services are authorized. According to the Federal Census of 1926, the denomination in that year had 1709 churches and 361,257 members, as compared with 1758 churches and 344,374 members in 1916. More than half of the churches and about two-thirds of the total membership were in Pennsylvania in 1926. In that year, 1692 churches reported total expenditures of $7,488,446 including $1,817,921 for benevolences, missions, etc., as compared with total expenditures of $3,247,773 by 1714 churches in 1916. The value of church edifices, including equipment, increased from $20,116,336 in 1916 to $44,662,875 in 1926. Figures for Sunday-school attendance were: 1926, 29,339 teachers and 315,353 pupils; 1916, 29,389 teachers and 304,350 pupils. Administratively, the churches are grouped in 7 district synods and 58 synods. The General Synod meets triennially. The denomination supports three theological seminaries and nine colleges. The seminaries are the Central Theological Seminary, Dayton, Ohio; Mission House Theological Seminary and College Academy, Plymouth, Wis.; and the Theological Seminary at Lancaster, Pa. The colleges are Catawba College, Newton, N. C.; College for Women, Allentown, Pa.; Franklin and Marshall College, Lancaster, Pa.; Heidelberg University, Tiffin, Ohio; Hood College, Frederick, Md.; Franklin and Marshall Academy, Lancaster, Pa.; Massanutten Academy, Woodstock, Va.; Mercersburg Academy, Mercersburg, Pa.; Ursinus College, Collegeville, Pa. Denominational publications in English are *Reformed Church Messenger, Christian World, Reformed Church Record, Way, Leaves of Light, Sunshine* (all weeklies), *Reformed Church Review* (quarterly), *Reformed Church Standard* (semi-weekly), and *Heidelberg Teacher* (monthly); in German, two weeklies.

REFORMED EPISCOPAL CHURCH. Intense discussion in the Protestant Episcopal Church in 1873 culminated in the withdrawal of many clergymen and laymen under the leadership of Bishop David Cummins, and the organization of the Reformed Episcopal Church. In policy and doctrine, it accords with the Protestant Episcopal Church, except that it looks upon the episcopacy as an ancient and desirable form of church government, rather than as of divine right, denies that Christian ministers are "priests," does not demand the reordination of clergymen of other denominations who enter its ranks, does not organize its bishops in a separate house in the General Convention, and denies baptismal regeneration. The Convention, which meets triennially, is the governing body of the church, comprising two synods in the United States, one in Canada, and three missionary jurisdictions. Meetings were held at Philadelphia, Pa., in May, 1924, and May, 1927. Membership in the church increased from 10,800 in 1913 to 13,750 in 1922, and to 25,300 in 1928, churches, from 81 to 86, between 1913 and 1928, ministers, from 83 to 91, and Sunday-school pupils, from 9496 in 1918 to 26,000 in 1928. The denomination continued its home missionary work among Negroes in the South, and its foreign work in India. The church maintains a theological seminary in Philadelphia, and publishes a periodical, the *Episcopal Recorder.* Headquarters of the General Council are at 1617 Oxford Street, Philadelphia.

REFUSE DISPOSAL. See Garbage and Refuse Disposal.

REGIMENT. See Armies and Army Organization.

REGIONAL PLANNING. See City and Regional Planning.

REGISTRATION OF BIRTHS. See Child Welfare.

RÉGNIER, rå′nyå′, Henri François Joseph de (1864–). A French author (see Vol. XIX) and member of the Academy. His later works include *L'illusion héroïque de Tito Bassi* (1916); *Les vacances d'un jeune homme sage* (1917); *1914–16–Poésies* (1918); *Histoires incertaines,* short stories (1919); *Vestigia flammæ,* poems (1921); *Romaine Mirmault* (1922); *Les rencontres de Monsieur de Bréot* (1922); *Les bonheurs perdus* (1924); *Le divertissement provincial* (1925); *Proses datées,* essays (1925); *L'escapade* (1926); and *L'altana, ou La vie vénitienne 1899–1924* (2 vols., 1928). He also edited *Le roman littéraire* (11 vols., 1917–25).

RÉGNIER, Marie Louise Antoinette (1875–). A French writer, born in Paris, who used the pseudonym of Gérard d'Houville. She is the daughter of José Maria de Hérédia, and the wife of Henri de Régnier. Besides her contributions to papers such as *Revue des Deux Mondes, Le Temps, Figaro,* and *Le Gaulois,* her writings include *L'Inconstante*; *Esclave*; *Le Temps d'aimer*; *Le Séducteur* (1914); *Tant pis pour toi* (1921); *L'Enfant* (1925); *La Vie amoureuse de l'impératrice Joséphine* (1925); *Chez le magicien* (1927); and *La Vie amoureuse de la belle Hélène* (1928). She also wrote poems, the dramatic proverbs: *Il faut toujours compter sur l'imprévu* (1916); *La nuit porte conseil* (1917); *On ne saurait penser à tout* (1920); *Il ne faut pas dire: fontaine* (1927); and *Je crois que je vous aime,* seven short plays (1927). In 1925 she edited *Falbalas et Fanfreluches.*

REGULAR ARMY, United States. See Armies and Army Organization.

REHBOCK, Theodore (1864–). A German engineer, specializing in river and harbor developments. Born in Amsterdam and trained in the technical schools of Munich and Berlin, he became a professor of engineering in Karlsruhe Technical School and supervised important engineering projects in North and South America and South Africa. In March, 1929, he lectured at the Massachusetts Institute of Technology and afterwards visited American and Canadian water power developments.

REID, E. Emmet (1872–). An American chemist, born at Fincastle, Va., and educated at Richmond College and at Johns Hopkins. He was professor of chemistry at the College of Charleston, S. C. (1898–1901), at Baylor University, Waco, Tex. (1901–08), and at Johns Hopkins (1914–). During the World War, he was associated in gas warfare investigations under the U. S. Bureau of Mines. His original investigations relate to such subjects as hydrolysis and alcoholysis of acid amines; thio acids and alcohols and their esterification; organic sulphur compounds; and organic catalysis. Besides many papers contributed to the *American Chemical Journal* and similar publications, he published a translation of Sabatier's *Catalysis in Organic Chemistry* (1921) and is the author of *Introduction to Research in Organic Chemistry* (1924).

REIMANN, Hans (1889–). A German satirist and caricaturist, born in Leipzig. His works include *Die Dame mit den schönen Beinen* (1916); *Kobolz* (1917); the autobiographical novel, *Tyll* (1918); *Sächsische Miniaturen* (1922); *Von Karl Man bis Pallenberg* (1923); *Der Geenig* (1923); *Der Komponist wider Willen* (1928). Since 1924 he has edited the satirical periodical, *Das Stachelschwein.*

REIMS. See World War, *Western Front.*

REINER, Fritz (1888–). A Hungarian conductor, born at Budapest. He studied under Thomann and Kössler at the Landesmusikakademie there and in 1900 became conductor at the Comic Opera. In 1910 he was first conductor at the Landestheater in Laibach and in the following year at the Volksoper in Budapest. His appointment as principal conductor at the Hofoper in Dresden, as Schuch's successor (1914), offered him the opportunity for the full development of his exceptional powers, so that in a short time, he was in great demand as a guest-conductor and appeared also in Spain and Italy. In 1922 he became Ysaÿe's successor as conductor of the Cincinnati Symphony Orchestra. In recent years, he appeared frequently as guest-conductor of several of the great American symphony orchestras. His wife, Berta Gardini, a daughter of the celebrated Etelka Gerster-Gardini, is a concert-singer.

REINHARDT, rīn′härt, Max (1873–). A German theatrical director and manager (see Vol. XIX). In 1919 he founded the Grosses Schauspielhaus, a theatre as large as the New York Hippodrome, specializing in impressionistic mass effects. As a master of the new stagecraft, Reinhardt toured the United States in 1923. He presented *The Miracle,* one of the largest theatrical pageant spectacles ever produced, in New York City under Morris Gest's management. Since 1924 he has directed the Theater in der Josefstadt in Vienna and produced the *Festspiele* in Salzburg, which has attracted many foreign visitors each summer.

REISS, rīs, Albert (1870–). A German dramatic tenor, born in Berlin. He had begun a successful career as an actor when Pollini discovered his voice and persuaded him to study for the operatic stage. He made his début in Lortzing's *Zar und Zimmerman* at the Stadttheater in Königsberg (1897). He then sang at Posen, Wiesbaden, and Munich. In 1901–17 he was a member of the Metropolitan Opera Company, with which he became especially identified with the rôles of David (*Meistersinger*) and Mime (*Siegfried*). He also created there the principal tenor parts in the world premières of Puccini's *Fanciulla del West* (1910); Humperdink's *Königskinder* (1910); Parker's *Mona* (1912); Damrosch's *Cyrano de Bergerac* (1913); De Koven's *Canterbury Pilgrims* (1917); and in the American première of Smetana's *Bartered Bride* (1909). In 1916 he organized the Society of American Singers for the purpose of producing in English the more intimate operas which lose much of their effectiveness in a large auditorium. He staged the American première of Mozart's *Schauspieldirektor* (October 26) during its first season in New York; in the following year, Pergolesi's *La Serva padrona* (May 7), Donizetti's *Il Campanello di Notte* (May 7), and Gounod's *Le Docteur Miracle* (May 10) had their American premières. He resigned in 1918 and was succeeded by William Hinshaw (q.v.).

REJUVENATION. See SECRETIONS, INTERNAL.

RELANDER, LAURI KRISTIAN (1883–). A President of Finland, born at Kurkijoki. Educated at the University of Helsingfors, where he received the degree of M.A. and Ph.D. in agriculture, he became a member of the central committee of the Agrarian Party in 1909 and represented that party in parliament in 1910–13 and 1917–19. He was chairman of the Education Committee of the Diet, Speaker of parliament (1919) and Governor of the administrative district of Viipuri (1920–25). In the latter year he was elected President of the Finnish republic.

RELATIVITY. See ASTRONOMY; PHILOSOPHY: PHYSICS.

RELIEF ADMINISTRATION, AMERICAN. An organization built up by Herbert Hoover shortly after the Armistice as an agency to administer American relief to the countries of Europe that were devastated by the War. The A. R. A. was set up by an act of Congress and approved by President Wilson on Feb. 24, 1919. In his capacity of director general of relief for the Allies and as member of the Supreme Economic Council, Mr. Hoover coördinated the Inter-Allied efforts for relief and economic reconstruction. Food valued at approximately $400,000,000 was supplied to European countries in central Europe for gold or negotiable securities. For additional supplies which were necessary, but for which the governments concerned were unable to pay cash, the American government accepted obligations amounting to $300,000,000. A further $30,000,000 was spent by the A. R. A. during this period for the relief work among children. The general relief operation under the congressional appropriation of $100,000,000 was completed in the autumn of 1919, but the care of children in the Baltic and central European countries was continued by the A. R. A. Relief measures for the year 1919–20 amounted to a cost of $100,000,000, of which $50,000,000 came from Congress. American supplies began to reach Europe early in 1919 and were distributed by the A. R. A. in Finland, Estonia, Latvia, Russia, Lithuania, Poland, Danzig, Germany, Czechoslovakia, Austria, Hungary, Rumania, Jugoslavia, Armenia, Georgia, and Bulgaria. Supplementing the general relief programme was the work among children carried on by the A. R. A. European Children's Fund.

The A. R. A. also helped wage war on typhus in Poland and Rumania and devised a money-exchange system to facilitate the sending of aid from residents in America to friends and relatives in the stricken European countries. In 1920 the A. R. A. joined with other American relief agencies in a national appeal for funds for the support of European children; this resulted in the collection of $29,000,000. In the year 1920–21 alone, the A. R. A.'s work among children reached $3,500,000. In 1921 the A. R. A. answered the appeal of Soviet Russia, then in the midst of a famine. Beginning with a programme for the feeding of one million children, its work reached its peak in August, 1922, when nearly 11,000,000 children and adults were receiving daily rations. The A. R. A. also carried on in Russia a vast medical-relief programme which included the rehabilitation of 15,000 hospitals and institutions, and a general campaign of sanitation in the principal cities and towns. The A. R. A. in Russia operated some 20,000 feeding stations with an American staff of 200 and a Russian staff of 150,000 persons. The funds for the Russian relief were approximately $65,000,000, of which $24,000,000 was appropriated by the United States Congress; $12,000,000 came from the Russian Soviet government; $3,000,000, from the American Red Cross; $4,000,000, from the Jewish Joint Distribution Committee; and the remainder from gifts made directly to the A. R. A. The arrival of American supplies checked the famine in Russia in the early summer of 1922, and by the autumn of that year work among adults could be discontinued. The organization nevertheless continued its activities on behalf of the Russian children until the summer of 1923. All European offices of the A. R. A. were closed and all personnel withdrawn in the autumn of 1923. The totals of supplies handled from all quarters exceeded one billion dollars. Relief was provided at one time or another to 200,000,000 persons, while direct services were rendered to more than 11,000,000 orphan and destitute children.

Officers of the American Relief Administration at the end of its European operations were: Herbert Hoover, chairman; Julius H. Barnes, vice chairman; Edgar Rickard, director general; Edward M. Flesh, comptroller; Gates W. McGarrah, treasurer; George Barr Baker, director of State organizations; Walter Lyman Brown, director for Europe; Col. William N. Haskell, director in Russia.

RELIEF IN BELGIUM, COMMISSION FOR. See BELGIUM.

RELIGION, PRIMITIVE. See ETHNOLOGY.

RELIGIOUS CONTROVERSIES. The period from 1914 to 1929, and especially the interval following the World War, was marked by a remarkable revival of religious controversies in several of the larger Protestant denominations. Those chiefly affected were the Baptist, Methodist, Presbyterian, and Protestant Episcopal. In the main, these dissensions centred about the old differences between liberal and conservative interpretations of the Scriptures and creeds, but this so-called fundamentalist-modernist dispute was clearly on the wane by 1927 and other sources of controversy presented themselves in the growing movement toward Protestant unity and the increased activity displayed by some of the denominations in support of prohibition and in other political questions.

The differences over Scriptural and creedal interpretations corresponded to a large extent to the struggle against modernism which for many years was carried on in the Roman Catholic Church. In connection with them, there emerged a new term, fundamentalism. Although this was applied especially to the controversy between the liberal and conservative elements in the Baptist denomination, it also described essentially the character of the disagreements in the other denominations. Fundamentalism is defined by one of its adherents as "merely an uprising of orthodox supernaturalism against modern naturalism." Those opposed to fundamentalism describe it as a movement among ultraconservatives to keep religion in the bonds of supernaturalism.

It is generally admitted that the conditions which followed the World War were largely responsible for the revival and development of this struggle between the liberal and conservative wings. Fundamentalism, however, was more than a reaction. It was the culminating point of a tendency which had been gathering strength for at least 30 years. The controversy in its widest sense turned on the view held in regard to the Scriptures. The fundamentalists or conservatives assumed an inerrant Bible, literally inspired and authoritative throughout, the virgin birth and deity of Christ, the literal resurrection of the body, the atoning sacrifice of Christ's death for the sins of the world, and His second coming in bodily form, and they viewed as inimical to Christian doctrines any theory or interpretation which contradicted the literal interpretation of the Scriptures. Thus, they came into conflict with the doctrine of evolution or Darwinism. The controversy first began among the Baptists and after 1920 spread to the Presbyterians, Methodists, and Protestant Episcopalians. Strong attacks were delivered, not only in the pulpit, but in the schools, against the teaching of the theory of evolution. Indeed, in several States, commencing in 1922, the Legislatures adopted resolutions prohibiting the teaching of evolution in the school system. Among the most ardent opponents of the evolution theory was W. J. Bryan, who devoted much of his time to attacking the doctrine on the platform and elsewhere.

In the Baptist denomination, where the controversy was especially fierce, it was estimated by Dr. Shailer Mathews of the University of Chicago in 1923 that the fundamentalists in that year controlled about one-fourth of the evangelical churches in the East, about half the evangelical churches in the Middle West and South, and about three-fourths of the evangelical churches in the Far West. The fundamentalists themselves claimed in that year to control nine-tenths of the laity of the churches. The fierceness of the controversy within the denomination subsided after 1924 and there was a gradual swing toward liberalism. The subject did not disturb the annual conventions of either Northern or Southern Baptists in 1928 and 1929, although kept in the background with difficulty at times. At the Northern Baptist Convention in 1929, conservatives temporarily blocked a proposal for immediate coöperation and ultimate union with the Disciples of Christ and raised objections to the participation of the denomination in the work of the Federal Council of Churches of Christ in America, the leadership of which, in general, has been liberal. The latter question assumed increasing importance in other denominations also as the Federal Council expanded its influence and activities.

In the Presbyterian denomination, the struggle took on great intensity from 1922 to 1924. *The Presbyterian*, conservative church organ, declared: "Rationalism and Evangelicism are antagonists that can never be reconciled; it is vain to try to plaster up a union between them." Prof. J. Gresham Machen of the Princeton Theological Seminary, a fundamentalist leader, stated that "modern liberalism is not only a different religion from Christianity but belongs to a totally different group of religions." In New York City, a particularly bitter controversy arose over the preaching of Dr. Harry Emerson Fosdick, a Baptist clergyman, at the First Presbyterian Church. He was one of the chief advocates of liberalism, and efforts were made at various times to prevent his occupying a Presbyterian pulpit. The struggle between liberals and conservatives for the control of the Princeton Theological Seminary prolonged the fundamentalist-modernist controversy in the denomination and it was still a live issue in 1929. In that year, the liberals won a victory at the General Assembly of the Presbyterian Church in United States of America in St. Paul by the election of Dr. Cleland B. McAfee as moderator and the subsequent merging of opposing boards of directors and trustees of the Princeton Seminary into a liberal board of control. Fundamentalist professors at the seminary, headed by Dr. Machen, and their sympathizers immediately announced plans for the establishment of a rival seminary in Philadelphia. The new institution, known as Westminster Theological Seminary, was formally opened in Philadelphia Sept. 25, 1929, with 50 students, 20 of whom were former students at the Princeton Seminary. The opening was heralded as "the beginning of a great movement to resist, and, if possible, overcome, the tendency toward Modernism." Other controversies within the denomination centred in the proposal to restrict the grounds for divorce solely to adultery, the demand that women be admitted to the ministry, and the powerful movement for union with the 13 branches of the denomination and with the Methodist Episcopal and Reformed churches.

In the Protestant Episcopal Church, the controversy turned on the interpretation of certain doctrines, especially the Virgin Birth and the bodily resurrection of Christ. In November, 1923, at a special session of the bishops of the church held in Dallas, Texas, a pastoral letter was drafted in which the declaration was made that to deny or to suggest errors as to the facts stated in the Apostles' Creed was irreconcilable with oaths taken by ministers of the church, and that objections to the Virgin Birth and the bodily resurrection are contrary to the best traditions and that these doctrines are abundantly proved by scholarship. This letter was appointed to be read in all the churches. It at once aroused opposition and hostility among the advocates of liberalism. A number of clergymen, including the Rev. Dr. Percy Stickney Grant, of New York City, and the Rev. Lee W. Heaton, of Fort Worth, Tex., publicly affirmed their disbelief in the Virgin Birth. A resulting controversy between Bishop William T. Manning of the Diocese of New York and Dr. Grant led to the latter's resignation.

The struggle between liberals and conservatives, or between the low and high church wings of the denomination, was still active in 1929, particularly in the Diocese of New York. A feature of the period was the development of a strong Anglo-Catholic movement, which opposed liberal efforts toward Christian unity in general and specifically the proposed union of the Protestant Episcopal, Methodist Episcopal, and Presbyterian denominations. Repercussions of the Anglican Prayer Book dispute were evidenced in the controversy over the proposed elimination of the so-called Thirty-nine Articles of Faith from the Protestant Episcopal Book of Common Prayer. The articles repudiated Roman Catholic doctrines and ceremonies. Their elimination was approved after some controversy at the triennial convention of the church in 1925, subject to ratification at the 1928 convention. In the latter year, a formal protest by 105 low-church leaders and a petition, signed by 30,000 communicants, opposing the proposed revision, induced the House of Bishops to table the matter indefinitely. The convention also disposed of other controversial issues by delaying revision of the canons on marriage and divorce for three years, rejecting a proposal to forbid the discussion of politics in the pulpit, and giving official sanction to faith healing.

Fundamentalism was an issue at the quadrennial general conference of the Methodist Episcopal Church in 1924. An attempt to pass a so-called Declaration of Faith presented by fundamentalists was defeated, although the majority of the delegates opposed modernism. Another attempt to inject the issue into the 1928 quadrennial conference, through heresy charges filed against Bishop Francis J. McConnell, an outstanding liberal leader, was overwhelmingly defeated. As in the other denominations, there was considerable opposition to the vigorous movement toward Protestant unity. Union of the Northern and Southern branches of the denomination was rejected by vote of the Methodist Episcopal Church, South, in 1925. The Northern branch at its 1928 conference voted 852 to 3 to inaugurate overtures looking to early organic union with like-minded denominations, namely, the Presbyterian and Congregational. The activities of the Methodist Board of Temperance, Prohibition, and Morals at Washington and those of Bishop James Cannon, Jr., of the Methodist Episcopal Church, South, and other denominational leaders during the presidential campaign of 1928 provoked severe criticism both within and without the denomination. Opposing Bishop Cannon were Bishop Warren A. Candler, senior Bishop of the Methodist Episcopal Church, South, and Dr. John A. Mell, president of the Georgia Baptist Convention, who publicly protested against the participation of the church as such in politics.

The Universalists in 1929 were facing a split between a section of the denomination desiring union with the Congregationalists and a section favoring union with the Unitarians.

Evidence of the lessening of the controversial spirit in the Protestant world was seen in the fact that, in the United States in 1929, nine leading denominations were conducting negotiations for organic union with one or more others. Even greater headway was made during the period in countries under the British flag. Important mergers took place in Canada, where the Methodist, Congregational, and most of the Presbyterian churches united in 1925 (see CANADA, UNITED CHURCH OF); in Great Britain, where three branches of Methodism combined in 1928, and in Scotland, where the Presbyterians of the Church of Scotland and the United Free Church were reunited in 1928. In the Anglican communion, bitter dissensions developed. See ENGLAND, CHURCH OF.

The century-old Catholic-Protestant controversy was fanned anew toward the close of the period 1914–29 by the religious situation in Mexico, the encyclical on "The Promotion of True Religious Unity," issued by Pope Pius XI in 1928, the candidacy of Alfred E. Smith, a Roman Catholic, for President of the United States in 1928, and the conclusion of the treaty in 1929 between Italy and the Vatican. The controversy as to the eligibility of a Roman Catholic for the Presidency of the United States was inaugurated through an exchange of letters between Charles C. Marshall, a New York lawyer, and Governor Smith. This discussion was on a high plane, from which those which followed during the heat of the campaign frequently descended.

Religious controversies between Moslems and Hindus in India continued to be marked by bloody riots and a dispute between Jews and Moslems over the ancient Wailing Wall in Jerusalem precipitated rioting throughout Palestine in 1929 in which several hundred persons were killed or injured.

RELIGIOUS DENOMINATIONS. See articles on the respective denominations.

REMINGTON, WILLIAM PROCTER (1879–). An American Protestant Episcopal bishop, born at Philadelphia, and educated at the University of Pennsylvania and the Theological Seminary of Virginia. He was ordained in the following year and was a curate and rector of several churches in Philadelphia until 1911, when he became rector of St. Paul's Church, Minneapolis, Minn. In 1918 he was consecrated Suffragan Bishop of South Dakota and served as chaplain in France during the World War. In 1922 he was elected bishop of Eastern Oregon.

RENSSELAER POLYTECHNIC INSTITUTE. A school of engineering and science, at Troy, N. Y., established in 1824, offering graduate and undergraduate courses in civil, mechanical, electrical and chemical engineering and in general science. Four courses were added in 1925, in business administration, in physics, in chemistry, and in pre-medical work. The Institute expanded during the period between 1914 and 1928 both in numbers and equipment. The registration in the latter year was 1426 compared with 640 in 1914; the faculty numbered 115 as compared with 63 in the earlier year; and productive funds increased from $1,350,000 to $4,500,000. The library in 1928 contained 18,355 volumes and 19,963 pamphlets. In 1922 a great broadcasting station was established which claimed the record for long distance, transmission from it having been heard a distance of 10,000 miles. A gauging station to be used by the students under the direction of the United States Geological Survey was established in 1923. In 1914 the property of the institute was valued at $2,850,000; in 1928 the value was more than $10,000,000. A new library with an auditorium, Amos Eaton Hall, was dedicated in 1928. It was built at a total cost of $320,000. The Caldwell Dormitory was opened in 1927. President, Palmer C. Rickets, E.D., LL.D.

RENT LAWS. See LAW, PROGRESS OF THE; HOUSING.

REORGANIZED CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS. See LATTER-DAY SAINTS, REORGANIZED CHURCH OF.

REPAIR SHIPS. See VESSELS, NAVAL.

REPARATIONS. The subject of reparation by Germany and her allies for damages done to the Allied countries during the World War constituted one of the most difficult and complicated of the multifarious problems considered at the Peace Conference of Paris in 1919. Only tentatively and unsatisfactorily dealt with at that time, it subsequently remained the key factor in the economic rehabilitation of Europe and a perennially potent menace to international peace and security. Inveterate international practice had consecrated the right of the victor to recover, if possible, the costs of war from his defeated enemy; the classic example of an indemnity was the $1,000,000,000 penalty imposed by the German allies on France at the conclusion of the Franco-Prussian War (1870–71). *Væ victis!* The first formal though secret reference known to have been made to this subject by the Allied governments during the World War was in the Treaty of London (Apr. 26, 1915), which promised Italy, besides many other things, "a share of the war indemnity." In their pronouncement of Dec. 30, 1916, the Allied governments asserted: "The disasters caused by the German declaration of war and the innumerable outrages committed by Germany and her allies against both belligerents and neutrals, demand penalties, reparations, and guarantees." In their note to President Wilson, Jan. 10, 1917, they explained that their war-aims, "with all the compensation and equitable indemnities for harm suffered," would only be set out in detail when the time came for actual negotiations, although they avowedly included "necessarily and first of all, the restoration of Belgium, Serbia, and Montenegro, with the compensation due to them," and the "evacuation of the invaded territories in France, in Russia, and in Rumania, with just reparation."

In his war-aims address of Jan. 5, 1918, Lloyd George reiterated these objects, declaring that the British government and the Allies demanded the "complete restoration . . . of the independence of Belgium and such reparations as can be made for the devastation of its towns and provinces. This is no demand for war indemnity as was imposed on France by Germany in 1871. *It is not an attempt to shift the the cost of warlike operations from one belligerent to another*, which may or may not be defensible. . . . Next comes the restoration of Serbia, Montenegro, and the occupied parts of France, Italy, and Rumania, . . . Finally, there must be reparation for injuries done in violation of international laws."

This clear-cut pronouncement, so remarkable in the light of the speaker's subsequent vagaries, promptly elicited (January 6) a telegram from Premier Clémenceau congratulating him for having so felicitously summarized "the actual truths." The same specific aims were later incorporated by President Wilson in his famous "Fourteen Points" address of Jan. 8, 1918 (Points 7, 8, and 11). The President, however, made no reference to indemnities for war costs, and his conception of reparations for damage done, as therein expressed, was distinctly limited in scope. Indeed, in his "Four Principles" address of Feb. 11, 1918, Wilson categorically asserted: *"There shall be no annexations, no contributions, no punitive damages."* On Dec. 4, 1917, he had explained to Congress that "the wrongs, the very deep wrongs, committed in this war, will have to be righted. . . . But they cannot and must not be righted by the commission of similar wrongs against Germany and her allies." This principle and purpose he reiterated on Sept. 27, 1918, in the much-quoted sentence that "the impartial justice meted out must involve no discrimination between those to whom we wish to be just and those to whom we do not wish to be just."

The Armistice terminating the War was avowedly predicated on the acceptance both by the Entente Powers and by Germany of the principles enunciated by Wilson in his successive addresses of 1918. The Peace Conference was to discuss the practical details of their application. To be sure, one of the reservations made by the Supreme Council (Nov. 4, 1918) was to the effect that provision for the evacuation and restoration of all invaded territories expressly implied that compensation would be made by Germany "for all damage due to the civilian population of the Allies and their property by the aggression of Germany by land, by sea, and from the air," but the exact force and extent of the obligations created by these conversations were rendered lamentably obscure by a qualifying clause in Article 19 of the Armistice Convention itself, suggested by M. Klotz, French Minister for Finance, stipulating that subsequent financial demands and claims by the Allies and the United States should remain unaffected. Around the interpretation of these conditions, a diplomatic and legal battle was destined to rage. Interestingly enough, Lloyd George insisted (Nov. 3, 1918) that nothing should be put into the Armistice terms that would lead Germany to suppose that the Allied Powers wanted a war indemnity.

With the emotional reaction of the post-Armistice period came a significant realignment of facts and forces. As the extent of Germany's collapse came to be known, greater demands were made for her condign punishment. In the parliamentary election of Dec. 14, 1918, in Great Britain, Lloyd George's coalition government catered to the popular demand for a retributive peace by promising to recover the whole cost of the War, "shilling for shilling" and "ton for ton." Lord Cunliffe, ex-Governor of the Bank of England, estimated Germany's liability to pay as aggregating the stupendous sum of $100,000,000,000, a total which the Premier very shortly afterward augmented to $120,000,000,000. In France, the Clémenceau cabinet and the overwhelming majority of the French people were formulating equally extreme demands. The imposition of taxes was postponed in response to popular claims, and by skillful propaganda the masses were convinced that Germany could, should, and would be made to pay the full costs of the War.

On Jan. 25, 1919, at the second plenary session of the Peace Conference, a commission was appointed to examine and report, first, on the amount which the enemy countries ought to pay by way of reparation; secondly, on what they were capable of paying; and thirdly, on the method, form, and time in which payment should be made. Two main controversies marked the discussions of the ensuing months: (1) that over permissible categories of damage; and (2) that over Germany's real or alleged capacity to pay. Of the 31 categories suggested to the Commission, 10 were ultimately incorporated in the Treaty of Versailles. It was universally agreed that direct damage to persons or property should be compensated, and certain other claims occasioned little conflict, but not so with war costs.

Mr. Hughes and Lord Sumner of the British delegation bluntly argued that since ultimately all war costs had to be met by general taxation, they constituted damage done to civilian populations in the Allied countries and might therefore be legitimately included in the reparations bill. This view received the keen support of the French, whose interest in reparations was subordinate only to their primary consideration of security. (See PEACE CONFERENCE AND TREATIES.) So fearful were they of a German revival, so completely exasperated and antagonized by the systematic and intentional destruction of their industrial regions that they proved even more determined than the British to cripple Germany economically. Consequently, they favored assessing the entire cost of the War on the vanquished foe despite the fact that although the absolute amount of their claim might be substantially increased thereby, their relative share in the total receipts would nevertheless be greatly diminished. The Belgians, anxious for complete indemnification and priority of payment, expressed serious concern lest the extension of Allied claims far beyond the finite capacity of Germany to pay would eventually deprive Belgium of her due. The Americans, renouncing any claims for themselves, attacked the inclusion of war costs as violating pre-Armistice pledges. The dispute was referred to the Supreme Council on March 1, and the refusal of the American experts to accede to the British and French demand was subsequently upheld by President Wilson, who denounced the course contemplated and declared that he would "dissent publicly, if necessary, not on the ground of the intrinsic injustice of it, but on the ground that it is clearly inconsistent with what we deliberately led the enemy to expect and cannot now honorably alter simply because we have the power."

This rejection of their original demand impelled the British and French to insist on the inclusion of pensions and separation allowances, which would serve the purpose not only of making the total payment to be demanded of Germany relatively enormous, but also of appeasing the British demand for a more equitable remuneration than the Empire would receive on the basis of reparations for damages alone. The Americans vigorously combated this new proposal, which in some measure vitiated their victory in the war-costs controversy; but the necessity for compromise following the bitter crisis with the French in early April (see PEACE CONFERENCE AND TREATIES) in combination with some rather illogical and sentimental arguments advanced (Mar. 31, 1919) by "the ordinarily liberal-minded" General Smuts of South Africa finally convinced Wilson of the advisability of including pensions and separation allowances, thereby more than doubling the reparations bill. The German delegation in its Comments on the Conditions of Peace, of May 29, 1919, expressed complete inability to recognize these claims as having "a legal title, as they apply to direct war costs and not to damages done to the civilian population by an act of war"; and in this contention, impartial legal opinion must sustain them.

Equally keen was the struggle waged from January to June over the question of Germany's capacity to pay. The French proposals were fantastic, the most extreme calling for a total of $200,000,000,000 to be collected in some 50 annual installments. British suggestions ranged from the Lloyd George-Cunliffe estimate of $120,000,000,000 to the Liberal Keynes's approximate $10,000,000,000. The Americans, vitally interested in the speedy reëstablishment of normal economic relations, labored indefatigably for the stipulation of a definite and moderate total sum, for they were of the opinion that any reasonable though arbitrary fixation would be greatly preferable to the uncertainty and consequent disorganization of Germany's credit sure to result from postponement, and they argued that France, the greatest creditor of Germany, "would benefit most by taking everything that she possibly could, by taking it quickly and writing off the balance." Their extreme proposal was for a capital sum of $58,000,000,000 to be paid in 30 years, but the basic figure which they later consistently advocated was a total of $25,000,000,0000. Both the British and French premiers feared to accept the moderate proposals of the Americans because they fell so far below the expectations of their respective peoples. Indeed, at one juncture the seeming acquiescence of Lloyd George in plans for a reasonable settlement evoked a telegram from 370 members of the newly-elected "khaki" Parliament, warning him that they expected the fulfillment of his electoral pledges. Had the Americans offered to cancel outright or to abate appreciably the enormous indebtedness of the Allies to the United States as the "essential American contribution toward a new coöperative plan for restoring Europe and the world," they would *ipso facto* have enjoyed a "powerful trading weapon in securing the settlements they desired." This, however, the Americans consistently refused to do, asseverating that these debts "had nothing to do with reparations or rehabilitation." A special committee of liberal-minded experts, British, French, and American, appointed in March to investigate the matter, concluded that "Germany might possibly pay from $10,000,000,000 to $20,000,000,000 over a period of 20 to 30 years." This sound conclusion was wholly unacceptable to the more conservative advisers and plenipotentiaries. The committee then sought to attain the definition of a flexible sum, "adjustable as to amount and means of payment, within certain maximum and minimum limits." For the execution of this scheme, they proposed a Reparation Commission endowed with rather large powers and capable of becoming an instrument of "wisdom and justice." The French, seeing a chance to postpone the fixing of a definite sum of reparations and thereby to keep Germany uncertain and to avoid domestic disillusion jumped at the suggestion and advocated a commission, but one empowered merely to register the claims of the various countries under the different legitimate categories and to settle the figure of the annuities and the period of payment. "The only consideration given to Germany's capacity to make payments would be in the form of lengthening the period given her to complete them—which, by the accumulation of interest on the unpaid portion, might be extended to infinity. It practically amounted to a perpetual economic control of Germany by an Allied Commission."

The whole question came to a crisis late in March. President Wilson and his advisers fought the French proposition bitterly. Lloyd George, guided by the dictates of expediency alone, agreed now with one side, then with the other. Finally, Wilson and House reluctantly acceded to the demands of Clémenceau (Apr. 5–8, 1919), the result representing a yielding all along the line from the American view. An era of compromise with the French was inaugurated (see PEACE CONFERENCES AND TREATIES). The problem of reparations affected not merely Germany, but the other Central Powers as well. In their respective treaties Germany, Austria, and Hungary accepted the responsibility for causing "all the loss and damage" to which the Allied and Associated Powers were subjected; and they were made jointly and severally liable for the whole amount. Bulgaria, on the other hand, was obliged to acknowledge that she had "caused losses and sacrifices of all kinds for which she ought to make complete reparation"; in other words, to assume separate responsibility for certain damages. On the Allies' side, arrangements for dividing the receipts were necessary. At the Peace Conference after a protracted struggle between the French and the Italians, the general principle was adopted that each Allied state was to share jointly with the other Allies in damage payments by any enemy nation for "all operations of war by the two groups of belligerents wherever arising." Belgium received special consideration. In addition to promised reimbursement for all her war costs, a just decision in view of her violated neutrality, she demanded priority of payment. Her representatives urged their most sweeping demands during the French crisis in early April and again during the period of threatened disruption over the Italian and Japanese settlements in late April. Though Balfour was sympathetic, Lloyd George opposed granting special concessions to the Belgians and it was largely owing to American support and the eventual winning of French consent that they were accorded a priority of $500,000,000 in addition to compensation for their entire debt.

In addition to protesting against the inclusion of pensions and separation allowances, the German delegation in its comments on the conditions of peace (May 29, 1919) further sought an immediate and definite fixation of their liability; they offered, subject to the modification of certain economic terms, to make periodic payments in the form of annuities commencing in 1927 and amounting to 100,000,000,000 gold marks, a sum whose approximate 1919 capital value amounted to 40,000,000,000 gold marks. Lloyd George made a short-lived and half-hearted attempt to moderate the reparations burden, but it was eventually decided to reject the German proposition outright.

The Treaty of Versailles (June 28, 1919) attempted to settle the question of German liability by distinguishing between moral responsibility and material compensation.[1] "The Allied and Associated governments," according to Article 231, "affirm, and Germany accepts, the responsibility of Germany and her allies for causing all the loss and damage to which the Allied and Associated governments and their nationals have been subjected as a consequence of the war imposed on them by the aggression of Germany and her allies." "The Allied and Associated governments recognize that the resources of Germany are not adequate . . . to make complete reparation for all such loss and damage. The Allied and Associated governments, however, require, and Germany undertakes, that she will make compensation for all damage done to the civilian population of the Allied and Associated Powers and to their property during the period of the belligerency of each as an Allied or Associated Power against Germany by such aggression by land, by sea, and from the air, and in general all damage as defined in Annex 1 hereto" (Article 232). Annex 1 set forth the 10 categories alluded to above, including pensions and separation allowances. A Reparation Commission was to be established composed of five members, four of whom were to be representatives of the United States, the British Empire, France, and Italy respectively, and the fifth to represent Belgium, Japan, or Jugoslavia, according to the specific nature of the business engaging the Commission's attention. Most of the important decisions had to be unanimous.

After receiving reports of the various governments as to the extent of their claims under the various categories, the commission was to calculate the sum total of Germany's obligations and concurrently draw up a schedule of payments prescribing the time and manner of payment within a period of 30 years from May 1, 1921. It was given discretion to extend the term and also to modify the form of payments, but not to cancel any part except with the specific authority of the several Allied governments concerned. In order to enable the Allied and Associated Powers to proceed at once to the restoration of their industrial and economic life, pending the full determination of their claims, Germany was to pay in gold, commodities, ships, securities, or otherwise, before May 1, 1921, the equivalent of 20,000,000,000 gold marks, from which should be deducted the cost of the armies of occupation and certain limited sums for the purchase of food and raw materials. Germany agreed to apply directly to reparations her economic resources, including merchant shipping, coal, dyestuffs, and chemicals, and to make restitution of cash, securities, animals, and objects of art seized or sequestrated. Provision was to be made for the issuance of several series of gold-bearer bonds as determined by the Reparation Commission. Other provisions of the treaty deprived Germany of territory, population, and resources, thereby gravely impairing her capacity to pay. The German Empire, "built more truly on coal and iron than by blood and iron," had the economic foundations of its prosperity virtually swept away.

The Treaty of St. Germain (Sept. 10, 1919) required Austria to pay "a reasonable sum" on account before May 1, 1921, and to hand over all her merchant marine, 20 per cent of her river shipping, and animals, machinery, and equipment up to the limit of her capacity. The total amount due from Austria for reparation was to be fixed in May, 1921, by the Reparation Commission. A special settlement of the Austro-Hungarian debt was arranged (see AUSTRIA). In March, 1921, due to Austria's distressing financial and industrial condition, the Allies decided to waive, for the time being, all their outstanding claims against her on account of reparation and it was eventually arranged (Oct. 4, 1922) that Austrian finances should be administered by the League of Nations (see AUSTRIA), Austria being freed from any reparation payments until 1942.

The Treaty of Neuilly (Nov. 27, 1919) obligated Bulgaria to pay 2,250,000,000 gold francs in half-yearly installments for 37 years. Up to April, 1922, Bulgaria had paid 799,000,000 gold francs, and in the spring of 1923, first of all the vanquished nations, she was able to make definite and satisfactory arrangements with the victors. Hungary, by the Treaty of the Trianon (June 4, 1920), was to pay a reasonable sum, fixed by the Reparation Commission, before May 1, 1921, when her total liability was to be fixed by the same body, with provisions for the discharge of the balance in semiannual installments over a period of 30 years unless a respite or remission were granted by the Allies. She had to surrender all her merchant shipping, 20 per cent of her river fleet, and an indefinite quantity of live stock. Hungary's payments were long delayed by her presentation of counterclaims against Rumania for losses sustained during the invasion of 1919. In 1923–24 Hungarian finances were, like those of Austria, entrusted to the League of Nations (see HUNGARY), but Hungary was obliged to pay about $2,000,000 a year for 20 years on her reparation obligation.

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[1] See Robert C. Binkley's article, "The 'Guilt' Clause in the Versailles Treaty," in *Current History*, May, 1929, pp. 294–300.

By the Treaty of Sèvres (Aug. 10, 1920), the Allies waived their claims for reparation from Turkey, although she was obligated to pay the costs of Allied armies of occupation and to compensate civilian nationals of the Allies for loss or damage suffered in the War through the action or negligence of the Turkish authorities; but even these claims were canceled by the later Treaty of Lausanne (July 23, 1924). The Reparation Commission, tentatively organized in June, 1919, was not put into formal operation until January, 1920. The German government had forthwith created, for permanent intercourse with the Commission, a special body, known as the *Kriegslasten Kommission*, the chairman of which was a permanent delegate in Paris. The failure of the United States to ratify the Treaty of Versailles was of fateful consequence as regards reparations. America was to have assumed the chairmanship of the Commission, and the vote of the American delegate would probably have been the deciding factor in all important contingencies, except where the treaty expressly required unanimity. The abstention of America (save for "observers") had the effect of throwing the chairmanship and predominant influence in the Commission to France, thereby impairing its usefulness from the start.

Although, according to the Treaty of Versailles, the Reparation Commission was to have "wide latitude as to its control and handling of the whole reparation problem," including the interpretation and administration of the reparation sections of the treaty and the receipt and distribution among the Allies of the payments made by Germany, it was also provided that members of the commission should be responsible to their respective governments alone. Consequently, the subsequent history of the reparations problem revolved not merely around the deliberation and decisions of the Reparation Commission but also around intricate and interminable negotiations between and among the various governments, with a view to achieving a settlement in consonance with seriously divergent and seemingly irreconcilable national interests. The theme of reparations thenceforth is one of confusion and of international maladjustment, of stern economic realities obfuscated by political vagaries and extravagances, of persistent French intransigence and a ruthless determination to coerce Germany into paying or to ruin her, of British vacillation and ultimate reversal of policy dictated by inexorable economic considerations, of German official remissness amounting to defiance and a struggle on the part of German industrialists to escape their obligations, and of American aloofness and shortsighted pursuit of national economic advantage and a mythical political isolation.

Reparations constituted the most important single item on the agenda of the long series of Continuation Conferences inaugurated in the spring of 1920 to deal with the unliquidated problems of the peace. (See PEACE CONFERENCE AND TREATIES.) The Supreme Council of Allied Premiers overshadowed the Reparation Commission and usurped its functions. At San Remo in April, it was decided to grant the Germans a hearing, although Premier Millerand of France, by yielding to Premier Lloyd George on Turkey and to Premier Nitti of Italy on Russia, secured a pledge that the Treaty of Versailles would be enforced to the letter. Lloyd George and Millerand conferred at Hythe (May 15–16) and at Boulogne (June 21–22) for a preliminary discussion of the measures to be taken. A special commission of experts being appointed to gauge the capacity of Germany to pay, Raymond Poincaré, French member and president of the Reparation Commission, resigned in protest. At Brussels on July 2, Allied experts tentatively advised that the German indemnity should be $60,000,000,000, including interest charges. No agreement was then possible as to the manner of distribution. Italy held out for 20 per cent. At Spa (July 5–16) Germany's request for a definite determination of the amount of reparation was denied. The discussion of coal deliveries threatened to disrupt the conference, but Germany yielded to an Allied ultimatum demanding 2,000,000 tons a month. A protocol signed at Spa on July 16 apportioned reparation receipts among the Allies as follows: France, 52 per cent; British Empire, 22 per cent; Italy, 10 per cent; Belgium, 8 per cent; Japan and Portugal, each three-quarters of 1 per cent, the remaining 6½ per cent to be reserved for Jugoslavia, Greece, and Rumania. In the disposition of Austrian, Bulgarian, and Hungarian reparations, a special arrangement was devised, 50 per cent going to the Powers in above-mentioned proportions, an additional 20 per cent to Italy, and 30 per cent to Greece, Rumania, and Jugoslavia.

Negotiations relative to reparations, continuing throughout the year, saw the development of serious differences between France and England over this question and also over Russia and Turkey. A joint conference of Allied and German economic experts was held at Brussels (Dec. 15–22, 1920, and Jan. 10, 1921). Here it was proposed that Germany should pay annual installments of 3,000,000,000 gold marks from 1921 to 1926, 6,000,000,000 from 1926 to 1931 and 7,000,000,000 thereafter until 1963. From Jan. 25 to 29, 1921, the Supreme Council met at Paris. The French from the outset objected to a fixed sum, afterward insisting that it should not be less than 400,000,000,000 gold marks, including interest. Lloyd George, supported by the Italians, vigorously objected, and a compromise decision was reached, which simply ignored the recommendations of the experts. Subject to Allied sanctions in case of default, Germany was to pay within 42 years the sum of 226,000,000,000 marks or its equivalent on a sliding scale of annuities and a further annual payment equal to 12 per cent of the value of German exports.

The German government, supported by national sentiment, frankly asserted that it could not accept the Allied terms, although it consented to attend a new conference at London (Mar. 1–7, 1921), to which it had been summoned "to agree to the decisions of the Paris Conference." On March 1, the Germans offered to pay 50,000,000,000 gold marks present value, with a deduction of 20,000,000,000 for payments already made. Lloyd George, replying on March 3, rejected the German offer, insisted that Germany's responsibility for the War was decided by the Treaty of Versailles founded on that fact, and delivered an ultimatum requiring acceptance of the Allied reparation demands within four days. Lloyd George was supporting French plans in Europe in order to secure French acquiescence in British Near Eastern projects. The German reply being deemed unsatisfactory, a force of French, Belgian, and British troops occupied (Mar. 8, 1921) the cities of Düsseldorf, Duisberg, and Ruhrort in the heart of one of Germany's greatest industrial regions. The results of this *coup de force* were nugatory, however, and France threatened to occupy the whole Ruhr Basin. New schemes were then propounded, including a further German request for American mediation.

A conference of the Entente premiers was held at Hythe (April 23–24) to formulate a tentative programme for the enforcement of Allied terms. On April 27, the Reparation Commission announced that it had decided unanimously to fix at 132,000,000,000 gold marks the amount of damages for which reparation was due. Of this, approximately 45,000,000,000 were for material damage and 87,000,000,000 for pensions and separation allowances. Germany was to pay this in addition to Belgium's war debt, provisionally estimated at 4,000,000,000 gold marks. Three series of bonds were to be issued, bearing 5 per cent interest and 1 per cent amortization: series A, comprising 12,000,000,000, and series B, 38,000,000,000, to be issued in 1921; and the third, series C, for 82,000,000,000, to be issued at the discretion of the commission. Payments were to be made in the form of annuities supplemented by 26 per cent of the value of German exports. The acceptance of the Commission's reduction of claims without a murmur by the Supreme Council marked the end of the exclusively political period of the reparations question. The Allied Conference of London convened on April 30; on May 5 it dispatched to Germany an ultimatum requiring acceptance of these terms. Confronted with the threatened French occupation of the Ruhr, Germany yielded on May 10. The Fehrenbach ministry, organized in July, 1920, had been superseded during the crisis by a new coalition cabinet headed by Chancellor Wirth.

Although Germany subsequently sought modification of these terms, France insisted that she carry them out. The first payments due were paid, and on September 29, Düsseldorf, Duisberg, and Ruhrort were evacuated. On Oct. 6–7, 1921, an economic pact was concluded at Wiesbaden by Rathenau and Loucheur, the German and French ministers of reconstruction; it provided for more effective reparation in kind, similar provisions in the Treaty of Versailles having been nullified by the obstructionist tactics of French industrialists and trade-unionists. France was to receive building materials from Germany in lieu of her share of the 26 per cent export tax, and Germany was to be credited with not more than 1,000,000,000 marks each year for 14 years to cover such deliveries. Only a few deliveries were made under this plan, however, even as revised in 1922. Meanwhile, the German government was encountering extraordinary difficulties in financing reparations payments due in part to the world-wide business depression and to the policy of truculent opposition of German industrial magnates, led by Hugo Stinnes.

An economic conference held at Brussels during September, under the auspices of the League of Nations, deliberated on feasible measures to prevent financial and economic chaos in Europe, but although its discussions proved illuminating, its activities were relatively fruitless. Unsound war finance and peace-time burdens led to a marked decline in the value of German currency. A serious flight of capital from Germany, effected through the exchange of marks for foreign currency, greatly aggravated the situation. The fall of tax receipts to an insignificant value resulted in prodigious budgetary deficits which impelled the Government to embark on an inflation policy, leading in turn to still further depreciation of the value of the mark. See GERMANY.

All these factors tardily convinced the Reparation Commission that Germany needed relief from cash payments, and at brief intervals Allied conferences were held, at each of which the amounts currently payable by Germany were reduced. On Dec. 14, 1921, the German government officially notified the commission that it would be unable to pay the installment due Jan. 15, 1922, or the other quarterly installments due in 1922, and in lieu thereof it proposed a smaller payment. This led to an Allied investigation and discussion of the problem at conferences held at London on Dec. 22, 1921, and at Cannes on Jan. 4–13, 1922. Lloyd George offered France a defensive, political, and military alliance in return for a modification of its attitude toward Germany, but French public and parliamentary opinion was opposed to concession. The conference was suddenly disrupted by a ministerial crisis in France which resulted in the displacement of Premier Briand by ex-President Poincaré, an ardent Nationalist and implacable enemy of Germany. This change in the French government presaged a serious rift in Entente solidarity and definitely prefigured the military occupation of the Ruhr. On January 13, the Reparation Commission granted a provisional and partial moratorium to Germany. On Jan. 28, 1922, Germany offered to pay 720,000,000 gold marks cash annually, distributed evenly throughout the year with 1,450,000,000 gold marks annually in kind. On March 21, the Commission decided to accept Germany's proposal, although in addition it stipulated that Germany should institute sweeping reforms in her financial administration and prevent further flight of capital from the country.

Premier Poincaré, whose diplomatic policy diverged widely from that of Lloyd George, strongly advocated leaving the problem of reparation to the Reparation Commission; but it soon found its way into the agenda of the Supreme Council again. On Mar. 11, 1922, the Paris Conference requested the Commission to study the possibility of a German external loan. The International Bankers' Loan Committee, which met between May 24 and June 10, found such a plan impracticable so long as Germany's external obligations were not reduced. Poincaré categorically refused to allow the international loan to be made contingent upon a new reduction of French claims. His whole attitude offended the bankers, especially J. P. Morgan of New York. Meanwhile, the 34-Power plenary conference held at Genoa (April 10–May 19), revealed even more strikingly the grave impasse in international reconstruction presented by the reparation and Russian problems. (See RUSSIA.) Prospects of a Russo-German rapprochement, signalized by the Treaty of Rapallo (April 16), which provided for the reëstablishment of diplomatic relations and mutual renunciation of war claims and financial obligations, angered the Allied governments and recemented the Anglo-French Entente temporarily, but otherwise the deliberations of six weeks proved devoid of practical consequences. On July 14, 1922, the German government requested an extended moratorium, and a somewhat reduced reparation payment was made under evident duress on July 15.

The thirteenth Inter-Allied Continuation Conference was convened at London during August, 1922, to discuss reparations and war debts. On August 1, the British foreign minister, Balfour, issued a note offering to remit all war loans due Great Britain and to abandon all further rights to German operations if reciprocal action were taken by other nations. He offered to cancel the $12,000,000,000 due Great Britain, if the United States would cancel the British obligation of $5,000,000,000. The American government refused to entertain any such proposition (see UNITED STATES), but Great Britain announced the intention of collecting in principal and interest only so much as she would be required to pay to the United States. At the London Conference, the British and French premiers were absolutely deadlocked on the subject of German reparations, although Berlin was granted a respite on the August 15 payment and it was agreed that henceforth the obligation of collection should rest on the individual governments. Poincaré favored imposing stringent "productive guarantees" on Germany and suggested elaborate schemes for the control of German resources. On August 31, a compromise arrangement was devised, granting Germany a conditional respite for six months; simultaneously, a new agreement for delivery of reconstruction supplies to France was negotiated by Hugo Stinnes and Senator de Lubersac.

With the passage of months, however, the situation grew worse and worse. A committee of foreign financial experts reported that stabilization of the mark was dependent on Germany's own efforts. On Nov. 8, 1922, the German government requested an indefinite moratorium on all payments and a revision of the total to be paid. Great Britain, more keenly desirous of stabilizing Germany and restoring the German market, consistently pursued a policy of opposing French militarism and of advocating the fixation of a definite and reasonable sum of reparation. Poincaré adhered to his policy of no concession and ruthless coercion. Belgium was definitely allied with France, while Italy, for business reasons, supported the British until the Fascist *coup d'état* produced an Italian dictatorship more sympathetically inclined toward French strong-arm measures. The autumnal crisis in Near Eastern affairs (see PEACE CONFERENCE AND TREATIES) exacerbated Entente differences. The downfall of Italian, German, and British cabinets (see ITALY, GERMANY, and GREAT BRITAIN) failed to clarify or ameliorate the situation. Another Allied conference, attended at London (December 9–11) by the British, French, Belgian, and Italian premiers, accomplished nothing beyond exchange of views. On Dec. 26, 1922, the Reparation Commission, despite British opposition, declared Germany in voluntary default on 1922 wood deliveries. On Jan. 9, 1923, similar action was taken in regard to coal deliveries, notwithstanding the fact that the commission had tacitly acquiesced in slight German undershipments for months past. The real motive appeared to be to render more plausible the alleged necessity for the contemplated seizure of the Ruhr coal region. Meanwhile, at an Allied conference in Paris (Jan. 2–4, 1923) detailed plans were presented for coping with the problems of reparations and international indebtedness. Great Britain affronted Belgium by demanding that she surrender her priority and aroused the indignation of France and Italy by requesting them to forfeit certain gold deposits which they had maintained (theoretically) in London as security for British war credits. Great Britain and France, although agreeing on a reduction of the reparations total to 50,000,000,000 gold marks and the institution of a comprehensive financial control over Germany, were diametrically opposed on methods of guarantee. Bonar Law, combating the punitive measures proposed by Poincaré, declared that their execution would not produce reparation. The French, whose prime consideration was to maintain security by rendering Germany impotent, refused to agree to any practical programme.

France and England had reached the parting of the ways. On January 11, after preliminary warnings, a Franco-Belgian army occupied the Ruhr Valley, the heart of industrial Germany, containing her principal coal and iron deposits, her greatest industrial establishments, and 7,000,000 inhabitants. The legality of this procedure was denied by the Germans and doubted by the British, but the French and Belgians, brooking no criticism, announced that they were acting under the provisions of Paragraphs 17–18 of Annex 2 to Part VIII of the Treaty of Versailles, which authorized the respective Allied governments in case of a voluntary default by Germany to take such measures as they deemed necessary. Although embarrassed from the outset by civil obstruction and passive resistance on the part of the inhabitants, including tradeunionists and industrialists (see GERMANY), the French took strong measures of repression and retaliation, and by March they had an unbroken military and customs line stretching from Switzerland to Belgium and Holland. All the rigors of military rule were enacted in the Ruhr, thousands of Germans being intimidated, incarcerated, or exiled, and the normal activities of industrial life almost completely suspended. For months the French and German governments remained obdurate in their determination not to yield, the British seeking in vain to effect a compromise settlement. Gradually, Germany, seriously crippled by the disruption of her economic system, was forced to recede from her extreme attitude. On May 2 and June 9, 1923, she outlined a new proposal involving the mortgaging of her railway system, the offering of guarantees on other industries, and the pledging of certain import and excise duties to reparation payments. Guaranteed annuities, secured by these means, and totaling 1,200,000,000 gold marks, were to be paid after July, 1927. The Ruhr was to be evacuated and economic connections with Germany reëstablished. Germany also agreed to submit to determination by an international commission of her capacity to make further payments. On June 8, Poincaré flatly refused to discuss any offer as long as the German resistance in the Ruhr continued. He made it perfectly clear that France and Belgium intended to retain control of the Ruhr until Germany paid the schedule of reparations fixed in May, 1921. By degrees, the French had restored a semblance of economic order in the Ruhr region, and partial production was resumed. Nevertheless, Great Britain remained antagonistic, the United States appeared distinctly unsympathetic, Italy failed to back the Ruhr policy vigorously, opposition developed in Belgian labor and shipping circles, and protests were made by Sweden, Holland, and Switzerland. In a note of July 20, 1923, the British government, while pronouncing the German proposals unacceptable, suggested that they were at least worthy of consideration, and to this end it proposed an investigation of the reparations situation by a committee of impartial experts. An exchange of notes during the summer merely confirmed the French in their intransigent attitude of utilizing only the Reparation Commission as an administrative or investigating body and of retaining the Ruhr until full payment was made by Germany.

The French note to Great Britain (of July 30) deserves quotation:

> An eye for an eye, a tooth for a tooth. In strict accordance with the precedent established by Germany in 1871, the Ruhr District will be released only when Germany pays. The Reich must be brought to such a state of distress that it will prefer the execution of the Treaty of Versailles to the condition created by the occupation. German resistance must cease unconditionally, without any compensation. Germany's capacity to pay cannot be established at all in presence of the present confusion in her economy. Furthermore, it is absurd to fix it definitely, as it is continually changing. The German Government will never recognize any amount as just and reasonable, and, if it does, it will deny it on the following day. In 1871 nobody in the world cared whether France considered the Treaty of Frankfort just and possible of execution. And what about the investigation of Germany's capacity to pay by impartial experts? What does impartial mean? Who has to select the experts? What will be their relation to the Reparation Commission? Even Lloyd George, in January, 1921, rejected the recommendation of the experts which were assembled at Brussels, and declared that he attached no value to them. What is to be done in the Ruhr District after the abandonment of passive resistance cannot be decided now; it depends entirely on the attitude of the Reich and the German people.

By September, 1923, German passive resistance in the Ruhr had definitely broken down and subsequently her industrial magnates were forced to come to terms with the French. A series of short-time agreements henceforth regulated German deliveries in kind.

On Oct. 5, 1923, the Reparation Commission announced that up to June 30, 1923, reparation payments had totaled 8,213,670,000 gold marks, of which 3,250,000,000 was in merchandise, 1,900,000,000 in cash, and the remainder in the form of credits for shippings, cables, Saar Valley mines, and ceded territories. Of this total, 5,494,782,000 gold marks had already been allocated to Allied recipients: 1,255,339,000 to Great Britain, 1,803,967,000 to France, 1,730,126 to Belgium, 338,621 to Italy, 204,368 to Serbia, 68,368 to Japan, and lesser amounts to other countries. Germany, however, contended that she had paid gold and cash to a value of more than 45,000,000,000 gold marks. The most exhaustive nonpartisan study made up to 1924 would indicate that Germany had paid from 20,000,000,000 to 26,000,000,000 gold marks. The advancing months of 1923 saw a slightly more coöperative attitude on the part of the American government. While the United States had maintained continuous unofficial relations with the Reparation Commission through "observers," she had consistently refused to be officially represented at any international economic conference. (See UNITED STATES.) In October, 1923, in response to British inquiries, the United States government expressed the opinion that "competent American citizens would be willing to participate in an economic inquiry . . . through an advisory body appointed by the Reparation Commission." France, while emphasizing her continued opposition to reduction of the German obligation, eventually consented to the inquiry. The Reparation Commission voted (Nov. 23, 1923) to appoint two committees of experts, one to inquire into means of balancing the German budget and of stabilizing German currency, and the other to examine and report on the extent and methods of the export of German capital to avoid reparation payments. On December 27, the personnel of the committees was announced, the first comprising 19 members, including Charles G. Dawes and Owen D. Young, prominent American financiers and business men, and the second, five members including H. M. Robinson, an American banker. All the experts were men of large experience in the fields of public or private finance. The first committee met at Paris on January 14, with General Dawes as its chairman; and the second, on January 21, with Reginald McKenna of Great Britain as president.

After three months of exhaustive investigation and deliberation, the Dawes Committee made a unanimous report to the Reparation Commission on Apr. 9, 1924. In essence, this report provided: (1) Germany must meet to the full extent of its capacity its external obligations as imposed by the Treaty of Versailles; (2) the payments should be made on a sliding scale beginning with 1,000,000,000 gold marks for the first year, to be increased after four years to 2,500,000,000 gold marks annually; (3) these charges should be defrayed from taxation, the railways, and industrial debentures, and a mortgage for this purpose should be placed on the industries of the country; (4) an index of prosperity should be devised and utilized, as more reliable than an index of export statistics in determining Germany's ability to pay more than 2,500,000,000 gold marks annually after the first five years; (5) a foreign loan of 800,000,000 gold marks should be obtained, so as to satisfy the requirements of the gold reserve and to aid in the payment of immediate obligations; (6) a bank of issue should be created to promote the stabilization of German currency, as a fundamental economic prerequisite; (7) an international organization of control should be set up, to consist of a trustee for railway and industrial bonds, three commissioners of railways, the bank, and revenues, and an agent in charge of the actual payment of reparations; and (8) France and Belgium should relinquish economic control of the occupied territories.

The McKenna report (Apr. 5, 1924) estimated that 6,750,000,000 gold marks had been exported from Germany and pointed out that the total foreign money lost through investment in German marks equaled the total sum of reparation cash payments made by Germany to date. The experts' reports elicted widespread commendation in Allied and neutral countries and in Germany, although some complaint was made that the Dawes committee had not been able to fix the total of German obligations. The Reparation Commission on April 11 approved the reports as offering a practical basis for rapid solution of the reparation problem, and by the middle of April, the several Allied governments, as well as Germany, accepted them in principle. The Germans announced, however, that the evacuation of the Ruhr was indispensable for Germany's complete coöperation. The French, just recovering from a serious financial crisis due to the fall of the franc (see FRANCE), expressed satisfaction with the Dawes plan, though reviving the old question of guarantees.

The situation was somewhat clarified by the outcome of the Franco-German elections of early May. In Germany, parties pledged to acceptance of the plan won a majority in the Reichstag, although not the two-thirds required for the alienation of control over the national railway system contemplated by Dawes and his associates. In France, Premier Poincaré's *bloc national* was defeated, and in June the Radical Socialist leader, Édouard Herriot, became Premier. He immediately relaxed the coercive control over the Ruhr and permitted the return of some hundreds of thousands of German exiles. During June and early July, he coöperated cordially with Ramsay MacDonald, the Labor Premier of Great Britain, in endeavoring to ensure Entente solidarity in putting the Dawes Plan into operation. A new Allied conference on reparations, the first since January, 1923, was called to meet in London on July 16, 1924. Preliminary conversations between Herriot and MacDonald, however, while producing cordial personal relations, revealed in all their grim significance the time-honored obstacles to a complete and harmonious settlement; namely, French insistence on adequate sanctions and security and full payment, together with opposition to any British attempt to supersede the Reparation Commission by any other international agency.

The London Conference lasted from July 16 to Aug. 16, 1924. Ten countries were represented; the British Empire, France, Italy, Japan, the United States, Belgium, Portugal, Greece, Rumania, and Jugoslavia. Among the prominent personages who participated in the deliberations were Prime Minister MacDonald of Great Britain as presiding officer, Premier Herriot of France, Premier Theunis of Belgium, Frank B. Kellogg, the American Ambassador to Great Britain, and later on, Chancellor Marx and Foreign Minister Stresemann of the German Reich.

In its initial stages, the Conference was confined to the endeavor of the Allied delegations to agree on a common programme before negotiating with the Germans. Three committees were constituted, the first to deal with the matter of German defaults in reparation payments and the sanctions to be applied in cases of willful defaults, the second to prepare recommendations on the restoration of German fiscal and economic unity as postulated by the Dawes Committee, and the third to perfect arrangements regarding the transfer of payments from the receiving agency in Berlin to creditor countries. Premier Herriot and his French associates, in compliance with pledges previously exacted by ex-Premier Poincaré not to surrender any French rights under the Treaty of Versailles or to relinquish control of the Ruhr, accepted in principle the view that it was unnecessary, if not impossible, to define exactly the penalties to be imposed on Germany in contingencies such as that which preceded the occupation of the Ruhr, and it was undoubtedly as a concession to these French susceptibilities that on July 19, Committee One unanimously agreed that all rights enjoyed by nations under the Treaty of Versailles were to be preserved intact. At the same time, it was further unanimously agreed that investors in the projected loan of 800,000,000 gold marks to Germany were to be guaranteed a prior lien on German resources in event of willful German default. The decision as to whether any default was willful or not was to rest with the original Reparation Commission, but it was obligated to consult the new agent general of reparations.

A grave crisis immediately developed regarding the loan formula. This deadlocked proceedings for a week, severely strained the conference atmosphere, and threatened to disrupt negotiations altogether. The American and British bankers who were depended on to underwrite the loan objected that the potental application of sanctions by one or more powers, acting not in consonance with all the other Allies but separately, would seriously jeopardize the interests of investors and render the floating of a large loan virtually impossible. Nevertheless, there was a strong resurgence of extreme French nationalism in the Paris press and political circles of opposition, where bitter criticism was leveled at Anglo-American financiers, and there was also manifest tension at London between British and French delegates. Matters were smoothed over by the friendly intervention of the American representatives. A less unyielding attitude was adopted by the naturally conciliatory Herriot. He and his colleagues busied themselves in devising a formula which would safeguard vital French interests at the same time that it would satisfy the demands of the bankers for reasonable safety for their investments. In response to friendly but firm pressure by MacDonald, Herriot decided to defy Poincaré and to consider an early evacuation of the Ruhr. Several critical days elapsed before a gradually evolved French plan for a special arbitration committee to decide on defaults, together with an offer to withdraw completely from the Ruhr within two years, gained ground in the conference despite the reluctance of the British. On August 1, the deadlock was broken when Committee One accepted Herriot's arbitral scheme, and on August 2, full accord was reached by the conference on all outstanding points.

The second phase of the conference opened on August 5, when the report as adopted in plenary session was placed in the hands of Marx and Stresemann, the German representatives dispatched to London. The German chancellor praised the Dawes Report and expressed the desire of his government to carry out its provisions in good faith. He emphasized Germany's concern on two points: first, the complete economic evacuation of the Ruhr; and secondly, the early abandonment of French military occupation of the region. On August 7, the Germans accepted the Allied default arrangement without amendment. On August 8, Herriot left for Paris, where at a ministerial council (August 10) he secured the approval of his colleagues for his actions and an authorization from President

Doumergue and Marshal Foch to settle the Ruhr occupation solely with regard to reparations, thereby temporarily subordinating the question of security. The French simultaneously declared in favor of disarmament control over Germany by the League of Nations. Meanwhile, affairs progressed rapidly at London, through a promising spirit of mutual conciliation and coöperation. On August 10, the Reparation Commission (sitting at London) and the German representatives signed a protocol for setting the Dawes Report in operation, and on August 16, a general protocol with four annexes was adopted incorporating this and all other agreements of the conference.

Briefly, the agreements were as follows: Germany was to promulgate and enforce the laws required to carry out the Dawes Report, especially those provisions relating to the bank, railways, and industrial debentures, and to apply certain provisions regarding the control of the revenues assigned as security for the annuities. The Reparation Commission on its part undertook to help execute the recommendations of the Dawes Report, especially in the way of facilitating the projected loan and making an accounting of necessary adjustments. Disagreements between the German government and the Reparation Commission as to the interpretation of this agreement and of the German legislation involved were to be resolved by a special committee of three arbitrators appointed one each by the commission and the government and a third, an American, as presiding officer, to be appointed by joint action, or, failing agreement, by the President of the Permanent Court of International Justice. Germany further agreed to facilitate in all ways possible the making of deliveries contemplated under either the Treaty of Versailles or the Dawes Report, the programme of such deliveries, in case of nonagreement either between members of the Reparation Commission or between the Reparation Commission acting unanimously and the German government, was to be determined by a committee of three independent and impartial arbitrators, whose chairman should be an American citizen. A mixed committee of Allied and German representatives was to determine procedure for deliveries in kind. Differences in opinion between the German government and the Transfer Committee contemplated under the Dawes Report were to be settled by reference to an arbitrator chosen by the President of the Court of International Justice. Provision was made for dealing with "concerted financial manœuvres." Technical improvements in reparations proceedings might be made through submission of any disputed points to an impartial arbitral committee. The Allied governments engaged with Germany to assist in the speedy restoration of a large measure of Germany's fiscal and economic unity. The French were to evacuate the Ruhr completely within one year. Furthermore, "in order to bring about mutual conciliation and in order to wipe out the past to the utmost extent possible," the Allied governments and the German government exchanged reciprocal assurances of general amnesty for nationals having committed political offenses in the occupied territory since Jan. 11, 1923. Such modifications in Annex II of the Treaty of Versailles as were made necessary by the Dawes Report and the London Compact were specifically sanctioned by an inter-Allied agreement constituting Annex IV of the London Protocol. The Allied governments agreed to safeguard specific securities pledged to the service of the 800,000,000-goldmark loan and granted investors a prior claim on any resources of Germany, subject to a general charge in favor of the loan.

The German Government immediately summoned the Reichstag in special session and on August 29, the requisite laws for the execution of the Dawes Plan were enacted. As these laws not only imposed heavy financial burdens upon the German people in accordance with reparation requirements but also introduced foreign coöperation in the management of important branches of German economic activity, their passage was naturally preceded by a severe political contest, but the Government carried its entire programme, even securing the requisite two-thirds majority (314–127) necessary to alter the constitution of the Reich so as to authorize the conversion of the state-owned and operated railways into a private company. Meanwhile, the French Parliament had sustained Herriot's policy in several decisive votes of confidence. In accordance with promises made to the German plenipotentiary at London (August 16), the French and Belgian governments ordered the military evacuation of the zone of Dortmund and the territories outside of that of the Ruhr occupied since Nov. 15, 1923. The British government warmly urged an early evacuation of the Ruhr. On August 30 took place the actual signing of the Conference agreement at London.

The London Conference was undoubtedly a success. It was made so by the partial supervention of economic realities hitherto obfuscated by political vagaries and extravagances, and it was also helped by the astute but frank diplomacy of the liberal-minded premiers, MacDonald and Herriot, by the friendly counsel of American representatives and by a coöperative attitude on the part of the German delegates. The vital issue of security for France, temporarily subordinated at London, was to receive attention at the ensuing September meeting of the League of Nations Assembly. See LEAGUE OF NATIONS. The question of inter-Allied debts, so inextricably intertwined with the reparation problem both historically and in actual fact, had been inflexibly debarred from discussion at the conference and was destined to cause considerable trouble in the year to come. See below.

On Sept. 1, 1924, the Dawes Plan was put into operation. For the transition period, the office of Agent General for Reparation Payments was assumed by Owen D. Young who was then succeeded on October 31 by Seymour Parker Gilbert, former Assistant Secretary of the Treasury in the United States. In Germany, the Reichsbank and the railway régime were definitely reconstituted, certificates for the Railroad and Industrial Bonds had been deposited with the Trustees. The French and Belgian governments relaxed their grip upon the economic and administrative life of the Ruhr and German control was reëstablished. Negotiations between the German Chancellor Luther and Dr. Schacht, President of the Reichsbank, on the one hand and the Bank of England and J. P. Morgan & Co. on behalf of the lender, culminated in a loan agreement signed October 10. The terms were: 7 per cent interest, issue price 92; repayment Oct. 15, 1949, by means of a sinking fund—in America at 105 per cent, in other countries at par. The loan was underwritten by the bank at 87 per cent in America and 87½ per cent in Europe. America was to subscribe $110,000,000, Great Britain £12,000,000; Holland, Sweden, Switzerland, France, Belgium, and Italy smaller amounts. The balance of £360,000 necessary to round the net proceeds up to 800,000,000 gold marks was raised in Germany through the Reichsbank. The Reparation Commission granted the service (i.e., interest and amortization payments) of the loan an absolute first charge on all payments under the Dawes Plan or any other assets or revenues of Germany subject to an Allied lien. The German Government recognized the service of the loan as a direct and unconditional obligation of the Reich. The issue of the loan took place in New York and London Oct. 14, 1924, and was a brilliant success.

On October 10, in conformity with the London Agreement, the Reparation Commission appointed Thomas N. Perkins of Boston its American member for the execution of the Dawes Plan. (Perkins resigned Apr. 17, 1926, and was succeeded by Walter P. Cooke.) Other officials, in addition to S. Parker Gilbert as permanent agent general for reparation payment, included G. W. Bruins (Dutch) as commissioner of the Reichsbank; Gaston Leverve (French) as commissioner of the Railways; Sir Andrew McFadyean (British) as commissioner of Controlled Revenues; Léon Delacroix (Belgian) as trustee for the German Railway bonds; and Bernadino Nogara (Italian) as trustee for the industrial debentures. The Transfer Committee embraced, besides the agent general as chairman, another American, and French, British, Italian, and Belgian members. The Reparation Commission's function and activities being thus largely restricted, a drastic reduction of its staff took place in the course of a few months. A special committee of four German and four Allied members provided for in the London Agreement to adopt an orderly procedure regarding all deliveries in kind, met in Paris on Nov. 6, 1924, and after exhaustive labor reported a plan for a simple and expeditious system to the Reparation Commission, Mar. 9, 1925, which with some amendments was accepted and put into operation on May 1, 1925. The Transfer Committee likewise took steps to gain jurisdiction over certain arbitrary 26 per cent levies on imports from Germany which Great Britain and France were collecting under their own national laws (Reparation Recovery Acts).

Meanwhile (Oct. 27, 1924), the financial experts of the Allied governments and of the United States met in Paris to resume, after a long interval, the discussion of the distribution among themselves of the German reparation payments. The United States presented a demand to be indemnified for its war claims as recognized under the German-American Treaty of Berlin Aug. 25, 1921, and for its Army-of-Occupation costs out of the annuities under the Dawes Plan. Moreover, the reparation accounts prior to Sept. 1, 1924, were in a state of confusion owing to the Franco-Belgian practices during the Ruhr Occupation. After weeks of work, the experts were unable to arrive at any definite arrangement, consequently a conference of Allied Ministers, of France, and of Frank Kellogg, American Ambassador to Great Britain, began in Paris Jan. 6, 1925. After compromising their conflicting interests and claims, they reached an understanding (January 14) known as the Financial Agreement of Paris. France and Belgium submitted the following account for the period Jan. 11, 1923–Sept. 1, 1924: Income: Fines and requisitions 45,500,000 gold marks; deliveries in kind 446,400,000 gold marks; cash receipts from coal tax, customs duties, railway revenue, forests, passports, etc. 490,000,000 gold marks, from which were to be deducted expenses of political administration, industrial operation, and military maintenance to the amount of 184,000,000 gold marks, leaving a net income from cash receipts of 306,000.000 gold marks. The conference, however, after stipulating that deliveries in kind and cash receipts were to be accounted for separately (the Reparation Commission on Dec. 18, 1925, fixed the value of deliveries in kind at 469,868,000 gold marks and the cash receipts at 423,362,000), provided that military expenses in the Ruhr were to be deducted from the value of deliveries in kind only to the extent that they exceeded the normal cost of the maintenance of troops in garrisons at home. The net amount of deliveries in kind then remaining was to be charged to the reparation account of the recipient countries. From cash receipts should be deducted only the civil cost of collection and administration and the cost of the operation of industrial enterprises. Of the balance, everything beyond a sum of about $14,750,000 already set aside for American expenses of occupation was to be transferred to Belgium on account of her priority.

The German annuities on the Dawes Plan as from Sept. 1, 1924, should be allocated on the following basis: (*a*) *Prior Claims*—(1) service of reparation loan, about 93,000,000 gold marks per annum: (2) expenses of the Reparation Commission and the new administration, 9,250,000 the first year, but not in excess of 7,500,000 thereafter; (3) Inter-Allied Rhineland Commission expenditures, 10,000,000 and Military Control Commission, 8,000,000 for first year—subsequent allowances to be fixed later; (4) payment of 55,000,000 gold marks annually to the United States beginning Sept. 1, 1926, for amounts in arrears of the cost of her Army of Occupation, superseding the so-called Wadsworth Agreement of May 25, 1923; (5) special appropriation gradually increasing from 15,000,000 to 30,000,000 gold marks for arrears of occupation costs incurred by France and Great Britain before May 1, 1921; and (6) for current costs of occupation in first-year advance payment in lump sums of 110,000,000 gold marks to France, and 25,000,000 each to Belgium and Great Britain, any excess cost to be borne by each Power out of its share of the annuity.

For later years, a new settlement was to be made prior to Sept. 1, 1925. The balance of the German annuity should then be applied to the payment of: (b) *Other claims*—(1) 5 per cent to the payment of the Belgian war debt, of which, provisionally, France should receive 46 per cent, Great Britain 42 per cent, and Belgium herself 12 per cent on account of her debt to America; (2) for restitution, 1 per cent of the total during the first four years, in subsequent years, 1 per cent of the first billion gold marks after deducting preferred claims and 2 per cent of the balance of the annuity; (3) Belgian priority, the exact remaining amount to be ascertained by the Reparation Commission. Regardless of that, however, Belgium should receive her share of 8 per cent during the first year; the same percentage monthly during the second year until the priority should be completely liquidated; thereafter or at latest from Sept. 1, 1926, a reduced percentage of 4.5 per cent, the other 3½ per cent to go to France and Great Britain in the proportion of 52 to 22; (4) after deducting priorities, a share of 2.25 per cent to the United States subject to a maximum limitation of 45,000,000 gold marks per annum with a similar percentage in the distribution and joint realization of all securities issued under the Dawes Plan; (5) otherwise, the Spa percentages remained unchanged, viz.,—52 per cent for France, 22 per cent for Great Britain, 10 per cent for Italy, and 5 per cent for Serbia, etc.

Greece was accorded 0.4 per cent of payments by Germany and of the first half of payments by Austria, Hungary, and Bulgaria, and 25 per cent of the second half of payments by Austria, Hungary and Bulgaria—Rumania was given 1.1 per cent of German payments and of the first half of Austrian, Hungarian, and Bulgarian payments and 20 per cent of the second half of the latter. In addition, there were complicated miscellaneous provisions which need not be mentioned here. Since the United States participated officially in the arrangement, European diplomats and publicists expressed satisfaction at her reëntry into Allied negotiations regarding German affairs and spoke glibly of America's adhesion as "an insurance policy on the payment of reparations."

The Coolidge Administration, however, in defending itself against attacks by isolationist senators and editors, steadily insisted that the United States remained as free from European entanglements as she was before. Public opinion, nevertheless, was divided on that point.

There is no gainsaying the fact that the Dawes Plan gave Germany, Europe, and the world a much-needed respite from controversy over reparations during the period of 1924–1929. Political and diplomatic attention shifted in considerable measure to other subjects—to the cognate and not less vexatious problem of inter-Allied indebtedness, to (theoretically) domestic questions of stabilizing currencies and balancing budgets (see FRANCE; ITALY; GREAT BRITAIN, etc.), and to the great central issue of arbitration, security, and disarmament (see LEAGUE OF NATIONS; UNITED STATES, etc.). Allied nations, creditors of Germany, felt the shoe on the other foot in adjusting their enormous obligations to the United States government and much ill-will and resentment were engendered. Nevertheless, following the lead of Great Britain, which had signed a debt settlement agreement with the United States on June 19, 1923, the other countries were brought by inexorable circumstances to the same course of action, viz., Finland May 1, 1923; Hungary, Apr. 25, 1924; Lithuania, Sept. 22, 1924; Poland, Nov. 14, 1924; Belgium, Aug. 18, 1925; Latvia, Sept. 24, 1925; Czechoslovakia, Oct. 13, 1925; Estonia, Oct. 28, 1925; Rumania, Dec. 4, 1925; Italy, Nov. 14, 1925; France, Apr. 29, 1926 (not ratified by French Parliament until July 26, 1929); Jugoslavia, May 3, 1926; etc.

All of these agreements, though providing for nominal repayment of principal in full, arranged for appreciable reductions in the rate of interest, thus having the effect of partial cancellations, varying from 19.3 per cent in the case of Finland, and 19.7 in the case of Great Britain, to 52.8 per cent for France, 53.5 per cent for Belgium, 69.7 per cent for Jugoslavia, and, highest of all, 75.4 per cent for Italy. Great Britain, however, though a debtor to the United States, was a creditor to other countries yet pledged by the Balfour note of Aug. 1, 1922, to collect no more from Germany and the Allies than should be necessary to meet the obligations to the United States. She negotiated settlements as follows: with Soviet Russia initiated Aug. 8, 1924; but never ratified; with Italy, Jan. 27, 1926; with France, July 12, 1926. The British-Italian agreement in effect wrote off all interest obligations together with 27 per cent of the principal. The Franco-British arrangement provided for repayment of the entire principal and funded accrued interest, but reduced the interest rate to less than 1 per cent, thus in effect cancelling a substantial portion of the French obligation.

France was particularly unlucky, however, in that she was the greatest sufferer from Soviet Russia's debt repudiation policy (see RUSSIA), since her holdings of the Russian pre-war debt had aggregated no less than two-thirds of the total, with lesser amounts due to Great Britain, Germany, Belgium, and the United States. During the World War, Russia had doubled her foreign indebtedness, borrowing 5,375,000,000 rubles from Great Britain, 1,492,000 from France, and 553,000,000 from the United States. The Soviet government's inability and unwillingness to shoulder these debts coupled with its eagerness to secure additional credits from abroad conditioned, almost as much as communist propaganda, Russia's entire diplomatic relations with the great capitalistic states of the world. After all, nearly seven billion dollars, exclusive of unpaid interest, was a prodigious sum.

The most amazing aspect of the whole situation was the consistent policy of the United States government in refusing officially to recognize or acknowledge in any shape or fashion that any connection whatever subsisted between the reparation problem and the problem of inter-Allied indebtedness, though the basic principle of capacity to pay was generally applied by the Washington authorities, as has been demonstrated above. Since in the last analysis no effective payments could be made either by Germany on reparations account or by other countries on debt-settlement account except by developing an excess of exports over imports, the high-tariff system of the United States and to a correlative extent of other countries (in their creditor capacity) was an important factor. This situation resulted in the promulgation (Oct. 20, 1926) of a manifesto signed by leading bankers and industrialists of 16 countries including the United States (e.g., J. P. Morgan) appealing to the nations of Europe to tear down the barriers created by tariffs, special licenses, prohibitions, and other commerce to flow in its natural channel unimpeded. But needless to say, these and other pleas had no effect on the Republican Administration of the United States.

Reverting to the Dawes Plan, it is necessary to comprehend that although on the surface it worked satisfactorily during the first five years of its operation, certain factors rendered it extremely doubtful whether continued smooth running could be expected. In the first place, the German budget did not begin to feel the full strain until the reparation year commencing Sept. 1, 1928. The following table shows the development of sources of reparation payments up to the normal annuity, as provided in the Dawes Plan and London Agreement:

	Million gold marks
First year, 1925–1926	
From railways	200
From reparation loan	800
	1,000
Second year, 1925–1926	
From railways	595
From transport tax	250
From industries	125
From sale of preferred shares in railway company	250
	1,220
Third year, 1926–1927	
From railways	550
From transport tax	290
From industries	250
From ordinary budget resources	110
	1,200
Fourth year, 1927–1928	
From railways	660
From transport tax	290
From industries	300
From ordinary budget resources	500
	1,750
Fifth year, 1928–1929 [normal annuity thereafter]	
From railways	660
From transport tax	290
From industries	300
From ordinary budget resources	1,250
	2,500

The payments during the third and fourth year were originally subject to contingent addition or reduction not exceeding 250,000,000 gold marks, depending upon the total yield of the assigned customs and taxes; but this was changed by an agreement (Sept. 8, 1926) between the German government and the Reparation Commission whereby a single definitive payment of 300,000,000 gold marks was to be made in installments after Aug. 31, 1927, thus increasing the annuity of the third reparation year (1926–1927) to 1,500,000,000 gold marks.

Germany punctually met all her obligations under the Dawes Plan and owing to the large percentage of payment made through deliveries in kind and the Franco-British import levies no considerable transfer of cash had to be made as between Germany and other countries. On Dec. 13, 1925, S. Parker Gilbert, Agent-General for Reparation Payments, issued a voluminous report covering the first year of operation (Sept. 1, 1924–Aug. 31, 1925) under the new régime. Though recognizing that many difficulties remained to be overcome, Gilbert spoke optimistically of the maintenance of a balanced budget and a stable currency in Germany and of the restoration of German economy to a productive state. Payments and deliveries were moving regularly to the creditor powers, and the whole administration of the plan had gone forward on the basis of mutual faith and confidence. The Agent General's report to the Reparation Commission for the second year (1925–1926) was dated Nov. 30, 1926 (published December 5). Germany met nearly 54 per cent of her obligations by means of deliveries of material—one-third of which consisted of coal, coke, and lignite. With the smooth functioning of the plan, stated Gilbert, had occurred a notable change in the attitude regarding it: the German Nationalists who had opposed its adoption no longer indulging in the stinging criticism of it which was characteristic of the first year. Nevertheless, further progress depended upon unpredictable factors—not least upon developments external to Germany.

On October 20, 1927, Agent General Gilbert presented to the German government a memorandum (published November 6) in which he courteously but pointedly criticized certain features of Germany's financial policy. He charged that the German authorities instead of economizing were "developing and executing constantly enlarging programmes of expenditures and of borrowings," which not only jeopardized the fulfillment of the Dawes Plan but the whole economic structure of the Reich. Specifically, his main criticisms were: (1) Overloading and unbalancing the budgets with such items as pensions and increased salaries for government officials, compensation by German citizens whose property had been expropriated by foreign countries during the World War, and enlarged educational expenditures. (2) Increasing grants-in-aid made by the Federal treasury to the separate states and cities which had uncontrolled expenditures. (3) Undue expansion of credit by the Reichsbank leading to increasing costs of production and an excessive inflow of imports. (4) The adoption of financial measures tending to increase the cost of production and the cost of living. The German government replied in good temper asserting its intention of developing the productive resources of the Reich to full capacity, decrying any fear of an industrial or financial crisis, and defending itself in other respects. Nevertheless, the Gilbert memorandum, which was warmly endorsed by Dr. Schacht, president of the Reichsbank, dealt a devastating blow to the prestige of the Marx cabinet. See GERMANY.

The truth was that Gilbert was profoundly alarmed by the mounting volume of Germany's foreign loans. In all, between Sept. 1, 1924, and Aug. 1, 1927, Germany borrowed from abroad some $1,172,675,000 including loans to the Reich, to the states, to municipalities, public utility companies, private firms, and church organizations. Conservative estimates assigned fully 70 per cent of this total to American investments. In other words, Germany's borrowings from abroad during three years' operation of the Dawes Plan exceeded her reparation payments to the Allies by approximately $242,675,000. Dr. Schacht had already inaugurated a vigorous campaign to check the enormous inflow of foreign credits. Germany's international trade balance continued to be regularly adverse (e.g., about $1,000,000,000 for the year 1927).

In his third annual report to the Reparation Commission (published Dec. 16, 1927), Mr. Gilbert took occasion to reiterate his previous remonstrance regarding Germany's administration of her finances. Though milder in tone than his previous memorandum, it nevertheless sternly insisted that the Reich retrench its expenditures and reform its financial arrangements with the federated states. Germany, he stated, had loyally fulfilled her obligations under the Dawes Plan—paying in cash or in kind the annuity of 1,500,000,000 gold marks. Two features of the report attracted world-wide attention. In the first place, the Agent General flatly denied the thesis advanced by certain American bankers that foreign loans for German private enterprises took precedence over reparation payments. Secondly, he intimated that the Dawes Plan was not conceived as final, but was intended only to operate over a period sufficient to restore confidence. "For," said he in conclusion, "as time goes on and practical experience accumulates, it becomes always clearer that neither the reparation problem nor the other problems depending upon it will be finally solved until Germany has been given a definite task to perform on her own responsibility, without foreign supervision and without transfer protection." This, he asserted, was the principal lesson to be drawn from the three years' experience, and it should be constantly in the minds of all concerned as the execution of the plan continued to unfold. Many circles, including the French, interpreted these latter observations to mean that the Agent General regarded the review and revision of the whole reparation problem by international experts as essential as soon as the operation of the Dawes Plan should have been sufficiently tested to provide the necessary data.

During the summer of 1928 a truly remarkable change came over Premier Poincaré. Whether his long struggle for the financial salvation of France had acquainted his legalistic mind with the inexorable operation of economic forces or whether he was influenced by the more liberal views of his eminent colleagues, Briand and Herriot, it is difficult to say, but at any rate, he was apparently converted from his former intransigent attitude of demanding the last sou to the project of commercializing the German reparation obligations. Meanwhile, Germany began to press for the adjustment of the Rhineland and Saar Basin issues. Dr. Mueller, the new Chancellor, in his declaration of policy (July 3) to the recently elected Reichstag stressed Germany's desire for friendly understanding with foreign nations, her loyalty to the League of Nations, and her intention energetically to demand effective disarmament.

Referring to reparation, he praised the smooth working of the Dawes Plan, but asserted that conditions were ripe for a final settlement of the problem as foreseen by the experts. Germany stood ready to coöperate in every way. Developing discussion regarding the Rhineland question led to a special conference at Geneva, Sept. 11, 1928, attended by Chancellor Mueller of Germany, Lord Cushendun of Great Britain, Foreign Ministers Briand of France, Hymans of Belgium, Scialoja of Italy, and a Japanese representative, to work out preliminary plans. On September 16, an official communiqué announced that the conference had determined on: (1) the opening of official negotiations relating to the request put forward by the German Chancellor regarding the early evacuation of the Rhineland; (2) the necessity for a complete and definite settlement of the reparation problem, and for the constitution for this purpose of a committee of financial experts to be nominated by the six governments; and (3) the acceptance of the principle of the constitution of a committee of verification and cancellation. The composition, mode of operation, object and duration of the committee, to form the subject of negotiations between the governments concerned.

At last, the intolerable situation caused by the failure to determine the extent of Germany's obligations was recognized by the Allies. The palliative of the Dawes Plan had to be replaced by a sounder arrangement. France, for example, was hesitant to commit herself to ratification of her debt agreement with the United States (see above), because of her fear that the Dawes Plan might break down and German payments cease. Some $400,000,000 worth of war supplies purchased from America after the War had to be paid for by Aug. 1, 1929, if the Mellon-Bérenger pact (which provided for funding them with France's other indebtedness) should not be accepted by the French government. Britain stood square on the principle of the Balfour note of Aug. 1, 1922 (see above). The United States maintained its attitude of official unconcern, but its sanction would have to be sought should any plan be adopted for commercializing the industrial and railroad bonds of the Dawes régime, because the coöperation of Wall Street would be imperative.

During October, there was much hurrying to and from Europe of prominent leaders of international finance. On October 14, S. P. Gilbert, the Agent General for reparations payments, was in London discussing the situation with Prime Minister Baldwin, certain British financiers, and J. P. Morgan. Five days later, Winston Churchhill, British Chancellor of the Exchequer, and Mr. Gilbert met Premier Poincaré in Paris and subsequently held conferences with M. Moreau, Governor of the Bank of France, Sir William Tyrrell, the British Ambassador, and J. P. Morgan. On October 23, Gilbert was in Brussels lunching with Premier Jaspar and exchanging views with Foreign Minister Hymans and Finance Minister Houtart. On October 25, the Agent General was in Berlin conferring with Chancellor Mueller, Finance Minister Hilferding, Herr Curtius, the Minister of Commerce, and Dr. Schacht, president of the Reichsbank.

On October 27, the German government took the initiative, formally proposing through the ambassadors in Paris, London, Rome, Brussels, and Tokio the formation of the committee of independent experts envisaged by the Geneva Resolution of September 16. For obvious reasons, no invitation was extended to the American government, though the participation of American experts was contemplated. From this time until the final appointment of the experts in January, the various governments sparred for advantage, each trying to strengthen its own position. France, standing on the legality of the London Agreement of 1921 with its $33,000,000,000 obligations, interpreted the Dawes Plan as a moratorium and alleged that, since Germany was even more deeply involved, she had no right to request French evacuation of the Rhineland. Germany, on the other hand, regarding the London Settlement as political rather than economic in origin, argued that the Dawes Plan had superseded it, and since Germany had faithfully lived up to her obligations under this régime, she had the right to demand French withdrawal from the Rhineland. Germany, however, had been able to meet the ruinous burden of Dawes payments only by continued borrowing from abroad and since further credit might not be available, she was anxious for a settlement, but unwilling to surrender the protection of the Dawes transfer system except for a price.

Early in November, 1928, Great Britain served notice on France, Belgium, and Italy that she expected preferential treatment with respect to German payments to make up the difference between what she had paid America ($198,000,000) and what she had received from Germany and the three Allied States ($83,000,000). The French challenged Britain's claim, saying that her seizure of German property during the War was greater than the deficit she now alleged. The British withdrew from their position. In December, Stresemann returned from the League of Nations Council session at Lugano with assurances that as soon as the experts should have presented their report, the second zone of occupation on the Rhine would be evacuated, and that troops would be withdrawn from the third and last zone progressively with the commercialization of German reparations.

Substantial accord likewise was achieved as to points of procedure to be followed by the experts at their meeting and an agreement was reached to restrain the excessive flow of ultranationalistic domestic oratory that always had constituted such an impediment to successful negotiations. As if to create optimism regarding the hazardous and adventurous task of commercializing the German debt, Agent General Gilbert published (Dec. 28, 1928) his fourth annual report on the Dawes Plan stating that it had continued to operate successfully, that Germany had made all of her payments loyally and punctually and that the transfer system was in smooth running order.

Immediately thereafter, Mr. Gilbert visited the United States, presumably to help guide the selection and instruction of American experts, who then held extended conferences with President Coolidge and Secretaries Kellogg and Mellon. In the preliminary arrangements, Germany had insisted, in opposition to the French, that the delegates should not be bound by instructions from their respective governments. France gave way and it was solemnly announced that no instructions would be given. Nevertheless, in all of the countries involved, the governments stated both elaborately and definitely what their demands were to be. Each of the five Allied countries officially participating—namely, Belgium, Great Britain, France, Italy, and Japan—nominated two experts for appointment by the Reparation Commission; the German government appointed two experts; and the American experts were nominally appointed by the Reparation Commission conjointly with the German government but were really designated with the unofficial approval of the United States government. Each of the experts was empowered to appoint an alternate.

The membership of the committee embraced:

(a) Belgian experts—M. Émile Francqui, M. Camille Gutt; alternates, Baron Terlinden, M. H. Fabri.

(b) French experts—M. Émile Moreau, M. Jean Parmentier; alternates—M. C. Moret, M. Edgar Allix.

(c) German experts—Dr. Hjalmar Schacht, Dr. A. Vögler; alternates—Dr. S. Melchior, Dr. L. Kastl.

(d) British experts—Sir Josiah Stamp, Lord Revelstoke; alternates—Sir Charles Addis, Sir Basil Blackett.

(e) Italian experts—Dr. Alberta Pirelli, M. Fulvio Suvich; alternates—M. Giuseppe Bianchini, M. Bruno Dolcetta.

(f) Japanese experts—Kengo Mori, Takashi Aoki; alternates—Saburo Sonoda. Yasumune Matsui.

(g) American experts—Owen D. Young, J. P. Morgan; alternates—Thomas N. Perkins, T. W. Lamont.

On February 9, the experts met at the Bank of France to discuss matters of organization and procedure. Two days later, the first regular session was held at the Hotel George V, and Owen D. Young (the real author of the Dawes Report) was unanimously chosen chairman. Five other experts also had served in the Dawes Committee of 1924. The committee stayed in almost continuous session over a period of some 17 weeks. Subcommittees were set up as required for the study of particular questions and met frequently in the intervals between plenary sessions. On the whole, there was real negotiation. The German delegates were treated with deference rather than hostility and good feeling generally prevailed. Nevertheless, a serious divergence of interest and viewpoint between Germany and the creditor nations produced periodical and prolonged deadlocks in the deliberations. Frequently, it seemed as though the committee would have to adjourn and report failure. Only the patience, resourcefulness, and diplomacy of Chairman Young served to prevent a disruption of the conference. The outcome represented real sacrifice on each side.

The salient features of the reparation plan embodied in the Young Report of June 7, 1929, may be summarized as follows:

(1) *German Annuity Payments.* The agreement provided for payments by Germany extending over a period of approximately 58 years to the year 1988. During the first 37 years, to Mar. 31, 1936, the annual payments would amount to a constant sum of 1,988,800,000 gold marks plus interest and sinking fund charges on the Dawes Plan loan of 1924 which would gradually increase the annuities to more than 2,400,000,000 marks, or an annual average for the period of 2,051,000,000 marks ($488,138,000). Thereafter, the payments would average 1,650,000,000 marks annually for 18 years, and finally three years averaging slightly more than 900,000,000 marks. The present worth, or immediate cash value, of these scheduled annuities aggregated about 37,000,000,000 gold marks or approximately $9,000,000,000, a sweeping reduction from the 133,000,000,000 gold marks of the London "settlement" of 1921 and a substantial cut from the 44,000,000,000 marks of the Dawes Plan of 1924. All German government obligations arising from the War were to be covered by these payments—various miscellaneous treaty claims and counterclaims in connection with property rights to be wiped out.

(2) *Division of Receipts among Creditor Nations.* No essential modification was proposed. For the first 37 years, the proceeds were to be distributed as indicated in the following table (in annual averages):

	Marks	Dollars
France	1,046,500,000	249,067,000
Great Britain	409,000,000	97,342,000
Italy	213,700,000	50,860,600
Belgium	115,500,000	27,489,000
Jugoslavia	84,000,000	19,992,000
Rumania	20,100,000	4,783,800
Greece	7,000,000	1,666,000
Portugal	13,200,000	3,141,600
Japan	13,200,000	3,141,600
Poland	500,000	119,000
United States	66,500,000	15,827,000
Service of the Dawes Loan	61,800,000	14,708,400
Total	2,051,000,000	488,138,000

The American share consisted of 40,000,000 marks for mixed claims and 26,500,000 marks for meeting the costs of the Army of Occupation. After the 37 years shall have elapsed, the United States is to continue to receive annual instalments of 40,800,000 marks for 15 years longer.

(3) *Deliveries in Kind.* Payments in the form of direct shipments of goods to the creditor countries were to be reduced gradually from 750,000,000 marks to 300,000,000 and to close after 10 years. Thenceforward, unless special arrangements for continuing such direct payments should be voluntarily made by interested parties, all payments would have to be made in foreign exchange secured by Germany as a result of ordinary trade and financial transactions.

(4) *Two Types of Annuities—Unconditional and Postponable.* Annual installments due should be divided into two parts—660,000,000 gold marks to be an *unconditional* obligation of which France should receive 500,000,000 marks and the balance subject to postponement under certain conditions. The German government was accorded the right on giving three months' notice to suspend payments of any portion of the *conditional* obligations for not more than two years, but all such postponed payments were to remain unconditional ultimate obligations. This provision was merely designed to obviate temporary exchange difficulties, and not to permit any permanent scaling down of obligations if future economic developments should show Germany's capacity to pay to be less than had been anticipated.

(5) *Commercialization Provision.* The Young Plan made partial provision for the commercialization of German reparation obligations. The creditor governments, whenever they judged the conditions of the world investment markets to be opportune, might ask the German government to create bonds representing the whole or any part of the capitalized value of the 660,000,000 marks of annual unconditional payments, or a maximum of 11,000,000,000 marks of bonds. It was not contemplated with such a huge total should be floated in any one year and indeed it was regarded as possible that a substantial portion might never be used. This 11,000,000,000 marks of potential bonds was the exact equivalent of the railroad bonds deposited with the trustee appointed by the Reparation Commission under the Dawes Plan. Nevertheless, these marketable bonds were not hypothecations of railroad property but were to be the direct and unconditional obligation of the German government. The industrial debentures of the Dawes régime were not retained.

(6) *The International Bank.* By far the most interesting and constructive feature of the Young Report was the recommendation that an internationally organized and controlled bank should be established. The new bank was to provide the necessary machinery for administering reparation payments and offering additional protection against temporary foreign exchange difficulties. The capital stock of $100,000,000 was to be allocated with a view to enlisting the financial interest of the countries involved in the reparations agreement. The bank was to have a board of directors consisting of the governor, or chief executive officer, of the central bank of each participating country and an additional member appointed by each of the foregoing to represent the interest of finance and industry. (The governors of the Bank of France and the Reichsbank were each to be allowed an extra appointment). This group of directors would then select not more than nine additional directors from lists submitted by the various central-bank governors. Thus, the management of the system was to be thoroughly international in character. The International Bank was to have the following functions and powers: (a) It would replace the office of the agent general for reparation payments and would receive all payments from Germany and make the necessary disbursements to the various creditor governments. (b) It might make loans to Germany to meet temporary emergencies and invest funds, temporarily undisbursed, within Germany. (c) It might facilitate payments in kind by short-term loans to purchasers of such commodity deliveries. (d) It would have charge of the flotation of such bonds as might be commercialized. (e) With the aid of a special advisory committee, the bank would safeguard the interests of the creditor countries in the event that Germany should ask for a postponement of the conditional part of the annuities. (f) It might receive deposits from, and make loans to, the various central banks, and also buy and sell gold coin and foreign exchange. (g) It might buy and sell intermediate or long-term securities on its own account, and might issue its own obligations, long-term or short-term, secured or unsecured, for the purpose of relending the funds thus obtained to central banks. (h) It might make loans to facilitate trade expansion, not only for Germany but for the world generally, particularly by financing the construction of public works and industries in undeveloped regions. (i) Finally, the bank was expected to develop eventually into a world clearing house for central banks, thus eliminating the necessity of shipping gold in the settlement of international transactions.

(7) *Relation to Inter-Allied Debts.* Though as usual precluded from definite consideration of the relation between German reparations and inter-Allied debts by the official policy of the United States government in declaring them to be legally separate and distinct questions, the Young Committee in fact evolved a plan that tied them up together in realistic accordance with the fact that economically, if not diplomatically, they had always been inextricably connected. For one thing, the time period over which reparations payments were to be made coincided quite closely with that during which inter-Allied obligations were to be discharged. Moreover, the annuities of the respective schedules during later years closely approximated each other. Most significant of all, however, was a special memorandum signed concurrently with the Young Report proper by the experts of France, Great Britain, Italy, Belgium, and Germany, recommending that if reparation creditor countries received any future relief in their out payments (i.e., their inter-Allied debt obligations), Germany should be granted a reduction equal to two-thirds the amount thereof during the first 37-year period and equal to the whole amount during the last 22 years. Should America ever consent to modify her debt settlement agreements, a substantial benefit therefrom would be passed on to Germany by her creditors. Without this possibility of ultimate relief, it is extremely doubtful whether the German experts would have consented to sign the Young Reparation Report.

This was a far cry from the fantastic and extravagant claims and proposals of 1918–19. The vindication of the courageous John Maynard Keynes and the few other far-sighted economists of the Paris Peace Conference could not have been greater. Whether the statesmanlike programme outlined by the Young Committee would be accepted by the governments concerned remained to be seen. Though American citizens had contributed greatly to the formulation of the plan and would doubtless participate in the future management of the new international financial system if adopted, the United States government officially maintained its attitude of aloofness, presumably being content as in other similar undertakings to accept the benefits without assuming any formal obligation. Upon Briand, who after the ratification of the Franco-

American debt settlement succeeded Poincaré as Premier of France on July 28, 1929, Stresemann, the long-tried Foreign Minister of Germany, and MacDonald, the more recently reinstated Labor Prime Minister of Great Britain, would rest primary responsibility for overcoming divergencies of national interest and principles to assure its success. With reparations and inter-Allied debts in a fair way to ultimate liquidation, attention might then be concentrated upon invigorating the League of Nations and seeking a solution of the fundamental human problem of promoting and attaining the realization of international arbitration, security, and disarmament.

Bibliography. The following list gives the more important of the works covering the subject of reparations: R. S. Baker, *Woodrow Wilson and World Settlement*, 3 vols. (Garden City, N. Y., 1922); Carl Bergman, *The History of Reparations* (London, 1927); E. M. House and C. Scymour, editors, *What Really Happened at Paris* (1921); C. P. Howland, *American Foreign Relations, 1928* (New Haven, 1928); J. M. Keynes, *The Economic Consequences of Peace* (New York, 1920); and *The Revision of the Treaty* (New York, 1922); H. G. Moulton, *The Reparation Plan of the Dawes Committee* (New York, 1924); and Moulton and C. E. McGuire, *Germany's Capacity to Pay* (New York, 1923). For text of the Young Plan adopted by the Experts Committee on Reparations, see *Current History*, vol. xxx, no. 4, July, 1929, p. 724 et seq. See also Robert R. Knczynski, *American Loans to Germany* (New York, 1927); H. G. Moulton and Leo Pasvolsky, *World War Debt Settlements* (New York, 1926); and Max Sering, *Germany under the Dawes Plan* (London, 1929), which is politically biased but offering a sound and brilliant economic analysis.

RESEARCH COUNCIL, NATIONAL. A scientific organization established in 1916 by the National Academy of Sciences at the request of the President of the United States and continued under the charter of the Academy by an executive order of the President in 1918. Its purpose is the encouragement of scientific research and the dissemination of scientific knowledge for the benefit of the national strength and wellbeing. It is organized in 12 divisions, arranged in two groups, one of which comprises seven divisions of science and technology, the other comprising five divisions of general relations as follows: State relations; educational relations; foreign relations; government relations; and research information. The council has the formal recognition and coöperation of 75 major scientific and technical societies throughout the United States, and its membership is composed largely of appointed representatives of these societies.

Since the close of the World War, financial support has been derived from a gift of $5,000,000 from the Carnegie Corporation of New York to the National Academy of Sciences and from gifts from various individuals and industrial concerns and from the Rockefeller Foundation, the General Education Board, International Education Board, Laura Spelman Rockefeller Memorial, and Commonwealth Fund. Part of the appropriation from the Carnegie Corporation was used for the erection of a building for the joint use of the National Research Council and the Academy of Sciences located at B and 21st streets, N. W., Washington, D. C., completed in 1924. The council maintains two regular series of publications: *Bulletins*, of which 66 had been issued up to the end of 1928, and the *Reprint and Circular Series*, of which 86 had appeared; and in addition, miscellaneous publications and an *Annual Report*. The chairman of the council for 1928 was George K. Burgess; the permanent secretary, Dr. Vernon Kellogg.

RESERVES, ORGANIZED. See ARMIES AND ARMY ORGANIZATION.

RESERVOIRS. See DAMS; FLOODS AND FLOOD PROTECTION.

RESINS. See CHEMISTRY, APPLIED.

RESPIGHI, OTTORINO (1879–). An Italian composer, born at Bologna. He received his musical education there at the Liceo Musicale under F. Sarti (violin) and G. Martueci (composition) and was professor of composition there from 1913 to 1919. In 1919–25 he was director of the Liceo Santa Cecilia in Rome. In 1928 he made a tour of the United States as pianist and guest-conductor of several of the great symphony orchestras. His works comprise the operas, *Rè Enzo* (Bologna, 1905), *Semirâma* (ib., 1910), *Belfagor* (Milan, 1923); *La Campana Sommersa* (Hamburg, 1927; New York, 1928); a puppet play, *La Bella Dormente nel Bosco* (Rome, 1922); for orchestra, *Sinfonia Drammatica, Danza delle Gnomidi, Notturno, Burlesca*; two orchestral suites, *Rossiniana* and *Vetrate di Chiesa*; the symphonic poems, *Fontane di Roma, Pini di Roma, Festa Romana, Nerone*; *Concerto Gregorgiano*, for violin and orchestra; a piano concerto; *Toccata*, for piano and orchestra; a cantata, *Aretusa*; two string quartets; a violin sonata; and pieces for piano, for organ, and for violin. He brought out a critical edition of Monteverde's *Lamento d'Arianna.*

RETHBERG, ELISABETH (1894–). Stage name of Elisabeth Sättler, a German coloratura and dramatic soprano, born at Schwarzenberg, Saxony. She studied piano and singing at the Royal Conservatory in Dresden, and made her début in Johann Strauss's *Der Zigeunerbaron*, in 1911. In 1915 she became a member of the Royal Opera at Dresden, where she rapidly rose to prominence through her versatility and extraordinary vocal histrionic ability. She remained there until 1922, when she came to the Metropolitan Opera House, New York. Since her American début as Aida (November, 22), she has been one of the stars of first magnitude. In the summers of 1926 and 1927, she sang with the Ravinia Park Opera in Chicago. She also made extended concert tours throughout the United States. Richard Strauss chose her to create the title rôle in his latest opera entitled, *Die ägyptische Helena* (Dresden, June 6, 1928).

RÉUNION. An island possession of France in the Indian Ocean, 420 miles east of Madagascar. Area, 970 square miles; population (1926), 186,637, made up as follows: 180,694 of French origin, 628 British Indians, 1626 Chinese, and several hundred Africans and Arabians. Chief towns are St. Denis, the capital, 23,390 inhabitants; St. Pierre, 20,479; St. Paul, 21,643. Chief products are sugar, rum, coffee, manioc, tapioca, vanilla, and spices. Chief exports are sugar (50,122 metric tons in 1927) and rum (1,202,298 gallons). The advances made by the colony may be gauged from the following trade figures: exports for 1913 and 1927, 16,592,000 francs and 146,991,441 francs; imports for same years, 24,935,000 and 173,640,398. Chief imports are foodstuffs and cotton goods. The 1927 budget showed revenues of 51,799,299 francs and expenditures of 48,759,085 francs.

REUTER, roi'tĕr, Gabriele (1859–). A German novelist and essayist (see Vol. XIX). The success of her early novel, *Aus Guter Familie*, an eloquent plea for a broader life for the unmarried daughters of the German middle class, gave her a prominent rank among women writers of her country. She resided for some years in Switzerland, but later returned to Berlin and published *Das Neue Land* (1916); *Die Jugend einer Idealistin* (1917); *Die Herrin* (1918); *Grossstadtmädel* (1919); the autobiographical *Vom Kinde zum Menschen* (1921); *Benedikta* (1923); and *Töchter* (1926).

REVENTLOW, rā'vĕnt-lō, Ernst, Count (1869–). A German journalist (see Vol. XIX), who contributed largely to the war literature of his country. After 1924 he was a member of the Reichstag representing the National Socialist Labor Party, and editor of the weekly, *Der Reichswart*. Among his later works were: *Der Vampyr des Festlandes* (1914); *Heucheleien Britischer Minister* (1915); *Der Einfluss der Seemacht im Grossen Kriege* (1917); *Die Politische Vorgeschichte des Grossen Krieges* (1918); *Das Diplomatische Vorspiel des Grossen Krieges* (1920); *Grundlinien einer deutschen Aussenpolitik* (1928); and *Monarchie?* (1928).

REVERSION. See Heredity.

REY, Abel (1873–). A French professor of philosophy, born at Chalon-sur-Saône, and educated at the Sorbonne. He taught philosophy at the lycées of Bourget and Beauvais, with the faculty of letters of the University of Dijon, and finally at Paris. He was best known as a philosopher of natural science and as the author of *La Théorie de la physique chez les physiciens contemporains et le mécanisme* (1907). His other works include *Leçons de psychologie et de philosophie; La Philosophie moderne* (1908); *Les Sciences philosophiques, leur état actuel*, and *Le retour éternel et la philosophie de la physique* (1927).

REYMONT, Ladislas Stanislaw (1868–1925). A Polish novelist, born in Kobjelie Wielkie, Russian Poland, who died at Warsaw. He received the Nobel Prize for literature in 1924, presumably for his four-volume work *The Peasants* (1904–10). His other works, with their German titles, include *Das gelobte Land* (1898); *Vor Sonnenaufgang* (1902); *Der Letzte polnische Reichstag* (1917), and *Ges. Werke* (7 vols., 1919–22).

REYNOLDS-STEPHENS, William (1862–). A British sculptor, born in Detroit, Mich., of British parents, and educated at Blackheath, England, in Germany, and at the Royal Academy School. He has exhibited at the Royal Academy each year since 1886 and in 1921–28 was president of the Royal Society of British Sculptors. His chief works are "The Scout in War"; "A Royal Game: Queen Elizabeth and Philip II," purchased by the Chantrey bequest for the National Collection; "Love's Coronet"; "Castles in the Air"; "Guinevere's Redeeming"; and various portrait statuettes. He also has painted "Love and Fate," "Summer," and other pictures, executed memorials to Sir William Q. Orchardson in St. Paul's Cathedral and Canon Brooke and others in Southwell Minster, and designed and executed the interior decorations for a number of churches.

RHENÉ-BATON (1879–). A French conductor and composer, born at Courseulles-sur-Mer in Calvados. Having studied piano with private teachers, he attended for two years the advanced class of C. de Bériot at the Paris Conservatoire and then studied composition as a private pupil of A. Gédalge. After one year as chorus-master at the Opéra Comique, he became conductor of the Concerts Populaires d'Angers, then of the Concerts Durand, and later of the Société Sainte-Cécile at Bordeaux. He directed the concerts at the Kursaal in Scheveningen in 1914–19 and in 1919 became conductor of the Concerts Pasdeloup in Paris. In 1910 he conducted a festival of French music in Munich and in 1915 a similar festival in Rome. In the spring of 1914, he was conductor of a season of Russian opera in London. His compositions include *Variations* for piano and orchestra; the orchestral works *Prélude et Fugue*, *Menuet pour Monsieur*, and *Frère du Roy*; a suite, *Fresques Antiques*; a violin sonata; and interesting piano pieces and songs. A ballet and an opera were still in manuscript and not yet produced in 1929.

RHENISH REPUBLIC. See Germany; Rhineland.

RHINELAND. The French policy at the Peace Conference, as represented by Premier Clémenceau and Marshal Foch, was to make the Rhine the western frontier of Germany and either to annex the left bank of the Rhine, i.e., the greater part of the Prussian Rhine Province, all of the Rhenish Palatinate, and part of Hesse-Darmstadt, or to set up this territory as a nominally independent but actually French-controlled republic, on the ground that such action was essential to the safety of France and Belgium. When this plan was wrecked by the opposition of Premier Lloyd George and President Wilson, a compromise was arranged whereby the left bank of the Rhine was to be occupied for 15 years by the Allied Powers; evacuation on the expiration of this term was to be dependent on two conditions, the complete fulfillment of the treaty by Germany, and the agreement among the Allies that "the guarantees against unprovoked aggression by Germany are considered sufficient by the Allied and Associated Powers." That these two clauses nullified the 15-year provision and left it to France's discretion to decide when the occupation should terminate has been sufficiently demonstrated by the declarations of the successive French governments that France did not consider the 15-year provision as having begun to go into operation. See historical sections of France and Germany; Reparations.

RHODE ISLAND. The forty-eighth State in size (1248 square miles) and the thirty-eighth in population; capital, Providence. The population increased from 542,610 in 1910 to 604,397 in 1920, a gain of 11.4 per cent; estimated population, 1928, 716,000. The white population increased from 532,492 (1910) to 593,980 (1920); Negro, from 9529 to 10,036; native white, from 354,467 to 420,481. Foreign-born whites decreased in number from 179,025 to 173,499. The urban population mounted from 524,654 to 589,180, while the rural decreased from 17,956 to 15,217. The growth of the principal cities was as follows: Providence (q.v.), from 224,326 in 1910 to 237,595 in 1920; Pawtucket, 51,622 to 64,248; Woonsocket, 38,125 to 43,396; Newport, 27,149 to 30,255.

Agriculture. Rhode Island, in common with most of the Eastern States, has undergone a considerable decrease in all phases of agriculture. The number of farms decreased 22.8 per cent, or from 5292 in 1910 to 4083 in 1920, and fell farther to 3911 in 1925; the total acreage in farms decreased from 443,308 (1910) to 331,600 (1920) and 309,013 (1925). The improved land in farms totaled 132,855 in 1920. The percentage of the total land area used for agricultural purposes decreased from 64.9 in 1910 to 48.6 in 1920 and 45.3 in 1925. The total value of farm property rose from $32,990,739 in 1910 to $33,636,766 in 1920, and was $33,446,425 in 1925; the average value per farm rose materially from $6234 in 1910 to $8238 in 1920, and farther, to $8552 in 1925. In interpreting these values, the inflation of currency incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 3263 were operated by owners; 176, by managers; and 472, by tenants. The corresponding figures for 1910 were 4087, 251, and 954. White farmers in 1920 numbered 4063, of whom 3123 were native and 940 were foreign born. There were 19 Negro farmers and one Indian farmer in 1920. Farms reported as under mortgage numbered 949 in 1920; 946 in 1925. There were 24,914 dairy cows in 1920; 21,961 in 1925; "beef" cows numbered 1001 in 1920; 143 in 1925; sheep, 2736 in 1920; 1897 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 390,000 bushels; potatoes, 244,000; apples, 230,000; and hay, 69,000 tons. Comparative figures for 1913 are corn, 402,000 bushels; potatoes, 650,000; hay, 68,000 tons.

Manufactures. Although one of the smallest States in area and population, Rhode Island is important industrially. There were 11 cities with more than 10,000 inhabitants in 1920 and these formed 83 per cent of the total population of the State. They reported 82.7 per cent of the value of the State's manufactured products in 1919. There were 1951 manufacturing establishments in the State in 1909; 2466 in 1919; 1595 in 1925; and 1497 in 1927. Wage earners in manufactories numbered 139,665 in 1919; 120,346 in 1925; and 120,009 in 1927. Capital invested amounted to $290,901,270 in 1909 and $594,337,448 in 1919. The value of the products was $280,343,797 in 1909; $747,322,858 in 1919; $621,919,637 in 1925; and $592,232,647 in 1927. The increase in the value of products evidenced in 1919 was partly due to changes in industrial conditions brought about by the World War; but there has been a substantial growth in the manufacturing activities of the State. A leading industry is the manufacture of cotton goods. This produced $50,313,000 in 1909; $177,423,000 in 1919; $128,526,645 in 1925; $90,053,620 in 1927. The manufacture of woolen and worsted goods produced $74,600,000 in 1909; $175,312,000 in 1919; $146,645,564 in 1925; $137,566,176 in 1927. The manufacture of jewelry amounted to $20,685,000 in 1909; to $21,522,000 in 1914; to $48,596,000 in 1919; and to $35,451,319 in 1927. The principal manufacturing cities are Providence, Pawtucket, and Woonsocket. There were 1080 manufacturing establishments in Providence in 1909, with a product valued at $120,241,000; 1274 in 1919, with $267,629,000; products in 1925 attained $212,118,000. Pawtucket had 217 manufacturing establishments in 1909, with products valued at $37,696,000; 235 in 1914, with $42,029,000; and 284 in 1919, with $135,518,000 Similar figures for Woonsocket are 130 in 1909, with $28,219,000; 157 in 1914, with $28,115,000; and 190 in 1919, with $93,647,000. Other important manufacturing cities are Newport, Central Falls, Cranston, Cumberland, and East Providence.

Education. Educational progress in Rhode Island has been well sustained. The public-school system includes elementary and secondary schools, established, maintained, and supported by towns and cities; and two colleges, Rhode Island State College, supported by the Federal government and by the State, and Rhode Island College of Education, the principal function of which is the training of teachers. The State also provides free State scholarships for vocational courses at the Rhode Island School of Design and the Rhode Island College of Pharmacy, and for teachers' training in the Graduate Department of Education at Brown University. Nearly 90 per cent of Rhode Island teachers are normal-school or college graduates, and many of the teachers are enrolled in summer schools or extension courses. The State maintains a pension system for teachers, to which all employed in public education are eligible. Progress has been effected in the establishment of evening schools maintained by towns and cities. Vocational instruction in these schools had an intensive development, the work being very closely related to the predominant State industries. The total enrollment in public schools in the academic year 1925–26 was 111,428; of this total, the kindergarten and elementary grades furnished 96,486 and the secondary grades, 14,942. The percentage of illiteracy in the State decreased from 9.2 in 1910 to 8.2 in 1920; among the native white population from 0.9 to 0.6; among the foreign-born white, from 18.1 to 17.5. Among the Negroes illiteracy increased from 11.4 to 12.5 per cent.

Finance. State expenditures in the year ended Nov. 30, 1928, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $6,538,951 (of which $470,472 was aid to local education); for conducting public-service enterprises, $17,036; for interest on debt, $861,985; for permanent improvements, $5,615,826; total, $13,033,798 (of which $4,099,746 was for highways, $850,535 being for maintenance and $3,249,211 for construction). Revenues were $11,573,300. Of this, property and special taxes formed 43.3 per cent; departmental earnings and charges for officials' services, 5.1 per cent; sales of licenses and taxation of gasoline, 40 per cent. Property valuation was $1,344,544,741; State taxation thereon, $1,613,454. Net State funded debt on Nov. 30, 1928, was $21,874,000.

Political and Other Events. In 1914 R. L. Beeckman, Republican, was elected governor, and was reëlected in 1916 and 1918. The Democrats elected a Representative to Congress in one district and the Republicans in two. Charge of corruption and bribery in this election were made and investigations were carried on in 1915 by the Federal Department of Justice. Peter G. Gerry, Democrat, was elected United States Senator in 1916 and reëlected in 1922. For President, in 1916, Hughes received 44,858 votes; Wilson, 40,394 votes. In 1918 the Republicans reëlected Senator LeBaron B. Colt, together with the entire State ticket, and the three Representatives in Congress. The Republicans elected the governor, Emery J. San Souci, and the other State officers in 1920. Harding, for President, received 107,463 votes; Cox, 55,062. In 1922 the Democrats made almost a clean sweep of State offices; William S. Flynn was elected governor. In 1924 and 1926 Aram J. Pothier, Democrat, was elected governor and died in office Feb. 4, 1928, Norman S. Case succeeding. In 1924 the presidential vote was: Coolidge, 125,286; Davis, 76,606. In 1928, it was: Smith, 118,973; Hoover, 117,522. Case was reëlected governor by the Republican vote in 1928, and Felix Hebert, Republican, was elected United States Senator.

Legislation. The Legislature of 1916 authorized the organization of coöperative agricultural associations. The laws relating to taxation were amended and so were the banking laws. In 1919 the Legislature amended the corporation-franchise tax. It changed the title, Commissioner of Industrial Statistics, to Commissioner of Labor and made provisions for a State Board of Labor. It passed measures for protection against anarchy and incitement to violence. The workmen's-compensation law of 1912 was amended. In 1920 the Legislature revised the State corporation law and authorized a soldiers' bonus; in 1921 it amended the corporation laws and the laws relating to the administration of the State, provided for vocational rehabilitation, made appropriations for the aid of discharged soldiers and sailors out of employment, debarred women from serving on juries, increased the benefits to employees under the workmen's-compensation law, adopted "blue sky" laws, and made all women subject to the poll tax of $1 per annum. A prohibition enforcement act was passed in 1922. The Legislature of 1923 regulated the sale of coal, created a system of mothers' pensions, amended the child-labor laws, and passed a measure forbidding anonymous campaign publications. In 1924 the Legislature was deadlocked because of a filibuster by Senate Democrats. Republican members absented themselves and so prevented a Senate quorum. The filibuster was designed to compel submission to a proposal to hold a convention to revise Senate apportionment as provided in the State constitution. Republicans had a Senate majority in 1925, but in 1926 amendment resolutions were passed to increase the numbers of State Senators from Providence and other centres and to abolish the property qualification for voting in the cities.

RHODES. See DODECANESE.

RHODESIA, NORTHERN. A British African protectorate, under the administration of the British South African Company until 1924. It has an area of 287,950 square miles and an estimated native population of 1,237,486. Whites in 1927 numbered 7275 (in 1911, 1947). The leading activities are stock raising, cereal culture, and lead mining. The mineral production in 1927 was valued at £360,337. Exports in 1927 were £777,890, as compared with £107,000 in 1911. Imports in 1927 were £2,030,599, chiefly from the United Kingdom, Southern Rhodesia, and the Union of South Africa. Revenues increased from £116,000 in 1911–12 to £474,683 in 1927–28; expenditures from £190,000 to £518,666. On Apr. 1, 1924, the protectorate was taken over by the British authorities and the typical government of a crown colony was established, in which a governor, executive council, and legislative council exercised appropriate functions.

RHODESIA, SOUTHERN. A British South African protectorate, up to 1923 under the administration of the British South Africa Company, but since then a self-governing colony under the British Crown. It has an area of 149,000 square miles and a native population of 950,638 (in 1927). Europeans numbered 41,624 in 1926 against 2912 in 1911. Chief towns, with white populations in 1926: Salisbury (7324), Bulawayo (8251), Gwelo (1148), Umtali (1874). Minerals continue to occupy the most important place in the colony's economic scheme. The gold yield in 1927 was valued at £2,458,862. Silver in 1927 yielded £20,234; coal, £324,511; copper, £109,343; chrome ore, £337,317; asbestos, £766,381. The total 1927 mineral output was valued at £4,238,257. To the end of 1925, total gold output was valued at £63,001,374. Agriculture is flourishing with 267,400 acres under maize in 1927. Tobacco and fruit orchards are being developed. In 1920 an important dam capable of holding 4,000,000,000 gallons, was completed across the Mazoe River. Cattle raising was taken up by the Europeans during the period 1912–22 and by 1920 their herds outnumbered the native stocks. Exports in 1925 were valued at £7,444,000, as compared with £2,812,000 in 1910. Leading exports are gold, copper, asbestos, chrome ore, tobacco, live stock. Imports in 1927 were valued at £7,574,000, as compared with £2,786,000 in 1910. Most of the imports come from the United Kingdom and the Union of South Africa. For administrative purposes, revenues were £773,000 in 1910–11, and in 1926–27, £2,009,600; expenditures £2,633,100. The net amount of the public debt outstanding Mar. 31, 1928, was £4,095,000. There were 2462 miles of railways at the end of 1927.

History. Before the Crown took over the territory, the British South Africa Company's sovereignty was continually challenged by the white settlers. The company was compelled to enlarge the number of elective members of the Legislative Council, so that by 1922, 13 members were being elected and 6 appointed by the company. Two bodies of opinion arose out of the World War, one favoring incorporation in the Union of South Africa, and the other self-government under the Crown. The latter was victorious in the general election of 1920 and was reaffirmed by the voters in a referendum held in October, 1922. Union with South Africa was rejected principally because of the ascendency of the Dutch Nationalists in the Union, the Rhodesians fearing submergence at the hands of a non-British population. One of the leading points of contention during the period was the ownership of the unalienated lands. In 1918 possession of these lands was denied the South Africa Company, although it was admitted the company had to be compensated for the deficits it had met in the territory's expenditures. In 1920 a commission fixed this at some £4,000,000 for Southern Rhodesia. In Northern Rhodesia, the deficit was about £1,250,000. The Company, however, was recognized in its exclusive rights to the mineral lands. On July 28, 1923, the rule of the chartered company terminated when the Legislative Council sat for the last time and the company's claims were settled. On Sept. 12, 1923, it was announced that Southern Rhodesia's status was that of a self-governing colony and on October 1, a new form of government established under a governor assisted by an executive council and a legislature. In

July, 1928, the franchise was extended to all British subjects over 21 years of age and to married women.

RHODES SCHOLARS. See Universities and Colleges.

RHONDDA, David Alfred Thomas, First Viscount (1856–1918). British colliery owner and food controller in the World War, born in Aberdare, Wales, and educated at Caius College, Cambridge. Soon after leaving college (1880), he became prominent in the Welsh coal fields and in Liberal politics. He was elected to Parliament in 1888, and remained a member for 22 years. His sympathy with the miners made him a leader in industrial circles in South Wales. Shortly after the outbreak of the World War, he went to America to negotiate war contracts and later to systematize the munitions supply for the British government. In 1917, at Lloyd George's urgent request, he accepted the post of Food Controller, and administered that office with conspicuous success. He was created a viscount a month before his death.

RHÔNE CANAL. See Canals.

RICE, Elmer L. (1892–). An American playwright, born in New York City, who graduated *cum laude* from the New York Law School. He wrote, among other successful plays, *On Trial* (1914); *The Iron Cross* (1917); *For the Defense* (1919); *Wake Up Jonathan,* with Hatcher Hughes (1921); *It is the Law* (1922); *The Adding Machine* (1923); *Close Harmony* (1924); *Cock Robin* (1927); and *Street Scene,* which won the Pulitzer Prize for the best play of 1928. *The Adding Machine* is an expressionist play put on in New York by the Theatre Guild in 1923 and since produced throughout the United States and in Europe as well.

RICE INSTITUTE. A coeducational institution for higher education at Houston, Texas, founded in 1912. The enrollment increased from 384 students in 1914 to 1303 in the autumn of 1928, and the faculty from 40 members to 87. Eleven scholarships were endowed, and a resident lectureship in civics and philanthropy established in 1912 through private support. In 1920 and 1922, similar provision was made for annual lectureships in public affairs and music. The construction of a new chemistry laboratory to cost in excess of $600,000 was begun in 1923 and completed in 1925. The library contained about 70,000 volumes in 1928. President, Edgar Odell Lovett, Ph.D., LL.D.

RICHARDS, Theodore William (1868–1928). An American chemist (see Vol. XIX). In 1916 he became a member of the National Research Council and allied committees, and he served as consulting chemist to the War Department and Bureau of Mines in 1918. In recognition of his later achievements in chemistry, he was awarded the Nobel Prize in chemistry (1914), the Franklin Medal (1916), and the Lavoisier and Le Blanc Medal (1922). He became president of the American Chemical Society (1914), the American Association for the Advancement of Science (1917), and the American Academy of Arts and Sciences (1919–21). He was made an officer of the French Legion of Honor in 1925. In his later years, Professor Richards busied himself with the significance of changing atomic volumes, and of other effects of internal cohesive and chemical pressure. Thermochemistry and electrochemistry also occupied him increasingly. He wrote many papers on atomic weights and other subjects.

RICHARDSON, Ernest Gladstone (1874–). An American Methodist Episcopal bishop, born at St. Vincent in the West Indies, and educated at Dickinson College and Yale University. In 1896 he was ordained to the Methodist Episcopal ministry and was a pastor of churches in Wallingford, Conn., and New York City until 1920, when he was elected bishop. Bishop Richardson was trustee of Clark University and several other educational institutions.

RICHARDSON, Owen Willans (1879–). An English physicist (see Vol. XIX). He was Wheatstone professor of physics in King's College, University of London (1914–24), and director of research in physics there and Yarrow research professor of the Royal Society (1924–). He was awarded the Hughes Medal of the Royal Society in 1920, was president of Section A of the British Association in 1921, and president of the Physical Society in 1926–28. His later works include *The Emission of Electricity from Hot Bodies* (1916, 2d ed., 1921), and numerous articles on theoretical and experimental physics.

RICHET, rē'shā', Charles (1850–). A French physiologist (see Vol. XIX). Professor Richet published the following works after 1914: *War Nursing* (English trans., 1918); *L'Homme Stupide* (1919); *Traité de Physiologie Médico-chirurgicale,* with Charles Richet, Jr. (1921); *Traité de Métapsychique,* an important work on the occult (1922), translated into English as *Thirty Years of Psychical Research* (1923); *L'œuvre de Pasteur* (1923); *L'homme impuissant* (1926; English trans., 1928); *Histoire naturelle d'un savant* (also in English, 1927); *L'Intelligence et l'Homme* (1927).

RICHMOND. The capital and largest city of Virginia. The population rose from 130,833 in 1910 to 171,677 in 1920 and to 194,400 in 1928, by estimate of the U. S. Bureau of the Census. In 1919, by amendment of the city charter, the mayor, instead of the bicameral council, was authorized to appoint the heads of the following departments: public safety, public works, public welfare, and public utilities. The city controller and city attorney are elected by the voters. An advisory board was created and a city-planning commission appointed. In 1927 the United States Congress authorized a new survey of the James River which will result in deepening the 18-foot channel and eliminating several bends in the river, thereby reducing the distance to the sea by more than 10 miles. The city has pledged itself to an improvement programme which will cost more than $3,000,000 to match the congressional appropriation. The first unit of the new city wharf, costing approximately $100,000, has been completed.

Richmond is the leading industrial and financial centre of the South Atlantic States. In 1928, 32,900 persons were employed in its 621 industrial establishments and received $29,162,621 in wages; the value of products manufactured was $248,959,716. The manufacture of tobacco in all forms is the principal industry, while the city's large business in printing and publishing, slaughtering and meat packing, locomotives, steam railroad equipment repairs, woodenware products, paper and paper products, iron and steel goods, flour milling, baking powder, flavoring extracts, stoves, and fertilizers make strong claims for second-place ranking. As a financial centre, Richmond is the home of 32 financial organizations and the seat of the Federal

Reserve Bank of the fifth district. In 1927 the combined resources of its banks were $174,240,469; combined capital and surplus were $26,349,561; and total deposits were $136,316,327. Bank clearings increased from $420,000,000 in 1914 to $2,319,531,000 in 1928. The Federal Reserve Bank has resources of $225,000,000, cash reserves of $100,000,000, capital and surplus of $18,000,000, and reserve deposits of $75,000,000. The municipal airport consists of a 400-acre tract which has been developed into one of the finest fields in the United States. The Belt Line Bridge, 2278 feet long, was built over the James River in 1922 at a cost of $477,774. In 1926 a $3,000,000 flood sewer project was completed. The Acca Temple Mosque was erected in 1928 at a cost of $1,750,000. Its auditorium, with seating capactiy for 5000 persons, is used not only for activities of the Shrine but for grand opera and theatrical productions. A $3,000,000 John Marshall Hotel, a main public library, and a 26-story Central National Bank Building were under construction in 1929. The English colony, Windsor Farms, is Richmond's most interesting suburban development. Two of the houses were brought from England and were reconstructed stone by stone. Agecroft Hall was built originally near Manchester in 1393; and Virginia House, which eventually will become the home of the Virginia Historical Society, was originally the Priory at Warwick, built in 1565. In 1927 building permits to a value of $9,789,943 were issued in Richmond. The assessed valuation of property in 1928 was $263,162,741; the net debt was $27,010,203.

RICKENBACKER, Edward Vernon (1890–). An American aviator, born at Columbus, Ohio. He was for many years well known as an automobile racer and won many championships. In 1917 he went to France as a member of the motor-car staff of the Army and in the same year was transferred to the Air Service, with which he served for a time as engineering officer. He was appointed commanding officer of the 94th Aëro Pursuit Squadron, the first American unit active on the western front, and in this service, he destroyed 26 enemy planes. He was the first commanding officer to conduct his own squadron into Coblenz and at the end of the World War retired with the rank of major. He received the Distinguished Service Cross, the Croix de Guerre, and other decorations. Following his military career, he organized and was vice president, until 1928, of the Rickenbacker Motor Company. He wrote *Fighting the Flying Circus* (1919).

RICKERT, Heinrich (1863–). A German philosopher (see Vol. XIX). In 1916 he became professor of philosophy at the University of Heidelberg. His later works include *Die Philosophie des Lebens* (1920); *System der Philosophie* (1921); and *Kant als Philosoph der modernen Kultur* (1924). *Der Gegenstand der Erkenntnis* reached its sixth edition in 1928 as did a number of other earlier works.

RICKETS. Our knowledge of the nature of this affection has within recent years undergone many changes. To quote Dr. A. F. Hess of New York, more has been learned during this period than in the preceding 250 years. With the discovery of the fat-soluable vitamin, it was assumed that rickets was a deficiency disease due to the absence of this growth agent, but this view has been disproved in various ways. Nevertheless, it was probable that some growth agent is absent from the diet. Professor McCollum has isolated his so-called vitamin D, which he regards as the missing growth agent, and which is quite distinct from the fat-soluble vitamin. This principle appears to be concerned in the calcium and phosphorus metabolism, the irregularity of which is responsible for rickets.

For some time, the subject of diet receded in importance in favor of the benefits to be derived from sunshine and activity, although the D vitamin and food articles containing it are now regarded as essential. Of substances containing this vitamin, codliver oil had long been regarded as a valuable remedy in the prevention and cure of the disease, so that the discovery of the vitamin D may be said to have been anticipated in practice. Moreover, the benefits of actual sunlight may be duplicated by the artificial ultra-violet ray. Codliver oil has been reinforced by other lipoid-containing substances, especially ergosterol; but the most striking of all the discoveries in regard to rickets is the fact that when the ultra-violet ray is applied directly to foods containing lipoids, and notably to codliver oil, milk, ergosterol, etc., it apparently endows them with the properties possessed by vitamin D. These irradiated food substances have recently been tested in all parts of the world and, while the good results are not uniform, they are in many instances brilliant. In any case, the net result has been to simplify the treatment of the disease and depend largely on the use of irradiated food. See Food and Nutrition; Vitamins.

RIDDELL, George (Allardice), First Baron of Walton Heath (1865–). An English newspaper proprietor, formerly a solicitor. He was director of *News of the World*, *Country Life*, *Western Mail*, and of several corporations allied with the publishing business. He represented the British press at the Peace Conference from 1919 to 1922, at the Disarmament Conference in Washington (1921–22), and at the International Press Conference, Geneva, in 1927. He was made a knight in 1909 and a baron in 1920. He wrote *Some Things That Matter* (1922); *More Things That Matter* (1925); and *Dame Louisa Aldrich-Blake, M.S., M.D.* (1926).

RIDDLE, Oscar (1877–). An American zoölogist, born at Cincinnati, Ind., and educated at the University of Indiana and the University of Chicago. He taught in Porto Rico and St. Louis, was instructor at the University of Chicago (1908–10); investigator in Europe (1910–11); research associate of the Carnegie Institution (1912–15); and investigator at the Carnegie Station for Experimental Evolution (1914–). He prepared for publication the results of extended observations on the genetics of pigeons made by Professor Whitman and continued these researches especially along the line of the control of sex.

RIFF TRIBES. See Morocco, under *History.*

RIFLES. See Small Arms.

RIGA, Peace of. See Galicia; Poland; Russia; Vilna.

RIGBY, Sir Hugh (Mallinson) (1870–). A British surgeon, born in Dublin and educated in arts and medicine at Dulwich College, the University College, London, and the London Hospital. He rose to the post of senior surgeon to the London Hospital, of surgeon in ordinary to the Prince of Wales in 1923 and of sergeant-surgeon to King George V. in 1928. He served in France as a colonel during the

World War. For his services in connection with the King's serious illness during the winter of 1928–29, he was made a baronet.

RINDERPEST. See PHILIPPINES, *Agriculture;* VETERINARY MEDICINE.

RINEHART, MARY ROBERTS (1876–). An American novelist (see VOL. XX). Her later stories include: *Tish* (1916); *The Altar of Freedom* (1917); *Long Live the King!* (1917); *Bab, a Sub-Deb*; *The Amazing Interlude* (1918); *Dangerous Days* (1919); *More Tish* (1921); *The Breaking Point* (1922); *The Truce of God* (1922); *The Out Trail* (1923); *Temperamental People* (1924); *The Red Lamp* (1925); *Nomad's Land* (1926); *Tish Plays the Game* (1926); *Lost Ectasy* (1927); *Two Flights Up* (1928); and *The Romantics,* short stories (1929). She wrote a number of successful plays, including *Tish* (produced in Chicago, 1919); *Bab* (New York City, 1920); *Spanish Love* (produced by Maxine Elliott, 1920) and *The Bat,* both in collaboration with Avery Hopwood (New York City, 1920); and *The Breaking Point* (1923). She was appointed by President Hoover a member of the Public Lands Board in 1929.

RINGELNATZ, JOACHIM (1883–). A German writer and painter, who was born at Wurzen. He wrote *Kuttel Daddeldu* (1923); *Turngedichte* (1923); *Geheimes Kinderspielbuch* (1924); *Reisebriefe eines Artisten* (1927); *Allerdings* (1928); and an autobiographical novel, *Als Mariner im Krieg* (1928).

RIO DE ORO. A Spanish possession and protectorate on the northwest coast of Africa. Area, approximately 109,000 square miles; population, 100,000 natives (estimate) and 253 Europeans. The population is largely Berber and nomadic. Fishing is the chief economic resource. The budget for 1929 amounted to 6,947,274 pesetas. Villa Cisneros is the capital of the colony.

RIPLEY, WILLIAM ZEBINA (1867–). An American economist (see VOL. XX). He was made director of the Chicago, Rock Island and Pacific Railway (1917) and administrator of labor standards for the War Department (1918). He was chairman of the National Adjustment Commission of the United States Shipping Board (1919–20) and special examiner on consolidation of railways for the Interstate Commerce Commission (1920–23). He wrote *Main Street and Wall Street* (1927), a book which caused the revision of standards for non-stock voting trusts.

RIPON COLLEGE. A coeducational, undenominational institution at Ripon, Wis., founded in 1851. The enrollment increased from 249 in 1916 to 405 (exclusive of music students) in the autumn of 1928; the faculty increased from 22 to 28 members, and the library from 22,000 to 34,000 volumes. The endowment in 1928 amounted to $668,060, and the income for the year 1927–28 to $261,417. President, Silas Evans, LL.D., D.D.

RISLER, ÉDOUARD (1873–). A French pianist, born at Baden-Baden in Germany. In 1874 his parents settled in Paris, where he studied at the Conservatory under Diémer (piano) and Chabrier (composition), taking the first prize for piano in both the elementary and the advanced class. After further study under Klindworth, Stavenhagen, and d'Albert, he made a successful début in Paris (1894). He later toured all Europe. He made his first American tour in 1923–24. In 1906 he became a member of the Conseil Supérieur of the Paris Conservatoire. He is considered one of the greatest of contemporary pianists, a player in the grand style, withal very poetic, with a tremendous technic reverently subordinated to the requirements of artistic expression. His enormous repertoire enables him to give complete cycles of various composers' works (Beethoven, Bach, Chopin, Schumann).

RITCHIE, ALBERT CABELL (1876–). An American lawyer and public official, born at Richmond, Va., and educated at Johns Hopkins University and in law at the University of Maryland. In 1898 he began the practice of law in Baltimore. He was city solicitor (1903–10); assistant general counsel of the Public Service Commission of Baltimore (1910–13); Attorney General of the State (1916–20), and Governor (1920–31). From 1907 to 1920, he was also professor of law at the University of Maryland Law School. During the World War, he served for a time as general counsel for the War Industries Board. He was the author of *Municipal Condemnation in Maryland* (1904). Governor Ritchie wrote and spoke vigorously in opposition to national prohibition.

RITSCHEL, WILHELM (1864–). An American marine painter (see VOL. XX). He was elected a full member of the National Academy in 1914. He won a gold medal from the National Arts Club (1914) and a gold medal from the Panama-Pacific International Exposition (1915). During the next year, he was awarded the gold medal of the State Fair at Sacramento, Calif., and in 1918 the gold medal of the Philadelphia Art Club. In 1921 he won the Ranger Purchase Prize from the National Academy of Design and the Isidor Medal from the Salmagundi Club in 1923.

RIVERA Y ORBANEJA, MIGUEL PRIMO DE, MARQUIS DE ESTELLA (1870–). A Spanish general and dictator, born at Cadiz. He served in Cuba and the Philippines during the Spanish-American War, in Morocco (1909–13), as military governor of Cadiz (1915–17), resigning in the latter year on account of differences with the Government in regard to civilian controllers in the army, and in 1922 was military governor of Barcelona, where he took effective steps against the syndicalists. He organized army officers into a national committee of defense whose programme was to end the war in Morocco by the elimination of corruption and incompetency in the conduct of the campaign. In September, 1923, he overthrew the government, established himself as dictator and Prime Minister, and with the support of the King instituted widespread economic reforms and finally brought the campaign in Morocco to a victorious close in 1926. Recurrent conspiracies and revolts were put down without great difficulty, and on June 12, 1928, he announced his intention of remaining in office for at least two years more, pending the drafting of a new constitution. The new constitution, to replace that suspended in 1923, was presented to the National Assembly July 5, 1929, for examination. See SPAIN, under *History.*

RIVIÈRE, rē'vyâr', JACQUES (1886–1925). A French author and editor who was born in Bordeaux and educated at the Lycée Lakanal in Paris, and in philosophy at the Sorbonne. His early writing in *L'Occident* (1907) and *La Grande Revue* was mainly critical, and from 1909 to 1914, he was secretary of the *Nouvelle Revue Française* and a frequent contributor to it. During August, 1914, he was made a German prisoner, by 1917 his health was so broken that he was interned in Switzerland. In 1918 he was repatriated. From 1919 until his death from typhoid fever in 1925, he edited the *Nouvelle Revue Française* and made it the leading literary monthly of Paris. While in prison in Germany, he wrote *A la trace de Dieu* and *Aimée*, a novel. Besides the essays in *Études* (7th ed., 1924) and the *Nouvelle Revue Française*, he wrote *L'Allemand*, on German psychology. From 1926 to 1928, his correspondence with Alain-Fournier (his wife's brother, killed in August, 1914) was published in 4 vols. as *Jacques Rivière et Alain-Fournier*. Consult *Jeunes Maîtres, états d'âme d'aujourd'hui* by Paul Archambault (1926).

RIZA KHAN PAHLEVI (1877–). Shah of Persia since Oct. 31, 1925. The son of a farmer, he joined the army as a private at the age of 16, became commander-in-chief, and on Feb. 20, 1921, overthrew the existing ministry. His programme was Persia for the Persians, and the new cabinet, which he supported, refused to sign the Anglo-Persian agreement. Great Britain withdrew her troops and her financial adviser and in the next year Dr. A. C. Millspaugh, an American, became economic adviser (resigned in 1928). From Feb. 15 to Oct. 25, 1923, Riza Khan was War Minister, and on the latter date became also Premier and Minister of the Interior, retaining his command of the army, which was sympathetic with his aims. His suggestion of a republic being opposed, particularly by the priests, he resigned, but was shortly recalled by the Medjliss (Parliament). In February, 1925, he was given full power by the Medjliss, on October 31, the Shah was deposed and Riza Khan made Regent, and on December 13 the constituent assembly elected him hereditary Shah. He was crowned on Apr. 25, 1926. He unified Persia, and established order, regular and fair collection of taxes, and equal treatment for the various communities. Through his initiative, all foreign capitulations were abrogated on May 10, 1928. See PERSIA, under *History*.

ROADS AND PAVEMENTS. The roads of the world had a total length of nearly 6,600,000 miles in 1928, of which 3,600,000 were in the North, South, and Central Americas, nearly 2,000,000 in Europe, and over 1,000,000 in Asia, Australia, and the islands of the Pacific. Of 3,600,000 miles in the Western Hemisphere, over 3,000,000 were in the United States. These figures were obtained by a world-wide survey, conducted by the U. S. Departments of Commerce and State in 1927–28. (See "Highways of the World," with table, in *Commerce Reports*, Nov. 10, 1928.) The survey covered also the number of motor vehicles ("automotive vehicles" in the report). These totaled 31,600,000 for the world and averaged 4.81 per mile of road, while the number of persons to one motor vehicle averaged 60. The miles of road per square mile of area averaged less than 8. The accompanying table gives the exact figures and averages for the world, the five continents, and the 19 countries which had 40,000 miles of road or over. Annual revisions of the figures are promised.

In *Commerce Reports* for Dec. 12, 1928, a summary of the highways of the world by types of construction or surfacing was given, from which the accompanying table has been made up. In the original, the figures here summarized were given by countries; also a table showing by continents and for the world a more detailed classification by types, but with many gaps indicating no figures available. Next to water-bound macadam, in the world totals, stood Portland-cement concrete, 49,254 miles; then bituminous macadam, 25,877 miles; stone block, 25,818 miles; bituminous concrete, 9921 miles; asphalt, 7271 miles. These figures are stated to be misleading, as some countries with a large percentage of high-type road surfacing had no segregated figures.

United States. Most of the 3,000,000 miles of roads in the United States are in the jurisdiction of counties and rural towns and townships. An estimate put out by the Department of Agriculture in January, 1929, classed as local rural roads 2,750,000 of the 3,000,000 total (both round numbers) and placed 1,750,000 under townships and 1,000,000 under towns or townships. Of the 3006 counties in the 48 states, 67 (in New England) had nothing to do with roads; of the 2999 remaining, only 975 were credited with reasonably competent control over road construction and maintenance. The rapid increase in road construction by the several States since 1905, accelerated after 1916 by Federal contributions toward cost, have resulted in the creation of more or less efficient highway departments in every State of the Union, that being one of the conditions under which Federal aid is granted. Large as has been the expenditure for road improvement in the United States during the twentieth century, most of the 3,014,000 miles of highway were still primitive dirt roads in 1928, estimates by the U. S. Bureau of Roads classing only 590,000, or less than 20 per cent, as "improved." Of these, only 92,000 miles were hard-surfaced road, while 412,000 were covered with gravel or water-bound macadam, and 84,000 had sand-clay surfaces. Federal aid in State-road construction began with $5,000,000 for the fiscal year 1917 and was materially increased subsequently.

Expenditure of the Federal-aid money by the several States is subject to the approval of the U. S. Bureau of Public Roads acting for the Department of Agriculture. The Federal Aid Road Act of Nov. 9, 1921, requires each and every State receiving Federal aid to lay out, in conjunction with agents for the Federal government, a State-highway system which must be so planned as to provide for interstate connection. The Federal-aid roads in each State must not exceed 7 per cent of the total highway mileage

HIGHWAY MILEAGE OF THE WORLD[a]

	Whole World	America	Europe	Australia[b]	Asia	Africa
Earth, sand-clay, or gravel	5,564,783	3,405,562	1,337,467	320,912	313,641	187,201
Water-bound macadam	588,873	76,477	351,705	40,035	103,229	17,427
All other, including unspecified	428,345	92,692	286,865	45,927	1,587	1,274
Total	6,582,001	3,574,731	1,976,037	406,874	418,457	205,902

[a] Not including bridle paths, pack trails, etc., totaling 251,209 miles, with no reports from many countries.
[b] Including New Zealand, and islands in the Pacific.

ROAD MILEAGE AND NUMBER OF MOTOR VEHICLES BY CONTINENTS AND VARIOUS COUNTRIES

Figures taken from the article, "Highways of the World," in *Commerce Reports*, November, 1928, based on a survey by the U. S. Departments of Commerce and State. Only countries with 40,000 miles of roads here included; original table includes all the countries of the world. The figures do not include mileage of city streets.

Continent and country	Road mileage	Area (square miles) to 1 mile of road	Motor Total	Vehicles to 1 mile of road	Persons to 1 motor vehicle
World Total	6,582,001	7.69	31,617,615	4.81	59.91
The Americas	3,574,731	4.4	25,001,625	7	9.2
Europe	1,976,037	5.2	5,244,695	2.7	100.4
Asia	418,457	248.8	375,910	.89	2,642.3
Australia, New Zealand and Pacific Islands	406,874	8.1	717,585	1.76	12.8
Africa	205,902	48.1	277,800	1.35	493.2
United States	3,005,614	1.01	23,386,540	7.78	5.1
France	440,085	.48	1,114,000	2.5	36.1
Russia	430,265	10.2	25,833	0.06	5,690.9
Canada	424,014	9.	957,108	2.3	9.8
Australia	360,000	8.3	508,204	1.41	12.3
India	211,068	8.6	109,978	0.52	2,900.1
United Kingdom	178,737	0.49	1,856,700	10.4	23.8
Germany	128,242	1.42	861,000	6.8	73.4
Poland	116,174	1.28	25,000	0.22	1,153.3
Italy	113,581	1.05	212,100	1.87	191.2
Sweden	80,778	2.14	147,862	1.83	42.4
Japan	72,817	2.4	72,541	1.00	881.4
South Africa, Union of	63,038	6.3	133,000	1.96	53.1
Rumania	54,680	2.09	21,716	0.40	789.9
Spain	50,000	3.1	194,200	3.9	1.12
Brazil	46,933	70.0	136,800	2.91	223.9
Irish Free State	46,700	.57	44,587	.95	381.7
Czechoslovakia	44,600	1.22	63,490	1.4	226.1
New Zealand	44,307	2.36	169,390	3.6	8.0

of the State and upon these roads all Federal-aid apportionments must be expended. The State highway systems so laid out are divided into primary and secondary roads, the primary not to exceed three-sevenths of the total.

The Act of 1921 provided that the several States must certify the mileage of their highways, as of Nov. 1, 1921, which proved to be a total of 2,866,061 miles. After coördination by means of conferences between the Bureau of Public Roads and groups of adjacent States, the bureau named recommended a road map of the United States to the Secretary of Agriculture. This map was published Nov. 1, 1923, and included 168,881 miles, which by 1928 had been increased to 187,573. The monthly summary of the status of Federal-aid road construction for Dec. 31, 1928, showed 76,075 miles completed, 8163 miles in the initial stage of construction, and 1053 miles of existing improved roads being provided with a surface of higher type. The larger of the accompanying tables shows these mileages by States, as well as mileages approved for construction and cost figures.

Of the 71,074 miles of Federal-aid roads "completed" to June 30, 1928, only 35 per cent were hard surfaced, the remaining 65 per cent ranging from mere grading and draining to water-bound macadam. Mileages and percentages are shown by the accompanying table.

MILEAGE OF FEDERAL-AID ROADS IMPROVED AS OF JUNE 30, 1928, BY TYPES

(*Compiled by Bureau of Public Roads, U. S. Department of Agriculture*)

Graded and drained	10,611	15
Sand-clay	6,471	9
Gravel	27,698	39
Water-bound macadam	1,427	2
Bituminous macadam	4,317	6
Bituminous concrete	1,993	3
Portland-cement concrete	17,516	25
Brick	818	1
Bridges	223	..
	71,074	100

Large bond issues for State-road construction began in 1906, when New York State voted $50,000,000 for the purpose. Following the World War, authorization of large State road bond issues became increasingly common, running to $100,000,000 in Illinois in 1924 and in Iowa in 1928 (both subsequently held unconstitutional through defective drafting). At the close of 1927, 31 States had $860,000,000 of road bonds outstanding, according to the U. S. Department of Agriculture, while, on the same date, the outstanding county and township bonds totaled $1,386,000,000. The same authority gave the total income for road expenditure (including funds for maintenance) for the year 1927, according to the latest figures available, as $1,581,000,000. Of this, $740,000,000 (including $80,000,000 of Federal aid) was available for State-road work and $841,000,000 for county and township work. In origin, the $1,581,000,000 total was thus accounted for: Road tax (for county and township use only), $405,000,000; motor-vehicle tax, $300,000,000; bonds, $272,000,000; gasoline tax, $219,000,000; Federal aid (for State roads only), $80,000,000; source not given, $305,000,000. Users of the roads contributed $519,000,000 (motor-vehicle and gasoline taxes) or one-third of the total; road taxes about a fourth; bonds, about a sixth; Federal aid, a twentieth part, while a fifth was unaccounted for. In round numbers, nearly half of the county and township road fund ($405,000 of $841,000) came from road taxes, two-fifths from bonds; one-fifth from gasoline and motor vehicle fees; leaving two-fifths unaccounted for.

To the 78,096 miles of roads improved by Federal aid at the close of the fiscal year 1929, there should be added what has been done by the States without Federal aid. The U. S. Bureau of Public Roads concluded that the States had improved a larger mileage unaided than with Federal aid, so it may be assumed that between 150,000 and 160,000 of the 188,000 miles in the Federal-aid highway system had been improved to some degree. For the six fiscal years, 1923–28, Federal-aid funds "obligated" totaled $500,607, an average of $83,434,000.

In the Philippine Islands, the Bureau of Public Works (under the direction of the United States) reported 5630 miles of "improved" roads at the close of 1927, but this

STATUS OF FEDERAL-AID ROAD CONSTRUCTION, DEC. 31, 1928. COMPILED BY BUREAU OF PUBLIC ROADS, U. S. DEPARTMENT OF AGRICULTURE

State	Completed mileage	Under Construction					Approved for Construction					Balance of Federal-Aid funds available for new projects
		Estimated total cost	Federal aid allotted	Mileage Initial	Mileage Stage [a]	Mileage Total	Estimated total cost	Federal aid allotted	Mileage Initial	Mileage Stage [a]	Mileage Total	
Alabama	1,902.0	$3,245,575.94	$1,619,227.38	249.1	12.3	261.4	$936,130.03	$468,065.00	29.9	21.1	51.0	$2,519,324.79
Arizona	877.2	1,460,664.47	1,232,991.67	70.8	9.6	80.4	160,164.56	43,021.41		4.4	4.4	3,717,102.10
Arkansas	1,736.3	3,742,844.14	1,656,718.01	102.4	6.6	109.0	74,477.68	37,238.83	10.9		10.9	3,051,061.11
California	1,523.7	9,149,190.75	4,218,315.03	233.1	.6	233.7	1,752,374.93	903,973.32	71.6	.1	71.7	3,107,061.68
Colorado	1,063.7	3,461,340.88	1,863,064.20	156.8	15.0	171.8	321,702.70	180,559.84	17.3	.9	18.2	3,042,624.51
Connecticut	220.1	1,893,291.22	419,866.53	21.7		21.7	667,713.84	279,338.73	3.6		3.6	837,708.90
Delaware	205.3	534,288.82	255,507.30	15.7		15.7						460,890.72
Florida	429.5	2,783,853.47	1,232,677.16	110.7	5.5	116.2						2,066,457.57
Georgia	2,456.7	5,435,922.73	2,512,656.92	249.7	46.6	296.3	259,439.89	124,002.22	13.4	4.6	18.0	1,995,062.27
Idaho	1,077.2	1,836,484.93	1,096,040.57	128.5	10.8	139.3	70,186.67	41,816.95	3.8		3.8	1,001,180.03
Illinois	1,777.8	20,268,114.90	9,218,013.47	635.3		635.3	1,538,554.77	648,267.00	38.8		38.8	3,112,847.70
Indiana	1,243.6	5,832,583.76	2,786,312.46	175.2	3.5	178.7	997,285.77	432,728.13	32.5		32.5	1,959,718.95
Iowa	2,995.3	2,525,321.36	1,005,108.23	44.4	81.8	126.2	562,850.93	256,968.32	14.6	22.5	37.1	2,075,430.98
Kansas	2,344.6	6,262,048.53	2,521,985.75	369.4	16.3	385.7	546,597.76	180,516.90	39.2		39.2	2,138,351.92
Kentucky	1,258.6	4,934,089.81	2,214,736.98	219.6		219.6	789,026.85	325,213.41	47.3		47.3	1,425,692.86
Louisiana	1,281.2	4,681,926.40	2,332,944.70	193.2		193.2	103,055.30	25,000.00	.2		.2	1,209,402.36
Maine	466.3	2,245,679.85	749,696.01	52.9		52.9	192,121.39	93,601.55	8.9		8.9	1,452,991.86
Maryland	557.6	1,742,202.42	799,750.00	70.4	7.2	77.6						664,211.23
Massachusetts	567.7	2,827,192.55	897,122.74	49.4		49.4	738,843.93	190,800.00	12.8		12.8	2,410,618.43
Michigan	1,441.3	11,180,946.36	4,723,846.96	272.4		272.4	779,320.00	324,456.86	14.1	6.5	20.6	2,163,236.82
Minnesota	4,089.8	1,083,279.54	335,618.27	96.0	11.2	107.2	165,941.21	15,000.00	.1		.1	2,147,297.96
Mississippi	1,591.1	5,261,484.71	2,413,698.27	229.7	41.5	271.2	290,009.59	145,004.78	19.6		19.6	1,457,152.13
Missouri	2,280.2	7,657,880.05	2,885,886.21	167.5	48.3	215.8	1,465,671.69	635,888.93	43.7	17.0	60.7	1,816,318.71
Montana	1,518.1	3,239,591.90	1,981,891.64	241.4	13.4	254.8	716,003.35	376,464.83	79.6	.2	79.8	5,514,866.55
Nebraska	3,462.1	3,735,878.57	1,846,603.33	341.8	106.0	447.8	330,285.16	164,142.54	7.2	28.4	35.6	3,394,162.30
Nevada	1,002.3	1,281,390.29	1,115,874.66	141.7	69.4	211.1	181,620.00	161,341.93	34.5	1.6	36.1	1,084,980.62
New Hampshire	331.7	279,253.01	108,613.31	7.5		7.5						399,082.40
New Jersey	442.9	5,225,494.22	907,122.35	60.8		60.8	108,429.58	33,975.00	2.3		2.3	945,629.94
New Mexico	1,786.4	3,255,434.56	2,130,101.96	202.3		202.3	278,971.64	176,951.68	22.9	5.1	28.0	1,346,859.13
New York	2,034.0	28,763,300.00	6,340,585.89	422.2		422.2	1,890,931.43	383,205.00	25.6		25.6	6,981,245.33
North Carolina	1,666.3	1,999,428.22	1,014,875.43	87.0	11.2	98.2	509,931.33	251,075.56	14.4	7.2	21.6	1,889,148.08
North Dakota	3,678.0	2,794,228.69	1,209,991.02	419.5	94.5	514.0	882,876.79	301,186.37	151.7	112.8	264.5	1,239,607.96
Ohio	1,960.2	10,899,160.39	3,852,368.15	238.4	.1	238.5	3,997,080.00	1,167,745.00	55.1	9.8	64.9	3,548,848.06
Oklahoma	1,703.5	3,330,275.31	1,519,966.41	143.7	32.5	176.2	549,239.88	247,686.84	15.4	8.5	23.9	1,673,342.95
Oregon	1,132.5	549,965.57	322,322.32	31.9		31.9	108,443.50	67,484.39	.2		.2	2,344,038.92
Pennsylvania	1,995.6	13,140,034.43	3,504,428.43	211.1	14.1	225.1	1,708,007.20	567,923.88	35.2		35.2	3,633,166.51
Rhode Island	159.6	610,898.36	153,054.55	8.8		8.8	381,212.36	149,805.00	10.0		10.0	776,149.23
South Carolina	1,716.8	6,804,078.45	1,488,452.17	159.3	88.1	247.4	3,046.08	1,000.00	1.1		1.1	1,007,107.90
South Dakota	3,233.6	2,340,629.80	1,272,859.49	421.5	43.3	464.8	245,331.08	134,932.07	18.1	3.0	21.1	1,364,147.77
Tennessee	1,067.7	4,708,684.21	2,103,133.51	111.9	60.6	172.5	541,047.98	246,457.86		24.4	24.4	2,114,787.78
Texas	6,076.7	10,930,270.08	4,626,100.95	414.2	158.0	572.2	6,195,218.22	2,632,724.32	231.8	131.5	363.3	5,166,360.01
Utah	898.7	1,347,246.19	885,064.05	64.8	4.0	68.8	123,239.39	91,197.14	6.6		6.6	904,551.79
Vermont	228.9	965,465.68	288,777.15	20.5		20.5						409,935.95
Virginia	1,313.4	3,662,257.11	1,114,862.93	93.1	15.2	108.3	643,617.27	20,749.23	22.0		22.0	1,450,366.97
Washington	829.7	3,895,685.06	1,313,775.25	74.5	18.1	92.6	82,670.11	44,000.00	4.7		4.7	1,537,637.83
West Virginia	691.7	1,172,976.95	551,161.17	46.6	2.5	49.1	471,311.61	210,674.18	11.2	9.9	21.1	1,102,671.28
Wisconsin	2,107.6	4,121,355.56	1,796,925.96	124.0	4.9	128.9	74,197.72	37,088.00	6.1		6.1	3,180,757.66
Wyoming	1,610.7	1,374,164.03	844,966.46	159.2	.4	159.6						1,029,176.31
Hawaii	39.4	175,931.99	57,501.20	1.8		1.8						1,432,123.59
Totals	76,074.9	230,649,286.22	91,343,164.36	8,163.4	1,053.1	9,216.5	32,434,181.17	12,819,273.00	1,178.0	419.5	1,597.5	101,372,498.41

[a] The term stage construction refers to additional work done on projects previously improved with Federal-aid funds. In general, such additional work consists of a surface of a higher type than provided by the initial improvement.

included practically no asphaltic or Portland-cement concrete surfacing. Total road expenditures for 1927 were P.12,532,000 ($6,266,000), about equally divided between construction and maintenance.

Cuba. Early in 1927, contracts were let for a central highway extending the length of the island, from Pinar de Rio to Santiago, a distance of 707 miles. The roadway will be improved to a width of 20.66 feet with an American type of surfacing on a concrete base, with thickened outer edges. The contract prices totaled $76,000,000, divided between a Cuban and an American contractor.

Mexico. Through an engineer-official appointed by the Minister of Communications, there was announced in January, 1929, a $41,000,000 road-improvement programme for 1929–34, including a highway for motor vehicles extending from the United States to Guatamala. Funds were to be obtained from the existing gasoline tax of 4 cents per litre (about 8 cents per U. S. gal.) and an increase in the tobacco tax.

British Isles. The total mileage of "classified" roads and streets in England, Wales, and Scotland is given as 178,737 in *The Municipal Year Book*, 1928, of which 153,661 is credited to England and Wales and 25,076 to Scotland.

Materials and Design. The leading materials used in the construction of both rural improved-road surfaces and city pavements became increasingly alike with the growth of motor-vehicle traffic and the loads carried. A world-wide view would show that many large and important countries of the world still have practically nothing but dirt roads and rude trails.

In the cities of the United States and many other civilized countries, there is still a considerable percentage of dirt streets and much gravel or water-bound macadam surfacing, neither of these surfacings being fit to stand heavy traffic. For both rural highways and city streets, where macadam is still being put down, the water-bound macadam is being superseded by bituminous-bound surfacing. Portland-cement concrete in both country and city is being used more and more extensively for pavements and rural highway surfaces, with steel reinforcement under the heaviest loading in some cases; and there is a continuing increase in the use of Portland-cement concrete base or foundation for rural and city pavements, regardless of what material is used for the wearing surface. Brick surfacing is used quite extensively in some parts of the United States, for both rural roads and city streets, the degree of use depending considerably upon proximity to paving-brick centres of manufacture. Sheet-asphalt surfacing is still in high favor for city streets in some sections of the country. For very heavy-traffic city streets, granite blocks are still extensively used, but their greater roughness, as compared with other readily available pavements, is against them.

Standardization. Standardization in paving material and construction has made marked progress. Standard specifications for various kinds of paving have been framed by committees of the American Society for Municipal Improvements and adopted by the society on letter ballot. Through the coöperation of the U. S. Department of Commerce, road and paving engineers, and manufacturers, the varieties of paving brick were reduced from 66 to 7 in 1922, then to 6 in 1923, to 5 in 1924, and to 4 in 1925. Likewise, grades of asphalt used for paving were reduced in number from 88 to 9 in 1923, as based on the penetration test used to show relative hardness.

Cleaning and Snow Removal. For machine cleaning of streets, motor-driven vehicles with or without pick-up attachments are increasing in degree of use. Hand cleaning is still considered to have material advantages, but lessens in importance with the diminishing extent of the use of horses. Snow removal both from city streets and from long stretches of rural highway is becoming increasingly common to meet the demands of motor-vehicle traffic. Snow plows and sweepers are employed, together with mechanical means of loading the snow into motor or other vehicles for carting away.

Bibliography. Recent new books or revised editions of important old ones include: Harger and Bonney, *Handbook for Highway Engineers* (New York); Blanchard, *American Highway Engineers' Handbook* (New York); Harger, *Location, Grading and Drainage of Highways* and *Rural Highways* (New York); Agg, *Construction of Roads and Pavements* and *American Rural Highways* (New York); Agg and Brindley, *Highway Administration and Finance* (New York); Boulnois, *Modern Roads* (London); Green, *The Science of Roadmaking* (London); Besson, *City Pavements* (New York); Chatburn, *Highways and Highway Transportation* (New York); Holt, *The Bureau of Public Roads* (Washington), No. 26 of *Service Monographs* of the United States government; Baalsrud (tr. from the Norwegian by Hansen) *Highways of Norway* (Oslo); Neumann, *Der Neuzeitlische Strassenbau* (Berlin). See also BRIDGES; CITY PLANNING.

ROBERT, JACQUES HENRI. See HENRI-ROBERT, JACQUES.

ROBERTS, KENNETH LEWIS (1885–). An American writer, born at Kennebunk, Me., and educated at Cornell University. From 1909 to 1917, he was a reporter and special writer on the Boston *Post*. In 1915–18 he was a member of the staff of *Life* (New York). In the World War, he served as captain of the Intelligence Section of the Siberian Expeditionary Force and from 1919 to 1921 was foreign correspondent in Central Europe and the Balkans for the *Saturday Evening Post*, and Washington correspondent for the same magazine from 1921. He wrote *Europe's Morning After* (1921); *Why Europe Leaves Home* (1922); *Sun Hunting* (1923); *Black Magic* (1924); *Concentrated New England* (1924); *Florida Loafing* (1925); *Florida* (1926).

ROBERTS, MORLEY (1857–). An English author (see VOL. XX). His later publications include *Hearts of Women* (1919); *Warfare in the Human Body* (1920), *Lyra Mutabilis, The Mirthful Nine* (1921); *Followers of the Sea* (1923); *On the Earthquake Line* (1924); *Malignancy and Evolution* (1926); *On the Old Trail* (1927).

ROBERTSON, ARCHIBALD THOMAS (1863–). An American theologian (see VOL. XX). His later publications include: *Harmony of the Gospels for Students of the Life of Christ* (1922); *Types of Preachers in the New Testament* (1922); *The Minister and His Greek New Testament* (1923); *The Christ of the Logia* (1924); *New Testament History* (1923); *An Introduction to the Textual Criticism of the New Testament* (1925); *Studies in the Text of the New Testament* (1926); and *Minor Characters in the New Testament* (1928). He was also the translator of *Luke's Gospel* (with grammatical notes, 1923).

ROBERTSON, Sir Charles Grant (1869–). A British historian, educated at Hertford College, Oxford. A fellow since 1893 of All Soul's College, Oxford, he was domestic bursar there (1897–1920), and senior tutor in modern history (1905–20) at Magdalen College. In 1920 he became principal and in 1927 vice chancellor of Birmingham University. In the latter year he was Creighton lecturer at the University of London. He was knighted in 1928. His works include *The Rise of the English Nation* (1895); *England under the Hanoverians* (1911); *A Historical Atlas of Modern Europe* (1915); *The Evolution of Prussia*, with J. A. R. Marriott (1915); and *Bismarck* (1918).

ROBERTSON, William (Robert), First Baronet (1860–). A British soldier (see Vol. XX). He was quartermaster general at the outbreak of the World War and efficiently outfitted the troops sent to France. In 1915 he was chief of the General Staff of the British Expeditionary Force and from 1915 to 1918 chief of the Imperial General Staff. In February, 1919, he was appointed to the eastern command and in June of that year became general officer with command of the troops in Great Britain. In 1919–20 he commanded the British Rhine Army in Germany. He was created a baronet in 1919, became a field-marshal in 1920, and received many decorations and honors. He published *From Private to Field-Marshal*, reminiscences (1921), and *Soldiers and Statesmen, 1914–18* (1926).

ROBIN, Léon (1866–). A French philosopher and classical scholar, born at Nantes, and educated at the Sorbonne. He taught at the Collège de Compiègne and the lycées of Vendôme and Angers and was made professor at the Sorbonne in 1918. His first publication, *La théorie platonicienne des idées et des nombres d'après Aristote* (1908), gave him an international reputation. His other works include *La Théorie platonicienne de l'amour* (1908); *Etude sur la signification et sur la place de la physique dans la philosophie de Platon* (1919); *La pensée grecque et les origines de l'esprit scientifique* (1923), and a critical and explanatory comment on *Lucrèce: De Rerum Natura*, with A. Ernout, 2 vols.,(1925–26). Besides articles in reviews, he edited and translated vol. 4 of the *Œuvres Complètes of Plato*.

ROBINS, Raymond (1873–). An American social economist (see Vol. XX). In 1916 he was chairman of the Progressive National Convention and also leader of the national Christian evangelistic social campaign in American universities and colleges (1915–16). He was chief of the Red Cross Mission to Russia in 1917 and 1918. He campaigned in the United States for the enforcement of constitutional prohibition. He was a member of the executive committee of the National Republican Committee during the campaigns of 1920 and 1924.

ROBINSON, Edwin Arlington (1869–). An American poet (see Vol. XX). He continued to produce poetry of high merit during the decade 1914–24. His later books include two plays, *Van Zorn* (1914) and *The Porcupine* (1915). He wrote also *The Man Against the Sky*, poems (1915); *Launcelot*, a poem (1920); *The Three Taverns*, poems (1920); *Avon's Harvest*, poems (1921); *Collected Poems* (1924); *Roman Bartholomew* (1923); *Tristram*, poem (1927); *Sonnets (1889–1927)* (1928); and *Collected Poems* (1929). Consult *Aspects of the Poetry of Edwin Arlington Robinson*, by Lucius Bube (1928).

ROBINSON, Joseph Taylor (1872–). A United States Senator (see Vol. XX). He was reëlected to the Senate in 1918 and in 1925 for the term expiring in 1931. He has served as chairman of the Minority Conference since the Sixty-eighth Congress and has been a member of the committees on Foreign Relations, Naval Affairs, and Territories and Insular Possessions. In 1928 he was the Democratic candidate for Vice President.

ROBINSON, Lennox (1886–). An Irish dramatist, one of the younger writers of the Irish Literary Revival, born at Douglas, Cork. He was manager of the Abbey Theatre, Dublin, during 1910–14 and 1919–23, director of it in the latter year, and during 1915–25 organizing librarian of the Carnegie Trust. His plays are interpretations of his native country. Life in rural and small-town Ireland is depicted in *The Clancy Name*, his first play, produced at the Abbey Theatre in 1908; *The Cross Roads*, played in 1909; and *The Whiteheaded Boy*, played in Dublin in 1916 and later in London, the United States, and Australia. Of his political plays, *The Dreamers* (1915), based on Robert Emmet's unsuccessful revolution of 1803, is perhaps the best. Others are *Patriots* (1912), and *The Lost Leader* (1918). His other produced plays include *The Round Table* and *Crabbed Age and Youth* (1922); *Never the Time and the Place* (1924); *Portraits* (1925), and *The Big House* (1926). He also wrote a novel, *A Young Man from the South* (1917), and the stories *Dark Days* (1918), and *Eight Short Stories* (1919). He edited *The Golden Treasury of Irish Verse* (1925), and *Poems* of Thomas Parnell (1927).

ROBISON, Samuel Shelburne (1867–). An American naval officer, who graduated from the United States Naval Academy in 1888. He served during the Spanish-American War and filled many important posts on land and at sea. He was with the Bureau of Equipment in 1909–10 and with the Bureau of Steam Engineering in 1910–11. In 1917–18 he was commander of the submarine force of the Atlantic Fleet and in 1918–19 a member of the Naval Armistice Commission. He was promoted to be rear admiral in 1918. In 1919–21 he was commandant of the Navy Yard in Boston, and in 1921–22 military governor of Santo Domingo. He was admiral in command of the Battle Fleet, 1923–25, and admiral in command of the U. S. Fleet, 1925–26. Since 1926 he has been commander of the 13th Naval District.

ROCHESTER. The third city in size in New York State. The population rose from 220,087 in 1910 to 295,750 in 1920, and to 328,200 in 1928, according to estimate of the U. S. Bureau of the Census. On Jan. 1, 1928, the council-manager form of government became effective. Under the new charter, the council of the nine members acted as the legislative and policy-forming body of the city government, making all local laws and ordinances, authorizing all expenditures of city funds, and appointing the city manager. A city-planning bureau was created in the office of the city engineer in 1917. The superintendent in charge, who was appointed by the city engineer, had power to make a city plan, to pass on all plotting for the opening, widening, or extension of streets, and to establish building zones. In 1928 the formation of a Monroe County Regional Planning Board, consisting of five members, to coöperate with the planning boards of Rochester and towns within the county, was authorized. A Civic Centre at Court Street and South Avenue was to be developed during 1930. Other contemplated improvements were: the extension of Broad Street and widening of Smith Street, the development of a harbor on Lake Ontario, and the construction of a new $1,000,000 Smith Street Bridge across the Genesee River.

Work was begun in 1922 on transforming the dry bed of the Erie Canal, which had been abandoned in favor of the new Barge Canal, into a freight and passenger subway, carrying trolley and railroad tracks. Eight and one-half miles of the canal were laid with track; of this, one mile in the heart of the city was covered over and a street built above it, parallel to and relieving the congestion of Main Street. The cost of the completed work was more than $12.000,000. In 1922 the Eastman Theatre, the third in size in the United States, was built, through a gift from George Eastman, for public use under the management of the Eastman School of Music of the University of Rochester.

The Rochester municipal airport is located 4 miles from the city. Air-mail and freight services are provided by the Colonial Western Airways, Inc., and passenger-plane service, by the Ryan Airways, Inc. The value of products manufactured by 1044 industrial establishments in 1927 was $427,730,972, according to local estimate. During 1922 the city's export trade amounted to approximately $10,000,000; in 1928 it had increased more than $21,000,000. Bank clearings in 1928 amounted to $777,900,000. The assessed valuation of real and personal property in 1928, according to local estimate, was $634,665,209, as compared with $521,868,000 in 1927. This gain was attributed primarily to a 20 per cent increase in the assessed valuation of real estate. The bonded debt in 1928 was $64,238,030.

ROCHESTER, University of. A coeducational, nonsectarian institution of higher learning at Rochester, N. Y., founded in 1850. The student enrollment increased from 531 in 1915 to 1419 in the autumn of 1928. The faculty increased from 45 to 314 in the same period, and the libraries from 66,000 to more than 162,000 volumes. Productive funds as of June 30, 1928, were $28,757,382.46 and total resources, including land, buildings, equipment, and endowment were approximately $45,000,000. George Eastman gave $4,500,000 to found the Eastman School of Music which was opened in 1921 with an endowment of $2,234,509. In 1921 he gave $4,000,000 to found a School of Medicine and Dentistry, and the General Education Board gave $5,000,000 for the same purpose. The school was opened to students in the fall of 1925. The university received $673,350 from the estate of L. P. Ross in 1917 to found the department of vital economics. In 1925 a dormitory for women students in the school of music, an addition to the Memorial Art Gallery, the medical school and Story Memorial Hospital with staff house, nurses dormitory, laboratories and power plant, were erected. Ground was broken in May, 1927, for the first building for the college for men. Among the buildings contemplated are a students' union, an auditorium-administration building, chemistry, biology-geology, physics and engineering buildings, a library, a liberal arts building, dormitories, and a gymnasium. It is expected that these will be completed by 1930, thus permitting the re-dedication of the present campus and buildings to the college for women. President, Rush Rhees, D.D., LL.D.

ROCKEFELLER, John D(avison) (1839–). An American capitalist (see Vol. XX). It was estimated that the total amount given by Mr. Rockefeller for philanthropic and charitable purposes, up to 1921, exceeded $500,000,000. The Rockefeller Foundation, the General Education Board, the Laura Spelman Rockefeller Memorial, and the Rockefeller Institute for Medical Research together received nearly four-fifths of this sum. These great corporations all were created by him. Consult *John D.: A Portrait in Oils*, by John K. Winkler (1929).

ROCKEFELLER, John D(avison), Jr. (1874–). An American capitalist (see Vol. XX). He continued active in business and philanthropy during the years 1914–29. He contributed large sums of money to various causes and was especially active in church activities. In 1929 he was awarded the gold medal of the National Institute of Social Sciences for "distinguished social service." He is the author of *The Personal Relation in Industry* (1923).

ROCKEFELLER FOUNDATION. An institution chartered in 1913 "to promote the well-being of mankind throughout the world." The scope of its present activities is in a broad way indicated by the names of the two divisions through which it carries on its work: The International Health Board, and the Division of Medical Education.

The International Health Board assists various public health projects throughout the world, encouraging the establishment of schools of hygiene and governmental health agents. It has been active in the control of yellow fever, malaria, and hookworm disease. A survey in 1925 showed that the only cases of yellow fever in the Western Hemisphere were in Brazil, and the Board therefore coöperated in the attempt to exterminate the fever mosquito from that region, and in taking preventative measures in several Central American countries. A commission also was sent to investigate yellow fever in West Africa. Similar work was continued the following year, and in 1927 when the commission found that it had not been able to check the spread of the disease, it devoted itself to discovering the identity of the infection. In Rio de Janeiro, 123 cases of yellow fever were reported in 1928, and the foundation aided health authorities there and in other localities. Malaria research and practical aid was furthered by the foundation between 1924 and 1929, in the United States, Central America, South America, Europe, the Far East, the Philippines, and Porto Rico, 18 countries in 1928. Study of the hookworm was carried on over the same period, and in 1928 the foundation contributed to the work of health organizations of 24 States of the United States, and of 20 other countries. An important feature of the foundation's health work in the past few years has been the promotion of medical colleges in China, where the board contributed to 12 universities in 1928.

Numerous other educational institutions in various parts of the world received regular assistance from the Division of Medical Education, biological research and public hygiene. In 1929 the Laura Spelman Rockefeller Memorial Fund of $2.500.000 was combined with the Rockefeller Foundation.

ROCKEFELLER INDUSTRIAL REPRESENTATION PLAN. See Labor Arbitration.

ROCKFORD COLLEGE. A nonsectarian, liberal arts college for women, with an enrollment limited to 400; chartered in 1847 at Rockford, Ill. The registration of matriculated students increased from 242 in 1914 to 406 in 1927–28, with an additional 242 in music and extension; the faculty was increased from 39 to 44 members, in 1928, and included a Jane Addams professor of sociology and social service; the endowment was approximately $1,000,000 in 1928; and the income, increased from $109,391, to $270,000 in 1927–28, including student fees and board; the student-aid trust fund of the institution amounted to $375,000, largely a gift of Hobart W. Williams of Chicago. Eighty students received awards in 1927–28. The college carried on a vigorous adult higher-education programme; contributed directly to the development of the art movement in Rockford, through activities of its professors of painting and sculpture; and aided the local Sunday schools by organizing a city council of education. A new dormitory with swimming pool was constructed, and a project for a new library and chapel was launched in 1928. The president, William Arthur Maddox, Ph.D., LL.D., was inaugurated in 1919.

ROCKS. See GEOLOGY.

RODMAN, HUGH (1859–). An American naval officer, born in Frankfort, Ky., and graduated from the United States Naval Academy in 1880. He served in the Spanish-American War and afterward performed many important services on shore and afloat. In 1916 he was appointed a member of the General Board of the Navy Department, and in the year following commanded the 3d Division of the Atlantic Fleet. In November, 1917, he was appointed commander of the 9th Division of the battleship force and with it served in the British Grand Fleet. For a year, he was commander of the 6th Battle Squadron of the British Grand Fleet in the North Sea. In 1919 he was commissioned admiral and commander-in-chief of the Pacific Fleet. He was retired in 1923. He received decorations and honors from several foreign governments.

RODRÍGUEZ CARRACIDO, JOSÉ (1856–1928). A Spanish chemist, educator, political leader, and man of letters, born in Santiago (La Coruña). He studied pharmacy at the University of Santiago and took his doctor's degree at the University of Madrid (1875). After serving as a pharmacist in the army (1875–80), he was professor of pharmacy at the University of Madrid (1881–98) and professor of biological chemistry there (1898–1926). For many years, he was dean of the faculty of pharmacy at Madrid and he was rector of the university from 1916 until his death; librarian and, after 1922, director of the Royal Academy of Exact, Physical, and Natural Sciences; a leader of the central group of the Liberal Party; and a member of the Spanish Senate (life Senator after 1923). Numerous foreign academies and universities bestowed honorary memberships or degrees upon him. His publications include *Tratado de química orgánica* and *Tratado de química biológica* (many editions); innumerable technical monographs; the novel, *La muceta roja;* the essays, *Jovellanos* (1893); and *Estudios historico-críticos de la ciencia española* (1897 and 1917); and the biography, *El padre José de Acosta y su importancia en la literatura científica española* (1899), crowned and published by the Royal Spanish Academy of the Language.

RODRÍGUEZ MARÍN, FRANCÍSCO (1855–). A Spanish critic, literary historian, and Cervantes scholar. Born in Osuna, he made his bachelor's studies in the Institute of Osuna (1864–69). Because of poor health, these studies were interrupted for five years, during which he devoted himself to wide reading, to music, to writing verse, and to collecting folk tales. From 1874 to 1880, he studied law in the University of Sevilla and during 1880–83 he was a journalist in Sevilla. He practiced law in Osuna from 1883–95, when he moved to Sevilla. There he founded *El Folklore Andaluz,* short-lived, but fruitful in its subsequent influence. In 1905 he moved to Madrid and was at once elected a member of the Royal Spanish Academy of the Language, of which he later became librarian. His published works constitute more than 115 titles, or more than 130 volumes. The most important are his studies in lexicography, his critical editions and studies concerning various editions of the *Novelas Ejemplares* of Cervantes, and his monumental critical and illustrated editions (some in four, some in six, and some in eight volumes) of *Don Quijote.*

ROGER-DUCASSE, JEAN-JULES (1875–). A French composer, born at Bordeaux. He studied composition under G. Fauré at the Paris Conservatoire and won the second Prix de Rome in 1902. After 1909 his works figured prominently in concerts in Paris and won favor outside of France. He is one of the neo-classicists whose works rest on the solid foundations of the classic masters, with slight impressionistic coloring. He wrote a ballet, *Orphée* (Paris, 1913); for orchestra, *Variations Plaisantes sur un Thème Grave, Suite Française, Prélude, Petite Suite, Prélude d'un Ballet, Le Joli Jeu de Furet* (scherzo), and the symphonic poems *Sarabande* (with solo voice), *Au Jardin de Marguérite* (with soli and chorus), *Nocturne de Printemps, Épithalame, Poème symphonique sur le nom de Fauré; Sur Quelques Vers de Vergile* for chorus and orchestra; a string quartet and a piano quartet; several motets; and piano pieces.

ROGERS, JAMES GAMBLE (1867–). An American architect. He was born at Bryant's Station, Ky., and graduated at Yale (1889). Since 1905 he has practiced architecture in New York City, designing the Sterling Memorial Library and the Harkness Memorial Quadrangle at Yale University, the New Haven Post Office, the Sophie Newcomb College at New Orleans, the Shelby County Court House at Memphis, Tenn., the Brooks Memorial at Memphis, and the Columbia and the Yale medical centres.

ROGERS, ROBERT WILLIAM (1864–). An American Orientalist (see VOL. XX). He was instructor at Columbia University summer sessions (1915–21) and professor at Princeton and Drew Theological Seminary. His later works are *History and Literature of the Hebrew People* (1917); *Great Characters of the Old Testament* (1920); and *Old Testament Lessons* (1921).

ROGERS, WILL (1879–). An American actor, orator, and writer, educated at the Kemper Military School at Boonville, Mo. He made his first appearance on the stage at Keith's Union Square Theatre in New York City in 1905. Later successes were made with the *Ziegfeld Follies,* with which he became associated in 1907 and in *Three Cheers* in 1929. He also is well-known as an after-dinner speaker and journalist. In 1924 and 1928, he covered the meetings of the national political conventions for the New York *Times*. He wrote *Illiterate Digest* (1924); *Letters of a Self-Made Diplomat to His President* (1927), and *Will Roger's Political Follies* (1929).

ROHRBACH, rōr′bäg, PAUL (1869–). A German writer (see VOL. XX). Among his later works are *Die Geschichte der Menschheit* (1914); *Russland und Wir* (1915); *Weltpolitisches Wanderbuch* (1915); *Das Baltenbuch* (1917); *Woher Es Kam* (1919); *Politische Erziehung* (1919); *Die Beweise für die Verantwortlichkeit der Entente am Weltkrieg* (1920); *Gottes Herrschaft auf Erden* (1921); *Die Länder und Völker der Erde* (1925); *Amerika und Wir* (1925); and *Deutschland in Not* (1926).

ROLLAND, rô′län′, ROMAIN (1866–). A French writer (see VOL. XX). He received the Nobel Prize for literature in 1915, following the completion of *Jean-Christophe*. During the World War, his pacifism, expressed in *Au-dessus de la Mêlée* (1915), and later in *Les précurseurs* (1919), incurred the displeasure of the French people, and he withdrew to Switzerland. His popularity returned after the War, and he wrote the novels *Pierre et Luce* (1918); *Colas Breugnon* (1919); *Clerambault* (1920); and a series called *L'âme enchantée*, comprising *Annette et Sylvie* (1922), *L'été* (1924), and *Mère et fils* (1926). Also the plays *Lilulie* (1920), *Le jeu de l'amour et de la mort* (1925), and *Pâques fleuries* (1926), the prologue to *Les Léonides* (1929), a drama of the French Revolution. Other works were *Voyage Musical ou pays du passé* (1920); *Mahatma Gandhi* (1924); *Beethoven, pour le centenaire de sa mort* (1927, Eng. trans., 1929). Most of these books were translated into English. Consult *Romain Rolland, the man and his work*, by Stefan Zweig (1921), and *Liber Amicorum Romain Rolland* (1926).

ROLLESTON, SIR HUMPHREY (DAVY) (1862–). A British physician, grandnephew of Sir Humphrey Davy, born at Oxford, England. Educated in arts at St. John's College, Cambridge, he took his medical degree at St. Bartholomew's. He was president of the Royal College of Surgeons (1922–26), president of the Royal Society of Medicine (1918–20), and was made physician in ordinary to the King in 1923. He was knighted in 1924 and became Regius professor of physics at Cambridge in 1925. He was coeditor with Sir C. Allbutt of the second edition of the *System of Medicine*. His chief works are *Diseases of the Liver* and *Some Medical Aspects of Old Age* (1922).

ROLLINS COLLEGE. A coeducational institution of higher learning at Winter Park, Fla., founded in 1885. Student enrollment in the fall of 1928 totaled 267, there were 68 members of the faculty, and 22,000 volumes in the library. Productive funds in the same year amounted to approximately $600,000. The college is a pioneer in promoting the idea of a two-hour conference plan of education. A student, instead of reciting for an hour and studying for an hour, remains in the class-room for two hours in study, recitation, and conference with his instructor. The college sponsored the first winter session, corresponding to summer schools in cooler localities. There is a professor of books, the first of this character to be established in an American institution. President, Hamilton Holt, Litt.D., LL.D.

ROLSHOVEN, JULIUS (1858–). An American painter and teacher, born at Detroit, and educated at Cooper Union and the Plassman Academy in New York City. He also studied with Hugo Crola at Düsseldorf Academy, with Löfftz at Munich, in Frank Duveneck's class at Florence, and in the Atelier Toney in Paris; Robert Fleury and Bouguereau were among his teachers in Paris. He founded the Rolshoven life classes in Paris and London with international attendance and was awarded honors and medals in Munich, Paris, Brussels, Berlin, Florence, Chicago, Buffalo, and St. Louis, "The Chioggia Fishing Girl" and two of his etchings are in the Cincinnati Museum, and "The Refectory of San Damaino, Assisi," is on exhibition at the Detroit Institute.

ROLVAAG, OLE EDVART (1876–). An American teacher and author. He was born at Rolvaag, Hegeland, Norway, and came to the United States at the age of 20. He studied at Augustana College, Canton, S. Dak., and St. Olaf College, Northfield, Minn. (B.A., 1905). He then spent a year at the University of Norway. Since 1906 he has been professor of the Norwegian language and literature at St. Olaf College. He is the author of *Ordforklaring* (1909); *Amerika-Breve* (1912); *Paa Glemte Veie* (1914); *Deklamationsboken* (1918); *To Tullinger* (1920); *Laengselens Baat* (1921); *Riket Grundlaegges* (1925); *Norsk Laesebok* (1919–25); and *Giants in the Earth* (1927).

ROMAINS, JULES (1885–). Pseudonym of Louis Farigoule, French man of letters, who was educated in the French universities and then became professor of rhetoric at a provincial lycée. In the meantime, under his literary pseudonym, he acquired a reputation as one of the most vigorous writers of the younger generation, accepting the label *Unanimiste* to denote the school of writing which he championed. This appellation implied an all-pervading sympathy and participation in the "collective consciousness" of the sociologists. Romains wrote the following volumes of poetry: *Amour, Couleur de Paris; Odes et Prières; La Vie Unanime* (1908); *Un être en marche* (1910); *Europe* (1919); *Le voyage des amants* (1920), and *Les chants de dix années* (1928). His prose works and novels include: *Le bourg régénére, conte de la vie unanime* (1906); *La mort de quelqu'un* (1911); *Les copains* (1913); *Le vin blanc de la Villette* (1914); *Puissances de Paris* (1919); *Lucienne* (1920), and a series *Le dieu des corps*. In addition, he wrote the plays *L'armée dans la ville* in verse (1911); *Cromedeyre-le-Vieil* (1920); *M. le Trouhadec saisi par la débauche* (1924); *Knock*, a very successful comedy (1924); and *Le dictateur, Démétrius* (1926).

ROMAN CATHOLIC CHURCH. In the period including 1914–29, three Popes reigned. The gentle, spiritual, peasant pontiff, Joseph Sarto, whose aim was "to restore all things in Christ," died of a broken heart in August, 1914, when the War brought international chaos. Giacomo Della Chiesa, "the Peacemaker," who was elected his successor on Sept. 3, 1914, combined the grace of his predecessor with the statesmanship of the great Leo XIII and adopted the ideals and policies of both. The internal affairs of the church received his constant attention. Among the special results were the promulgation of the new Code of Canon Law (June 28, 1917), and the encyclicals on preaching; true family life; the Bible; Dante; and social welfare work. The revocation of the rule in regard to visits of foreign officials to the Quirinal, was followed by the ceremonial calls at the Vatican of the rulers of Spain and England (1923) and President Wilson (Jan. 4, 1919). His official acts followed each other so swiftly that their full influence and significance were barely appreciated when he died on Jan. 21, 1922.

The American cardinals were too late to vote at the conclave that elected Cardinal Achile Ratti his successor as Pius XI. Cardinal Farley happened to be in Europe when Benedict XV was elected and so was the only American cardinal who ever voted for a Pope. This, however, will not happen again, for by order of Pius XI, the time limit for the opening of the conclave has been extended to 15 days to enable the foreign cardinals to arrive in Rome. The new Pope, understanding English and having intimate family and social connection with America, and having lived in England and acted as a diplomat in central Europe, was especially well equipped to take up the renewed appeal for a peaceful adjustment of the discord of the nations on a basis of justice, not force. His wide experience as a student and critical historian was frequently shown in his discourses and encyclicals, notably those on St. Francis de Sales (Jan. 30, 1923); St. Thomas (June 29); St. Bernard (August 20); St. Columbanus (August 4); Sœur Thérèse, "the Little Flower" (February 11); the Jesuit Robert Bellarmine (May 19); and the letter of thanks to the American hierarchy (September 8), for their aid to the Papal Relief Expedition to Russia. This expedition he placed in charge of the American Jesuit, the Rev. Edmund A. Walsh, Regent of the School of Foreign Service at Georgetown University. It distributed more than $1,000,000 until its operations ceased because of the attempt of the Bolsheviks to use it to force the Vatican to recognize the Soviet government (Nov. 14, 1923). Pius XI took occasion, on Nov. 14 and Dec. 10, 1923, to reaffirm his great interest in the reconciliation of the churches of the Eastern rites, and officially announced a projected reopening of the Vatican Council of 1869 and that the Holy Year would be proclaimed on Dec. 30, 1924, as the twenty-second general jubilee. The year closed with the encyclical permitting the acquiescence of the French Episcopate in the new association laws which make the position of the church in France more stable in the eyes of the law and therefore more satisfactory. Other encyclicals issued by this Pope were: That on the French diocesan associations (Jan. 18, 1924); the establishment of the new feast of Christ the King (Dec. 11, 1925); on Catholic missions (Feb. 28, 1926); on the celebration of the seventh centenary of St. Francis of Assisi (Apr. 30, 1926); on the persecution of the Catholics of Mexico (Nov. 18, 1926); on the promotion of religious unity (Jan. 6, 1928); and on Devotion to the Sacred Heart (May 9, 1928). On Jan. 6, 1929, he published a bull instituting a general jubilee in honor of his Sacerdotal Golden Jubilee and urging an increased zeal in the spread of the faith.

The following new saints were canonized: John Eudes, and John Baptist Vianney, May 31, 1925; M. Sophie Barat and Mary Magdalene Postel, May 24, 1925; Peter Canisius, May 31, 1925; and Thérèse Martin of Lisieux, May 17, 1925; the eight Jesuit martyrs of North America: Jogues, Goupil, de Brébeuf, Lalemant, Daniel, Garnier, Charbanel, and de la Lande were beatified June 21, 1925; the venerable Don Bosco, founder of the Salesian Fathers, on June 2, 1929; the venerable Claude de la Columbrière, S.J., on June 16, and Cosma da Carboniano, the Armenian martyr, on June 23 of the same year. The general jubilee year ended Dec. 24, 1925, during which 983 pilgrimages visited Rome, including about 500,000 persons. Three International Eucharistic Congresses were held: Amsterdam, July, 1924; Chicago, June, 1926 (one of the greatest ecclesiastical functions in the history of the church); and Sydney, N. S. Wales, September, 1928.

The relations between the Vatican and the Italian government were on a somewhat more cordial basis and early in 1929 the world was surprised by the announcement that the 60-year-old controversy between the Vatican and the Italian State had been settled. A treaty of conciliation was signed in the Lateran Palace on February 11, and the affirmation of the Pope as a temporal ruler was ratified on June 7. See LATERAN TREATY.

The Pope during these years gave a new impulse to the work for the missions, checked the growth of excessive nationalism, and promoted the cult of international harmony.

The Hierarchy. The official data of the Catholic hierarchy show that 92 cardinals died during the 1914–29 period, and 34 during the term of Pius XI, reducing the total membership to 58 in which the Italians numbered only 26, an unprecedented minority. The administration of the church was entrusted to 14 patriarchs; 245 archbishops and 908 bishops with residential sees; 57 abbacies; 331 apostolic vicars; and 600 titular bishops.

The religious bodies of men make up 37 monastic orders; 17 mendicant orders; 8 orders of clerics regular; 66 ecclesiastical congregations; and 10 religious institutes. The Holy See was represented abroad by 50 pontifical delegates, 24 nuncios, 4 internuncios, 1 chargé d'affaires, and 21 apostolic delegates. Foreign representatives at the Vatican numbered 11 embassies and 18 ministers. The new cardinals created in 1914–29 numbered 64, among whom were included: Dougherty of Philadelphia, Sbarretti, Schulte, Ratti (Pope Pius XI), Dubois, Begin of Quebec, Laurenti, Hayes of New York, and Mundelein of Chicago.

In the United States, 93 new bishops were appointed, and 74 died. Seven new dioceses, El Paso, Grand Island, Kearney, Lafayette, Springfield (Ill.), Amarilo, Tex., and Raleigh, N. C., were organized. The new archdiocese of San Antonio was created and the title of Oregon City changed to Portland. The older generation of the hierarchy disappeared in the passing away of Cardinals Gibbons and Farley; Archbishops Riordan, Quigley, Spalding, Blenk, Prendergast, Keane, and Kennedy, rector of the American College; and Bishops McFaul, Chatard, Hennessy, Beaven, Foley, Harkins, McDonnell, O'Gorman, Kudelka, Donahue, Burke, Gabriels, Ryan, Ward, Corrigan, O'Hara, and Byrne. Most of the new bishops were comparatively young men. A radical departure in the selection of candidates for vacant American sees was enacted by the Pope (1916). The old procedure of voting for three names at diocesan convocations was abolished; a permanent list of eligibles was to be filed in Rome every two years, made up of names submitted by the bishops of the United States of those they regard as most worthy to be their successors.

Archbishop Fumassi-Biondi assumed the office of apostolic delegate at Washington (Mar. 6, 1923), in succession to Mgr. Falconio, who was created a cardinal, and Archbishops Dougherty, Shaw, Mundelein, Hayes, Curley, and Daeger were added to the Metropolitans.

Statistics. The *Official Catholic Directory* for 1929 gives these statistical totals for the United States: 17 archbishops, of whom 4 are cardinals; 104 bishops; 18,370 diocesans and 7403 priests of religious orders, an increase of 352 and 228, respectively, over the previous year; 11,903 churches, increase 204; 136 seminaries with 14,686 students, increase 254; 7063 parish schools with 2,488,682 pupils; 237 colleges for men, 734 academies for girls, and 357 orphanages with 54,350 inmates. The total estimated Catholic population is 20,112,758, a gain of 423,709 over the previous year. Frequent complaint was made that owing to faulty and unscientific methods of computation, this total of the Catholic population is an underestimate, and it is contended that the total should be more than 22,000,000. Seventy per cent of the Catholic population is in 12 States, and the remaining 30 per cent is widely scattered over the others. There are 2230 congregations made up of non-English-speaking people.

The *Catholic Directory* for England gives the Catholic population of England and Wales in 1928 as 2,156,146 with 5310 priests and 2183 churches and chapels. The Catholics of the British Empire numbered 15,300,000, and the grand total for English-speaking countries was 50,000,000. There were 335,000,000 Catholics in the whole world, of whom about 6,600,000 were not of the Latin Rite. In England and Wales, there were 4 archbishops and 14 bishops; in Scotland, 2 archbishops and 4 bishops; in Ireland, 4 archbishops and 24 bishops. In the British Empire, there were 33 archibshops and 118 bishops; 55 vicariates; and 13 prelates apostolic. The Catholics in Ireland numbered 3,500,000.

In August, 1917, the Catholic hierarchy organized the National Catholic War Council to promote the spiritual and material welfare of Catholics in the service of the Government and to direct and assist all Catholic activities incident to the War. It coördinated the efforts of 9714 Catholic men's and 4959 Catholic women's organizations for this purpose. When hostilities ceased, this body was continued as the National Catholic Welfare Council, at a meeting of the hierarchy held on Sept. 24–25, 1919, from which was issued a pastoral letter setting forth the problems of necessary social reconstruction. The name, however, was changed in the following year, on advice from Rome, to the National Catholic Welfare Conference, under which title it continued its work for social action, education, immigration welfare, and the proper and advantageous solution of other industrial and economic problems affecting the Catholic population, and which are discussed at annual meetings of the bishops held in Washington. On Nov. 27, 1917, Cardinal Hayes, then bishop auxiliary of New York, was appointed by the Pope chaplain bishop of all the United States forces and so served during the War. He had under his jurisdiction, when the Armistice was signed, 1023 chaplains in active service and 500 approved in the reserve list. The Catholic quota allowed by the Government was 37.8 per cent of the whole corps.

The welfare work in the camps was in the hands of the Knights of Columbus who were given funds for war-service work to the amount of $43,000,000, and expended in this cause, from June 16, 1917, to Oct. 7, 1923, a total of $37,250,000. The balance was devoted in the years following to social reconstruction work and education and care for disabled service men. The membership of the Knights of Columbus in 1929 was 637,127, organized into 2544 separate councils, distributed through 61 States and 2 territorial jurisdictions.

ROME. The capital of the Kingdom of Italy. The population in 1928 was estimated to be 877,289. Rome has shown the greatest progress of all the Italian cities under the Fascist form of government. In 1925 a new form of municipal government was decided on by the cabinet council, and the administration of the city was entrusted to a government appointee nominated by royal decree, the Governor of Rome. At first, the governor was assisted by two vice governors, 10 rectors, and 80 consulters, also appointed by royal decree. To the governor were entrusted the powers hitherto possessed by the mayor, the board of aldermen, and the municipal council; the vice-governors were empowered at his request and under his responsibility to perform part or the whole of his duties. The rectors were technicians to whom were entrusted duties under the governor's responsibility in the various branches of the city administration. The consulters acted in an advisory capacity, their opinion being especially necessary on all important matters affecting the city finances. In 1928 the powers of the governor were made still more arbitrary with the abolition of the board of rectors and one of the vice governorships. The board of consulters was reduced to 12 members appointed by the Ministers of the Interior and of Municipalities. The reason for this change was the necessarily close connection between the purely communal interests of the city and the interests of the nation as a whole.

On Apr. 21, 1926, on the occasion of the inauguration of Rome's first governor, Premier Mussolini gave to the city his "regulatory plan" of its reconstruction within a fifteen-year period. The principal feature of the plan was the resurrection of the ancient part of Rome and the restoration of its former grandeur. It envisaged the building of a ring of boulevards and the creation of new squares and parks so as to add to the beauty of the Eternal City; the construction of new palatial government buildings; the demolition of houses so as to leave open space around the Augusteo Amphitheatre, Marcello Theatre, Capital, Pantheon, and Victor Emmanuel Monument; the excavation of the Circus Maximus and the forums of Augustus, Vespasian, Nerva, and Trajan; and the erection in the centre of Rome of a new forum known as the Forum of Mussolini. The inspiration for this restoration is found in the new Museum of the Roman Empire, housed in the ancient Convent of Saint Ambrosia, whose exhibits portray in minute detail the life of the city of the Cæsars. In 1926 the Cabinet Council voted 60,000,000 lire annually to the City of Rome as the Government's contribution toward its restoration.

Mussolini's plan also included the conversion of Rome into a modern metropolis. It called for the adoption of a zoning scheme whereby the city would be divided into business, industrial, and residential sections; the construction of a subway system under the famous Seven Hills; the erection of model tenements in the new industrial centre to the south and southeast of the city; and the construction of main thoroughfares to coördinate means of communication with the environs. The subway system, which has been under construction since 1927, will consist of three lines, one running east and west, another north and south, and the third diagonally, and will be approximately 24 kilometers (14.9 miles) in length. The terminals will lie in the new residential sections on the outskirts of the city.

In 1927 the Institute for the People's Houses in Rome, in coöperation with local and national officials, had erected 10,878 dwellings with accommodation for 55,000 persons. The programme called for the construction of several thousand more so as to house 100,000 persons. More than half of these dwellings had been built since 1922, with State aid. The value of the institute's holdings in 1927 was approximately 500,000,000 lire.

A third great improvement has been the construction of Rome's $1,000,000 airport at Tittorio covering more than one square mile. Its two-story hangar is capable of housing 200 planes. Toward the construction of the field, the Italian government contributed $100,000. Many streets are being widened and others are being cut through the centre of Rome so as to relieve traffic congestion; among these are the Via del Tritone and the new thoroughfare connecting the Piazza Barberini and the principal railroad station. The grave of Italy's Unknown Soldier is under the Altar of the Country at the base of the Victor Emmanuel Monument.

RONALD, Sir Landon (1873–). A British conductor, born in London. He studied at the Royal College of Music under F. Taylor, Sir H. H. Parry, Sir C. V. Stanford, and Sir W. Parratt. After a successful début in London as pianist (1890), he accepted the position as second conductor at Covent Garden (1891–94) and was conductor of Sir A. Harris's Italian Opera Company on tour (1894). In 1894–95 he traveled in the United States as accompanist to Mme. Melba. During 1898–1902, he was conductor at the Lyric Theatre in London, and began a series of symphony concerts at Blackpool, which attracted attention, so that, when the London Symphony Orchestra was established in 1907, he was invited to conduct a number of its concerts. His great reputation was made in 1908–09, when he made a tour of Germany, Austria, Holland, and Italy as guest-conductor of some of the world's famous orchestras. As a result, he was chosen on his return, in 1909, as permanent conductor of the New Symphony Orchestra (since 1920 the Royal Albert Hall Symphony Orchestra). In 1916–20 he also conducted the concerts of the Scottish Orchestra in Edinburgh. In 1910 he accepted the appointment as principal of the Guildhall School of Music, which under his administration not only raised its musical standard but also enlarged its scope by the introduction of general culture courses. He was knighted in 1922. Because of poor health, he resigned all positions in 1928.

RÖNTGEN RAYS. See Physics.

ROOP, James Clawson (1888–). An American financial officer, who was born in Nebraska and educated at the University of Pennsylvania (B. S., 1909). During the World War, he was a lieutenant of engineers, serving as a supply officer in England in 1918. In 1919 he was promoted to the rank of lieutenant colonel and appointed chief of the Purchasing Division in France. Returning to the United States, he became First Assistant Director of the Budget under General Charles G. Dawes. In 1929 he succeeded General Herbert Mayhew Lord as Director of the Budget.

ROOSEVELT, Franklin D(elano) (1882–). An American lawyer and public official, born at Hyde Park, N. Y., and educated at Harvard University and the Columbia University Law School. In 1907 he was admitted to the bar. He was active in Democratic politics and a member of the State Senate in 1910, but resigned in 1913 on his appointment as Assistant Secretary of the Navy, which he held until 1920. In that year, he was Democratic nominee for vice president. During the World War, he acted as inspector of the United States Naval forces in European waters and was in charge of demobilization in Europe in 1919. Although not an active candidate in the Democratic Convention of 1924, he was prominent in the proceedings of that body. In the convention of 1928 at Houston, Tex., he made the speech placing Gov. Alfred E. Smith in nomination for the Presidency. Later in the campaign, he was himself nominated for Governor of New York and elected, running ahead of the Democratic national ticket. He wrote *The Happy Warrior: Alfred E. Smith* (1928). He received honorary degrees of LL.D. from Harvard and Dartmouth in 1929.

ROOSEVELT, Theodore (1858–1919). A former President of the United States (see Vol. XX). In 1914 he conducted an exploring expedition in Brazil, where he endured many hardships. The most spectacular episode of this journey was the descent of the so-called River of Doubt, which had hitherto been practically unexplored. This river was renamed for him the Rio Teodoro. At the outbreak of the World War, his sympathies with the Allies were emphatically and repeatedly expressed. He strongly denounced the policy of strict neutrality laid down by President Wilson and pointed out the danger to the United States if Germany won. In 1916 he supported Charles E. Hughes for President. As soon as the United States had declared war, he offered to raise a division and to lead it into France. President Wilson refused this offer on the ground that it would be inexpedient to give a civilian practically inexperienced in large military operations such an important command. All of his four sons served during the War. Theodore, Jr., with the infantry in France, rose to the rank of lieutenant colonel. Kermit served with the British Royal Artillery in Mesopotamia until he was transfered in July, 1918, to the American Artillery in France. Archibald rose to the rank of captain. Quentin, the youngest, entered the Air Force and was killed in an air fight in July, 1918. After a short illness, Theodore Roosevelt died in his sleep, on Jan. 6, 1919. Following his death, many books relating to him were published. These included his letters to his children and to others and many reminiscences. He had published in 1916 *A Booklover's Holiday in the Open.* Joseph Bucklin Bishop edited two volumes of his letters (1920) and Mrs. Corinne Roosevelt Robinson wrote *My Brother, Theodore Roosevelt* (1921).

ROOSEVELT, Theodore, Jr. (1887–). An American public official, born at Oyster Bay, N. Y., the son of Theodore Roosevelt. He was educated at Harvard University. He was for several years engaged in business, but at the outbreak of the World War was commissioned major of the 26th Infantry, U. S. Army. He was promoted to be lieutenant colonel in September, 1918. He took an active part with his regiment in campaigns in France, including the Meuse-Argonne and the St. Mihiel offensives. He received the Distinguished Service Cross and the Croix de Guerre. In 1919 he was active in the organization of the American Legion. He was elected to the New York Assembly in 1919 and served for one year. In 1921 he was appointed Assistant Secretary of the Navy and resigned in 1924 to become the unsuccessful Republican candidate for Governor of New York. He took part in Asiatic scientific expeditions for the Field Museum of Chicago in 1925 and 1928–29. In 1929 he was appointed Governor of Porto Rico by President Hoover. He is the author of *Average Americans* (1919); (with his brother Kermit) *East of the Sun and West of the Moon* (1926); *Rank and File* (1928); and *All In The Family* (1929).

ROOT, Elihu (1845–). An American statesman (see Vol. XX). In 1917 he headed a special diplomatic commission sent by President Wilson to Russia. He formulated the plan for the Permanent Court of International Justice, established in 1921. He was Commissioner Plenipotentiary for the United States at the Washington Disarmament Conference (1921–22). He was awarded the Woodrow Wilson Foundation Medal and Prize in 1926 for his championship of the Court of International Justice. In 1929, when nearly 84 years old, he accepted membership on a committee of international jurists appointed by the League of Nations to consider revision of the World Court statute of 1920, the object being to secure the participation of the United States. In 1918 he became chairman of the United States Government War Savings Investment Society. His later writings include: *Addresses on International Subjects* (1916); *Addresses on Government and Citizenship* (1916); *Military and Colonial Policy of the United States* (1916); *Latin-America and the United States* (1917); *Russia and the United States* (1917); *Miscellaneous Addresses* (1917); *Men and Policies* (1924).

ROOTS. See Botany.

ROPSHIN. See Savinkov, Boris.

ROSE, John Holland (1855–). An English historian (see Vol. XX), Vere Harmsworth professor of naval history at Cambridge University since 1919. He was coeditor of the *Cambridge History of the British Empire*, contributed articles to various reviews, and wrote *Nationality as a Factor in Modern History* (1916); *Lord Hood and the Defense of Toulon* (1922); and *The Indecisiveness of Modern War* (1927).

ROSENAU, rōz′e-nou, Milton Joseph (1869–). An American physician and sanitarian (see Vol. XX). He was director of the School of Public Health of Harvard University and the Massachusetts Institute of Technology (1913–22) and director of the antitoxin and vaccine laboratories of the Massachusetts State Board of Health (1914–21). He wrote *Preventive Medicine and Hygiene* (1921).

ROSENOW, Edward Carl (1875–). An American pathologist and bacteriologist, born at Alma, Wis., and educated at Rush Medical College. He became a member of the teaching body in the department of internal medicine at Rush and was made an assistant professor of medicine as well as a member of the research staff of the Institute of Infectious Diseases. These positions he left in 1914 to fill the chair of experimental bacteriology in the Mayo Foundation at Rochester, Minn. In Chicago, he had played a notable rôle in the study of focal infection and especially of the selective action of bacteria in attacking certain tissues to the exclusion of others. This line of research he also followed with great success at the Mayo clinic, making it increasingly apparent that infection from slight deposits of pus is responsible for a very large amount of chronic ailments formerly attributed to natural regressive change in the vital organs. The writings of Dr. Rosenow are scattered throughout periodical literature.

ROSENSTOCK, Josef (1895–). An Austrian conductor and composer, born in Cracow. He began his studies at the conservatory of his native city and completed his musical training at the Vienna Conservatory under Lalewicz (piano) and Schreker (composition). In 1920 he began his career as second conductor of the Vienna Philharmonic Chorus, the next year went to Stuttgart as assistant conductor at the opera, and in 1922 became first conductor in Darmstadt, succeeding Balling in 1925 as general musical director. Two years later, he exchanged that post for a similar one at the Staatstheater in Wiesbaden. In 1929 he was called to the Metropolitan Opera House, New York, as conductor of German opera, but resigned later in the year. His compositions include *Ouvertüre zu einem heiteren Spiel*; *Symphonisches Vorspiel*; a piano concerto; *Doppelfuge* for two pianos; a piano sonata.

ROSENWALD, Julius (1862–). An American merchant-philanthropist (see Vol. XX). Until 1925 Mr. Rosenwald was president of Sears, Roebuck & Co., of Chicago. Since that year, he has been chairman of the board. In the World War, he was appointed by President Wilson a member of the Advisory Commission of the Council of National Defense and chairman of the committee on supplies. In 1918 he was on a special mission to France for the Secretary of War, and a member of the Second National Industrial Conference in 1919. He has contributed generously toward the erection of Y. M. C. A. and Y. W. C. A. buildings for the colored race in 15 cities and to the cost of 4000 rural public schools for Negroes in the South. He also pledged $3,000,000 for an Industrial Museum in Chicago and $2,000,000 for Jewish colonization work in Russia. He is interested in promoting plans by which persons in moderate circumstances may have medical attendance at a minimum of expenditure and in various philanthropic causes.

ROSE POLYTECHNIC INSTITUTE. A school of engineering, founded in 1874 at Terre Haute, Ind., and opened for students in 1883. The student enrollment increased from 192 men in 1914 to 274 in 1927–28, the faculty from 14 to 20 members in the autumn of 1928, and the productive funds from $800,000 to $1,500,000 in 1927–28, for which year the income was $110,000. The library in 1928 contained 15,000 volumes. In September, 1922, the institute moved to a site three miles outside the city with new buildings and greatly improved equipment in shops and laboratories, and in 1926 a dormitory accommodating 52 students was erected. Frank C. Wagner, A.M., D.Sc., D.Eng., president, died in November, 1928, after serving five years as the head of the institute.

ROSNY, rô′nē′, J. H. Pseudonym of the brothers Henry (1856–) and Justin (1859–) Boëx, French writers (see Vol. XX). The later works of Henry, signed "J. H. Rosny, *aîné*," include *Perdus?* (1916); *L'énigme de Givreuse* (1917); *Le félin géant* (1920); *Torches et lumignons,* literary souvenirs (1921); *Dans la nuit des cœurs* (1922); *L'assassin surnaturel* (1924); *L'amour d'abord* (1924); *Les femmes des autres* (1925); and *Mémoires de la vie littéraire* (1927). Those of Justin, "J. H. Rosny, *jeune*," were *Fanchon-la-Belle* (1921); *La Courtisane triomphante* (1925); *La métisse amoureuse* (1927); *Les Furies* (1928); and *Wilhelm II* (1928).

ROSS, Edward Alsworth (1866–) An American sociologist (see Vol. XX). He continued as professor of sociology at the University of Wisconsin. His later books include *The Old World in the New* (1914); *South of Panama* (1915); *Russia in Upheaval* (1918); *What is America?* (1919); *The Principles of Sociology* (1920); *The Russian Bolshevik Revolution* (1921); *The Social Trend* (1922); *The Social Revolution in Mexico* (1923); *The Outlines of Sociology* (1923); *The Russian Soviet Republic* (1923); *Roads to Social Peace* (1924); *Civic Sociology* (1925); *Standing Room Only?* (1927).

ROSS, Sir Edward Denison (1871–). An English Orientalist (see Vol. XX). In 1916 he became director of the School of Oriental Studies, London Institution, and professor of Persian in the University of London. He was knighted in 1918 and the Order of the Nile (2d class) was conferred in 1920. His later publications include *Life and Times of Omar Khayyam, Islam, Eastern Art and Literature* (1928), and contributions to the *Cambridge History of India.*

ROSS, Sir Ronald (1857–). A British physician (see Vol. XX). In 1918 Dr. Ross was knighted. His experience with malaria during the World War is summed up in a work which he edited, *Observations on Malaria by Medical Officers with the Army* (1919). His *Memoirs of Sir Ronald Ross* (1923) gives the entire summary of his experiences in fighting malaria. After the War, he became director of the Ross Institute and Hospital for Tropical Diseases, London.

ROSS DEPENDENCY. The Ross Dependency was created by Great Britain by an order in council on July 30, 1923. The order states that "That part of His Majesty's Dominions in the Antarctic Seas, which comprises all the islands and territories between the 160th degree of East Longitude and the 150th degree of West Longitude which are situated south of the 60th degree of South Latitude shall be named the Ross Dependency." It further appoints the Governor General of New Zealand to be the Governor of the Ross Dependency, with power to make rules and regulations, and grants and dispositions of any lands which may lawfully be granted or disposed of by His Majesty. With the Falkland Islands Dependencies, Great Britain possesses practically one-third of the Antarctic south of 60° South Latitude. The present economic value of the Dependency lies in its rich sea life; the Ross Sea being one of the centres of the Antarctic whaling industry. The 1923–24 season yielded 17,000 barrels of oil. The routes of the Amundsen and Scott expeditions to the South Pole were within this territory, as is the Bay of Whales base of the Byrd Antarctic Expedition of 1928.

ROSTAND, rô′stän′, Edmond (1868–1918). A French dramatist and poet (see Vol. XX). During the World War, he devoted himself chiefly to the writing of patriotic verse. Among his volumes of verse are *Musardises, Le Vol de la Marseillaise,* and *Le cantique de l'aile,* a posthumous publication (1922), as was also *La dernière nuit de Don Juan,* a dramatic poem (1921).

ROSTAND, Maurice (1891–). A French author born at Cambo, the son of Edmond Rostand (see above). He is a prolific writer of poetry, novels, and plays in verse and prose. His works include *Un bon petit diable,* a play written with his mother Rosemonde Gérard Rostand (1912); *Le cercueil de cristal,* a novel (1920); the plays, *Le Phénix* (1923), *Le secret du Sphinx* (1924), *L'Archeange* (1925), *La déserteuse* (1926); the novels, *L'Homme que j'ai tué* and *L'Ange du suicide* (1926); and *Napoléon IV* (1928), a play which nearly caused a diplomatic incident between France and England because he made Queen Victoria responsible for the death of the Prince Imperial in the Zulu War.

ROSTAND, Rosemonde Gérard (1871–). A French writer (see Vol. XX). In 1926 she wrote *La vie amoureuse de Madame de Genlis* in the series *Leurs Amours.*

ROTHENSTEIN, rō′then-stīn, William (1872–). An English portrait, figure, and landscape painter (see Vol. XX). He was professor of civic art at Sheffield University (1917–26) and principal of the Royal College of Art, South Kensington, after 1920. Continuing active in his art after 1914, his works found their way into the leading museums of Great Britain, America, and the British dominions. To his publications he added, *Six Portraits of Sir Rabindranath Tagore* (1915); *A Plea for a Wider Use of Artists and Craftsmen* (1917); *24 Portraits* (1920, 2d series, 1923); *Ancient India,* with K. de B. Codrington (1926).

ROTHERMERE, rŏth′ẽr-mēr, Rt. Hon. Harold Sidney Harmsworth, First Viscount, (1868–). An English newspaper proprietor (see Vol. X, Harmsworth), brother of Viscount Northcliffe. He was associated with the latter in his newspaper enterprises and was director general of the Royal Army Clothing Department (1916–17), and Air Minister (1917–18). He endowed a chair of Naval History at Cambridge, and a chair of American History at Oxford. Following the death of his brother, he succeeded to the management of the *Daily Mail,* the *Evening News, Daily Mirror,* and the *Weekly Dispatch.*

ROTTERDAM. The second city in size and the chief commercial port of the Netherlands. The population, according to the census of 1920, was 510,538 and, according to the communal population lists for Dec. 31, 1927, 571,842. The area through the annexation of neighboring suburbs was increased to 62 hectares (153.2 acres). The new West End section is a model of modern town planning. In 1919 the National Technical Nautical Museum was opened; it comprises a unique collection of objects pertaining to the technical side of shipping and shipbuilding. In 1923 the Boymans Museum acquired the former library building as an annex for the exhibition of its collection of modern paintings and sculpture. The new Town Hall, or Stadhuis, erected between 1914 and 1920, is an imposing building, constructed principally of limestone, with a frontage of more than 260 feet. The great tower, 246 feet high above the central hall, serves, in accordance with national tradition, as a bell tower. Another example of modern Dutch architecture is the new Post and Telegraph Office Building, which was erected at a cost of nearly 5,000,000 guilders.

The port of Rotterdam covers an area of 1125 acres. The total length of its quays is 17 miles, in addition to which there are about 10 miles of buoy berths. The principal of the large harbors on the left bank of the River Meuse are the Rhine, the Meuse, and the Waal. On the right bank of the river are the Schie, Yssel, Lek, Keile, and the newly constructed Merwe harbors. Several other harbors are in course of construction. There are 31 shipbuilding yards which together have 113 slipways for the building of ocean vessels and 15 floating docks for repair work. The largest of these docks has a lifting capacity of 46,000 tons.

For grain transport, the port of Rotterdam possesses 27 floating elevators with a capacity of 150 to 300 tons per hour. It is also a first-class petroleum harbor, its extensive tank grounds stretching along the river for 1¼ miles. In 1928 Dutch engineers completed widening the River Noord, part of the waterway connecting the Rhine and Amsterdam, to 200 meters (656 feet) throughout its entire length. The accompanying table shows the figures for the seagoing ships entering the harbor of Rotterdam:

Year	No. of Ships	Net Register Tonnage	Percentage of traffic of Dutch Ports (Net Register)	
			Number	Tonnage
1914	7,303	9,223,817	58	68
1915	3,644	4,153,682	57	63
1916	2,979	3,183,032	58	68
1917	1,374	1,299,384	63	70
1918	1,048	1,215,203	59	73
1919	4,328	5,047,742	61	71
1920	5,601	7,319,204	50	64
1921	7,475	10,366,333	53	62
1922	8,012	11,967,356	51	64
1923	7,797	11,161,328	47	58
1924	9,539	14,539,334	51	62
1925	10,951	16,658,286	53	62
1926	14,377	21,176,099	50	58
1927	13,060	21,087,405	53	63

In 1927, 2972 of these ships were Dutch, 2928 British, 2445 German, 1131 French, and 203 of the United States. The merchandise traffic from the Rhine, in tons of goods, was:

Year	Inward Clearances	Outward Clearances	Percentage of the traffic of the Kingdom
1913	7,024,259	15,739,982	81.47
1917	1,371,393	73,573	44.35
1918	1,007,837	27,577	35.67
1919	1,469,474	2,059,964	70.06
1920	3,024,944	3,476,325	70.78
1921	4,206,562	4,570,629	75.78
1922	3,141.158	8,453,736	74.09
1923	1,692,492	5,,752,486	75.63
1924	10,120,582	8,583,231	73.96
1925	11,591,932	11,252,917	73.20
1926	22,081,133	10,320,680	77.15
1927	15,266,362	18,001,835	76.47

Rotterdam's admirably equipped airport at Waalhaven functions as the centre for various international air services.

ROUAULT, GEORGES (1871–). A French painter, engraver, and lithographer, born in Paris, and curator of the Gustav Moreau Museum of that city. His chief works, which have established his position as one of the greatest visionaries of contemporary art, are "L'Enfant Jesus parmi les docteurs," a painting; "Tête de vieille femme," an engraving; "Paysage," a pastel; and "Minerve et Guerre."

ROUSSEL, ro͞o'sĕl', ALBERT (1869–). A French composer, born at Tourcoing. Although he received systematic instruction on the piano and organ at an early age, he did not think of following music as a career, but prepared himself for the navy, which he entered in 1887. On board ship, he made his first attempts at composition and became convinced of the necessity of serious study. After receiving a favorable verdict on some compositions he had submitted to Koszul, the director of the Conservatory at Roubaix, he resigned from the navy in 1893 and began his theoretical studies under Koszul. Later, he went to Paris, where he studied organ under Gigout and composition at the Schola Cantorum under d'Indy. After graduation in 1902, he taught counterpoint there until 1913. His compositions impress through their admirable technical workmanship and brilliant orchestral color, rather than through originality or spontaneity of invention. His principal works are an opera, *La Naissance de la Lyre* (Paris, 1925); two ballets, *Le Festin de l'Araignée* (1913) and *Padmâvati* (1922); two symphonies, *Le Poème de la Fôret* and *In B♭*; a symphonic prelude, *Résurrection*; three symphonic sketches, *Évocations;* an orchestral suite in F; a piano concerto; *Psalm LXXX*, for tenor, chorus, and orchestra; incidental music to Jean-Aubrey's *Le Marchand de Sable qui passe*; pieces for piano and songs.

ROVE TUNNEL. See TUNNELS.

ROWE, LEO S(TANTON) (1871–). An American economist (see VOL. XX). He was general secretary of the International High Commission (1915–17) and delegate to several Central American and South American conferences. He was Assistant Secretary of the Treasury (1917–19) and chief of the Latin-American Division of the State Department in Washington (1919–20). In September, 1920, he became director general of the Pan-American Union. He was U. S. delegate to the Fifth International Conference of American States at Santiago in 1923 and chairman of the U. S. delegation to the Pan-American Scientific Congress at Lima, Peru, 1924–25. His later publications include *Problemas Americanos, conferencias* (1915); and *The Federal System of the Argentine Republic* (1921).

ROWING. Rowing as a competitive sport originated in England among the boating clubs early in the nineteenth century and now ranks as one of the most popular sports, not only in the country of its origin but also in Germany, Belgium, Italy, France, Canada, and the United States. The oldest rowing fixture of importance is the Henley Regatta which was founded at Henley-on-Thames in 1839. The annual contests between Oxford and Cambridge universities date from 1829.

In the United States the decidedly outstanding competition is the Intercollegiate Regatta held yearly on the Hudson River, near Poughkeepsie, N. Y. The American Henley on the Schuylkill, near Philadelphia, the Childs Cup race on Lake Carnegie, Princeton, N. J., and the Yale-Harvard contests on the Thames, Connecticut, are other highly regarded rowing tests in the United States.

In the Oxford-Cambridge races, a string of five consecutive victories has been scored by

Cambridge since 1924. Oxford, however, can point to nine triumphs in a row in the period 1861–69 and the same number during 1890–98. The University of Washington captured the intercollegiate on the Hudson in 1923, 1924, and 1926, while the U. S. Naval Academy was victor in 1925, Columbia in 1927 and 1929, and California in 1928. Yale has conquered Harvard in their annual clashes seven times out of nine during 1920–28.

ROYCE, Josiah (1855–1916). An American philosopher (see Vol. XX). During the early years of the World War, he was active in his denunciation of the German cause. He was honored on his sixtieth birthday by a testimonial volume of philosophic essays written by his former students. Of his works published after 1914, *The Hope of a Great Community* appeared during his lifetime (1915). It dealt with one of his favorite themes, community loyalty. *Lectures on Modern Idealism* was published posthumously (1919) under the editorship of Professor Lowenberg.

ROYDEN, Agnes Maude (1876–). A British evangelist, who was educated at Cheltenham Ladies' College and Lady Margaret Hall, Oxford, where she studied philosophy. Accepting the teachings of Jesus as a result of her study, she worked at the Victoria Women's Settlement in Liverpool for three years, then in Luffenham parish, and later was the first woman lecturer, in English literature, at the Oxford University Extension Delegacy. In 1908 she started her activities in the nonmilitant branch of the woman-suffrage movement, being on the executive council and editor of the *Common Cause* (1908–14). In this work, she became widely known as an eloquent and convincing speaker. She was assistant-preacher at the City Temple, London (1917–20), and in the latter year, she and Dr. Percy Dearmer founded the Fellowship Services, held in a hall, so that those opposed to seeking aid in a church might have the benefit of their help. Her publications include *Women and the Sovereign State* (1917); *The Hour and the Church* (1918); *The Moral Standings of the Rising Generation* (1922); *Blessed Joan of Arc* (1923); *Christ Triumphant* (1924); and *I Believe in God* (1927).

RUBBER. With the universal use of the motor vehicle with its pneumatic or solid rubber tires, the rubber industry has developed into one of the important manufacturing activities of the United States, which by 1928, so far as its product was concerned, exceeded the rubber manufacturing industries of all other countries in the world combined, and consumed nearly 70 per cent of the world's crude-rubber production in that year. With approximately 89 per cent of the world's motor vehicles made in the United States, it was inevitable that the United States should occupy a leading position in rubber manufacturing, and when to this is added the production of rubber footwear, as well as rubber hose and packing, it can be appreciated how important the American industry really is.

The world's production and consumption between 1910 and 1928 had increased roughly from 93,950 tons to about 658,000 tons in 1928. There was overproduction in 1919 following the World War, so that in 1920 and 1921 there was a decline in the output and in the latter year the lowest prices since 1913 were recorded. Low prices due to overproduction continued notwithstanding the increased consumption in the United States, and it was realized that many of the plantations in the Far East were either operating at a loss or their future was seriously threatened.

In view of this situation, a plan devised by Sir James Stevenson and a committee, known by the name of its chairman as the Stevenson plan, was put into effect to restrict production on the Eastern planations and increase, or at least stabilize, prices of crude rubber. This plan was pursued until Nov. 1, 1928, when it was abandoned. The Stevenson plan duly accepted by the British government came into effect Nov. 1, 1922. In 1923 British- and Dutch-owned plantations produced approximately 93½ per cent of the world's rubber, and of this somewhat more than 33 per cent was controlled by companies owned or managed in the Netherlands. Therefore, for the complete success of any restriction scheme, the coöperation of Dutch interests and plantations was essential.

The original plan developed in 1922 by the British Colonial Office aud rubber producers, provided that 60 per cent of the estimated normal crop of rubber would be exported at the minimum duty, while exports in excess of that amount would be taxed heavily, the greater the excess, the heavier the tax. The normal output of each plantation was computed and each producer was alloted a certain amount over which he would be taxed. There was no restriction on production, and the producer could hoard his supply if he so desired. The growers in the Dutch East Indies were urged to coöperate and to work on the same basis as the British-owned plantations of Malaya and Ceylon, but they almost unanimously declined.

The first effect of the plan was an improvement in prices in which naturally the Dutch shared, and the members of the Rubber Growers' Association, the British controlling agency, believed that the plan would be effective without the coöperation of the Dutch East Indies. Naturally, there were disturbances in the rubber industry of both Europe and America, but these were calmed as prices soon declined. Those behind the scheme were doomed to disappointment, as American buyers cut down their purchases and prices fell below a point where it was believed they could be held by the Stevenson scheme. In the meantime, the Dutch East Indies benefited, as their production and exports increased, while those of Malaya and Ceylon were cut down in accordance with the restriction plan. Thus, the British Malayan exports in 1923 were about 184.000 tons, as compared with 212.695 tons in 1922; and those from Ceylon about 39,000 tons, as compared with 46,694 tons in 1922; but the Dutch shipped about 30,000 tons more in 1923 than in 1922, so that the Far Eastern supply was cut only about 9000 tons.

Obviously, such a small reduction had but little effect on prices, which fell during the year, and was not satisfactory to the advocates of restriction, who, still confident of its efficacy, continued to urge that the Dutch should join with them notwithstanding that they had made some $70,000.000 more on rubber in the year ended Oct. 31, 1923, than in the year before. The British advocates tried to persuade the Dutch not to export more than 100,000 tons in 1924 and they argued that such a restriction would be good not only for the industry but would improve the plantations by preventing the trees from deteriorating under overtapping. The Dutch claimed that they had not overtapped their trees, and that the

TABLE I—CRUDE RUBBER: WORLD PRODUCTION, UNITED STATES IMPORTS AND REËXPORTS, NET IMPORTS, AND PRICE

[Quantities are in long tons of 2240 pounds]
Source: Bureau of Foreign and Domestic Commerce, except for prices.

Year	World production			United States [a]			Per cent of world production	Average yearly price per pound	
	Middle east	Other	Total	Imports	Reëxports	Net imports		Fine para [b]	Ribbed smoked sheet [c]
1905	174	59,320	59,494	28,637	1,616	27,021	45.4	$1.243	.....
1910	10,916	83,034	93,950	45,003	2,749	42,254	45.0	1.908	$2.066
1913	53,644	66,479	120,123	53,906	1,881	52,025	43.3	.807	.820
1914	74,587	48,586	123,173	64,884	2,618	62,266	50.6	.616	.653
1915	116,370	54,456	170,826	101,093	2,082	99,011	58.0	.557	.659
1916	161,842	52,247	214,089	121,709	4,098	117,611	54.9	.669	.725
1917	221,452	56,688	278,140	183,255	4,000	179,255	64.4	.648	.722
1918	181,061	38,623	219,684	146,132	2,746	143,386	65.3	.549	.602
1919	348,990	50,741	399,731	240,689	2,282	238,407	59.6	.483	.487
1920	305,106	36,927	342,033	253,680	4,160	249,520	73.0	.333	.363
1921	277,516	23,996	301,512	185,452	5,716	179,736	59.6	.182	.163
1922	379,520	26,874	406,394	301,203	4,809	296,394	72.9	.183	.175
1923	380,058	28,583	408,641	310,299	8,772	301,527	73.8	.248	.295
1924	394,037	31,954	425,991	329,322	10,309	319,013	74.9	.212	.262
1925	488,825	39,660	528,485	400,423	14,827	385,596	73.0	.569	.725
1926	582,163	41,102	623,265	417,643	17,671	399,972	64.2	.380	.487
1927	568,133	44,431	612,564	431,246	27,775	403,471	65.9	.268	.381
1928	626,181	31,819	658,000	439,732	32,159	407,573	61.9	.186 [d]	.226

[a] Import figures in this table include with crude rubber, guayule, which is excluded in other import tables, but is included in this table in order to make a comparison with production figures which also include guayule.
[b] Bureau of Labor Statistics, Department of Labor.
[c] Commercial Research Department, United States Rubber Co., for 1910; thereafter, compiled from the *India Rubber World*.
[d] Partly interpolated.

great increase in rubber output of the Dutch colonies was accounted for not so much by larger production from the estate plantations, possibly some 5000 tons over 1922, but by an extraordinary production of wild or native rubber, which was estimated at over 22,000 tons more than in 1922. The Dutch planters also claimed that the complete cessation of tapping for some such period as three months would be more advantageous than a policy of restricting.

While this restriction policy during its first years had failed so to stimulate the market price of rubber as to result in increasing the exportable allowances, in 1925 it became possible for producers to increase production and this continued in 1926, although the regulations were changed somewhat at this time. In the meantime, the consumption of rubber had increased to a very marked degree and in the three-year period, 1925–27, the world consumption totaled 1,674,000 tons, the yearly amounts being: 1925, 553,000 tons; 1926, 541,000 tons; and 1927, about 580,000 tons.

During these years, there was evident the constantly declining degree of control of the world's production of crude rubber exercised by British colonies and territories. In 1922, before restriction, British possessions produced 67 per cent of the world's rubber, but this declined to 53 per cent in 1925 under the policy of restriction. In 1926, when production was practically unrestricted, the British share amounted to 59 per cent, but in 1927 it was estimated at 53 per cent, while in 1928 the British territories supplied 61.6 per cent of the world's entire rubber production.

With the rubber decline in British possessions, there was corresponding increase of production in the Netherland East Indies, where Dutch native rubber had increaesd from 20,000 tons dry weight, produced in 1922, to about 93,000 tons in 1927. There was also an increase in the production of rubber in Indo-China and Siam, guayule rubber in Mexico, as well as of wild rubber in Brazil and Africa.

TABLE II—UNITED STATES IMPORTS OF CRUDE RUBBER, BY COUNTRIES OF SHIPMENT

Year	Total	United Kingdom	Ceylon	British Malaya [a]	Other British East Indies	Netherland East Indies	Brazil	Continental Europe	All other countries
Quantity, thousands of pounds: [b]									
1900	49,377	8,611	([c])	([c])	640	.....	28,027	8,388	3,711
1905	67,234	10,025	([c])	1,899	207	7	36,594	14,546	3,957
1910	101,045	15,557	([c])	1,278	1,124	18	39,511	16,127	[d] 27,430
1913	113,384	34,165	([c])	5,639	6,536	81	43,519	17,955	5,490
1920	566,546	75,297	([c])	296,448	55,476	72,374	36,982	16,840	13,129
1921	415,283	41,521	([c])	219,194	48,846	53,012	23,274	23,977	5,459
1922	674,410	50,880	76,826	406,327	1,477	92,362	25,009	15,926	5,604
1923	692,483	66,612	61,443	399,108	1,561	112,305	25,940	14,595	10,920
1924	734,845	85,237	61,075	407,850	3,700	131,763	29,026	10,506	5,690
1925	888,478	84,731	66,398	517,148	3,991	153,241	34,715	18,308	9,947
1926	925,878	57,522	81,532	573,204	4,626	156,555	29,659	14,253	8,527
1927	954,750	73,788	85,012	568,644	1,018	169,551	38,146	11,330	7,276
1928	978,107	108,305	82,700	558,773	2,121	192,414	25,380	6,492	1,923
Value, thousands of dollars: [b]									
1925	429,705	47,951	35,687	244,636	1,857	65,639	16,174	12,306	5,454
1926	505,818	33,536	44,863	314,878	2,615	87,157	11,845	7,206	3,718
1927	339,859	26,743	30,608	203,828	483	62,817	9,699	3,719	1,967
1928	244,855	28,930	20,814	138,012	609	49,042	5,148	1,379	922

[a] Designated as Straits Settlements prior to 1926.
[b] Fiscal years to and including 1913, calendar years thereafter.
[c] Included with "Other British East Indies"; not shown separately.
[d] Includes 23,486,384 pounds of rubber, valued at $10,918,104, from Mexico.
Source: Bureau of Foreign and Domestic Commerce.

World production of rubber as measured by net exports from producing countries increased from 426,000 long tons in 1924 to 528,000 tons in 1925, and to 623,000 tons in 1926. This increase, as stated, was the result of the higher rate of exports permitted in the area under restriction in 1925 and 1926, as well as of stimulation of production in nonrestricted areas caused by the high price of rubber during the period. This last factor operated to maintain production at 613,000 tons in 1927, despite a reduction in the exportable rate for the restriction area. World production in 1928 had increased to 658,000 tons, the gain being the direct result of the abandonment of restriction effective November 1 of that year.

Following the announcement of the British Colonial Secretary in this connection in the previous year, producers entered upon a full-production programme as rapidly as possible, exporting excess production after November 1, and continuing into the following year. How long the production would continue to increase was a debatable subject, as considerable areas planted during 1925–28 would soon yield.

TABLE III—THE UNITED STATES RUBBER INDUSTRY [a]
Source: Bureau of the Census.

Industry and year	Establishments	Wage earners (average number)	Primary horsepower	Wages	Cost of materials	Value of products	Value added by manufacture
The industry as a whole:							
1899	301	36,566	70,536	$15,426,573	$60,240,559	$99,880,693	$39,640,134
1909	267	49,264	121,721	25,136,976	122,745,102	197,394,638	74,649,536
1914	342	74,022	199,242	44,167,402	163,034,713	300,993,796	137,959,083
1919	477	158,549	429,273	193,763,089	594,343,590	1,138,216,019	543,872,429
1921	496	103,273	([b])	123,612,873	377,879,372	704,903,133	327,023,761
1923	529	137,868	605,634	182,084,056	501,162,768	958,517,634	457,354,866
1925	530	148,525	659,691	191,285,520	721,730,842	1,260,805,063	539,074,221
1927	515	141,980	925,613	198,052,473	660,294,888	1,224,941,390	564,646,502
Boots and shoes, rubber:							
1921	24	23,888	([b])	23,428,115	32,132,942	94,032,524	61,899,582
1923	25	29,435	56,184	33,670,810	45,268,988	131,739,742	86,470,754
1925	23	24,999	59,413	28,057,948	40,566,085	115,934,554	75,368,469
1927	22	26,848	67,159	32,078,955	43,372,916	124,607,801	81,234,885
Tires and inner tubes, rubber: [c]							
1921	178	55,496	([b])	75,054,148	291,554,377	496,123,335	204,568,958
1923	160	73,963	370,551	108,623,102	365,165,016	644,193,697	279,028,681
1925	126	81,640	403,227	120,614,081	559,940,978	925,001,520	365,060,542
1927	109	78,256	592,025	120,063,854	499,220,642	869,688,063	370,467,421
Rubber goods, not elsewhere classified: [d]							
1921	294	23,889	([b])	25,130,610	54,192,053	114,747,274	60,555,221
1923	344	34,470	178,899	39,790,144	90,728,764	182,584,195	91,855,431
1925	381	41,886	197,051	42,613,491	121,223,779	219,868,989	98.645,210
1927	384	36,876	266,429	45,909,664	117,701,330	230,645,526	112,944,196

[a] Figures are not strictly comparable for censuses prior to 1909.
[b] Not called for in schedule for 1921.
[c] Not separately classified prior to 1921.
[d] Figures for this group prior to 1921 are not comparable.

The American rubber industry, depending on raw materials shipped from foreign countries, where various schemes of restriction to control the production at times have been practiced, has manifested great interest in acquiring supplies of its own upon which it could depend for raw rubber. The Ford Industrial Company of Brazil, a subsidiary of the Ford Motor Company of Detroit, acquired 3,700,000 acres in the Amazon Valley on which it proposed to undertake rubber cultivation on a large scale. The Firestone Company in 1926 arranged for a lease of 1,000,000 acres in Liberia, and continued to make further progress with its rubber-planting project. In Sumatra, the Goodyear interests increased their plantation holdings, so that American holdings in this island, including those of the U. S. Rubber Company and the Continental Rubber Company, together with the plantations of the Manhattan Rubber Company in Java, amounted to some 200,000 acres under development. In the Philippine Islands, progress has been made in furthering rubber cultivation and it has been proposed to amend the land laws so as to allow ownership of sufficient areas for the economic production of rubber. In the Southwest, there has been development of guayule growing, while in Florida, Thomas A. Edison carried on experiments, with 3000 rubber and near-rubber plants, for which he claimed encouraging results.

As the accompanying table indicates, automobile tires and tire sundries are responsible for the larger part of the crude rubber consumption in the United States and notwithstanding their improvement and the greater numbers used have continued to mount and require an ever-increasing amount of crude rubber. The accom-

TABLE IV—CENSUS STATISTICS OF PRODUCTION OF AUTOMOBILE TIRES
Source: Bureau of the Census

	Pneumatic casings		Pneumatic inner tubes		Solid and cushion tires	
Year	Number	Value	Number	Value	Number	Value
1914	8,021,000	$105,679,000	7,907,000	$20,101,000	([a])	$13,736,000
1919	32,836,000	603,896,000	33,255.000	81,313,000	1,455,000	43,917,000
1921	27,298,000	377,829,000	32,082,000	52,858,000	401,000	14,736,000
1923	45,426,000	458,108,000	57,229.000	74,983,000	944,000	29,061,000
1925	58,784,000	656,492,000	77,388,000	118.235,000	1,035,000	43,870,000
1927	63,550,000	633,582,000	70,855,000	105,487,000	813,000	34,985,000

[a] Number of solid tires not reported for 1914.

TABLE V—CONSUMPTION OF CRUDE RUBBER AND VALUE OF OUTPUT BY CLASSES OF PRODUCTS

Source: Rubber Association of America (Inc.)
[In thousands of pounds or dollars]

Product	Consumption of crude rubber				Value of products			
	1925	1926	1927	1928	1925	1926	1927	1928
Grand total	792,676	738,622	767,706	911,342	1,142,096	1,206,022	1,113,380	1,099,790
Tires and tire sundries								
Automobile casings	665,249	630,909	652,257	780,279	803,659	866,795	785,419	771,066
Automobile tubes	478,742	469,992	499,876	608,131	618,266	680,026	624,746	622,557
Motor-cycle tires (casings and tubes)	131,716	113,362	106,411	126,343	117,631	121,891	99,567	94,854
Bicycle tires and tubes	909	712	903	923	2,189	2,083	2,128	1,834
Airplane casings and tubes [a]	1,817	1,691	1,613	2,164	3,011	2,860	2,470	2,845
Solid and cushion tires for	2	....	67	260	450	425	839	411
automobiles	41,355	33,764	30,614	27,373	40,842	36,098	33,190	24,694
Other solid tires	1,033	732	836	1,421	1,440	898	1,032	2,602
Sundries and repair materials	9,675	10,656	11,937	13,666	19,830	22,514	21,447	21,269
Other rubber products	127,427	107,713	115,450	131,062	338,437	339,227	327,961	328,724
Mechanical rubber goods	41,998	33,925	34,975	40,083	102,607	98,258	98,273	102,258
Boots and shoes	29,575	31,909	37,014	37,843	100,675	114,594	103,892	93,875
Insulated wire and insulating compound	7,170	6,825	7,797	7,715	33,379	35,487	34,075	34,432
Druggists' rubber sundries	5.286	4,731	5,219	3,532	13,711	12,931	14,048	8,492
Stationers' rubber goods	([b])	([b])	([b])	2,847	([b])	([b])	([b])	2,746
Bathing apparel	([b])	([b])	([b])	1,404	([b])	([b])	([b])	2,347
Rubber clothing [c]	5,943	5,613	9,054	2,796	21,754	22,662	27,383	8,438
Automobile fabrics [c]				2,153				9,110
Other rubberized fabrics [c]				5,011				9,695
Hard-rubber goods	5,589	2,547	1,572	2,486	12,719	10,355	8,073	7,345
Heels and soles	18,341	9,659	8,785	12,524	27,565	18,373	19,616	23,653
Rubber flooring	1,481 [d]	1,942	2,065	2,379	2,971 [d]	4,241	4,884	4,707
Sporting goods, toys, and novelties	([e])	([e])	([e])	3,091	([e])	([e])	([e])	7,582
Miscellaneous, not included above	12,044	10,562	8,967	7,199	23,056	22,326	17,717	14,044

[a] Formerly reported as "Other casings and tubes."
[b] Included in "Druggists' rubber sundries."
[c] Formerly reported as "Proofed goods."
[d] Last 9 months only.
[e] Included in various classifications.

panying table indicates the production of automobile tires for certain years as recorded in censuses of manufactures.

The consumption of crude rubber in mechanical rubber goods (belting, hose, and packing) in factories reporting to the Rubber Association of America amounted to 40,083,000 pounds in 1928, which was 5 per cent less than the peak consumption of 1925. In the manufacture of mechanical rubber goods in the past few years, large quantities of reclaimed rubber also have been used. The value of boots and shoes reported in 1928 was only $93,875,000, which was smaller than that for any of the previous five years. The value of heels and soles amounted to $23,653,000; and the consumption of rubber in them was 12,524,000 pounds.

Manufacture of insulated wire and insulating compounds consumed 7,715,000 pounds of crude rubber in 1928, according to incomplete reports of the Rubber Association. Statistics for stationers' rubber goods and bathing apparel, included previously with druggists' rubber sundries, were shown separately in 1928. Production of the three classes together appears to have increased largely, 7,783,000 pounds of rubber being consumed, compared with 5,219,000 pounds in 1927. Lower prices brought a decline in value.

TABLE VI—USE OF CRUDE AND RECLAIMED RUBBER

Year	Long tons		Ratio of reclaimed to crude, per cent
	Crude rubber	Reclaimed rubber	
1925	387,629	137,000	35.3
1926	366,000	164,500	45.0
1927	373,000	189,500	50.8
1928	437,000	223,000	51.0

Reclaimed Rubber. An interesting development of recent years has been the increased use of reclaimed rubber, a material that, extensively employed in 1917 on account of war conditions, by 1929 had become established as a compounding ingredient capable of employment in a wide variety of rubber products. By reason of regularity of supply, quality, and price, its content of many chemicals required in rubber manufacture, and the increasing skill of chemists in its application, reclaimed rubber had made for itself an important position and continued to increase in use, as the accompanying tabulation shows. Notwithstanding the low crude-rubber prices during 1928, the percentage of reclaimed used, as compared to 1927, was not reduced; during the last half of 1928, however, the percentage was notably less than in the first half. See MOTOR VEHICLES; PHYSICS.

RUBBER, ARTIFICIAL. See CHEMISTRY, APPLIED.

RUBIES, ARTIFICIAL. See MINERALOGY.

RUBIÓ Y LLUCH, ANTONIO (1856–). A Spanish scholar and man of letters. He took his doctor's degree in philosophy and letters at the University of Madrid (1879), and later became licentiate in civil and canon law. A professor of Spanish literature at the University of Barcelona, he has also specialized on the history of the Principality of Cataluña. His principal works are *Estudio crítico-bibliográfico sobre Anacreonte y la colección anacreóntica, y su influencia en la literatura antigua y moderna* (1879); *Los navarros en Grecia y el Ducado Catalán de Atenes en la época de la invasión* (1886); *El renacimiento clásico en la literatura catalana* (1889); and *Documentós per l'historia de la cultura catalana migeval* (2 vols., 1908 and 1921).

RUDDER, FLETTNER. See NAVIGATION.

RUEDEMANN, RUDOLF (1864–). An American geologist and palæontologist (see VOL. XX). In 1926 Dr. Ruedemann, who had been assistant State palæontologist of New York and curator of palæontology of the N. Y. State Museum since 1899, became State palæontologist. In 1928 he was elected to the National Academy of Sciences. His publications include: *Lower Siluric Shales of Mohawk Valley* (1916); *Paleontologic Contributions* (1916); *The Existence and Configuration of Pre-Cambrian Continents* (1922); *Utica and Lorraine Formations of New York* (1925); and *Some Silurian (Ontarian) Faunas of New York* (1925).

RUFFO, rōōf'fō, TITTA (1878–). An Italian dramatic baritone, born at Pisa. He studied under Persichini at the Accademia Santa Cecilia in Rome and then under Cassini in Milan. In 1898 he made his début at the Teatro Costanzi in Rome, as the Herald in *Lohengrin.* It was not until the following year, in Rio de Janeiro, that he had the opportunity of appearing in principal parts; his unusual gifts both as a singer and actor were quickly recognized. After his return, he sang at the principal Italian opera houses and also won triumphs in Paris and Vienna. His American début as Rigoletto with the Chicago Opera Association (Nov. 4, 1912) caused a veritable sensation. He later revisited the United States several times, and always appeared with the same success, both in opera and in concert.

RUHR OCCUPATION. See GERMANY, under *History*; REPARATIONS.

RULE OF REASON. See LAW, PROGRESS OF THE.

RUMANIA. An eastern European country, with an area of 122,282 square miles, as compared with 53,489 square miles before the World War. The cession of the following provinces accounted for the increase: Bessarabia (17,146 square miles), Bukovina (4030), Transylvania (22,312), Crisana (8038), Maramuresh (6258), Bánát (11,009). The population in 1914 numbered 7,768,341; in 1920 it was 16,262,177. Of the latter, 3,348,860 lived in urban communities and 12,913,317 in rural. An estimate in 1927 placed the population at 17,709,273, or 155 per square mile. Cities of over 50,000 in order were: Bucharest, the capital (308,987 inhabitants in 1917), Chisinau, Czernowitz, Ismail, Jassy, Galatz, Temesvár, Braila.

Education; Religion; Race. Elementary education, though free and compulsory, is still in a rudimentary state. In 1927–28 the number of students enrolled in primary schools was 1,600,098; in other schools, 215,872; and in universities, 25,525. Besides the universities at Bucharest and Jassy, two additional were opened, at Cluj in Transylvania in 1919 and at Czernowitz in Bukovina in 1920. In 1918, 9,695,714 communicants belonged to the National Orthodox Church, 1,456,147 to the Greek Catholic, 1,483,929 to the Roman Catholic. Besides, there were 1,344,970 Protestants, 834,344 Jews, and 44,098 Mohammedans.

Though statistics on the subject are not available, a consideration of ethnographic surveys indicated that Rumania's problem of racial groups is one of great importance. There are large numbers of Magyars in Central Moldavia and East Transylvania, Saxons and Swabians in South Transylvania and the Bánát, Germans and Ruthenians in Bukovina and Bessarabia, Bulgarians and Serbs along the Danube, Bulgars, Russians, Germans, Turks, and Tartars in the Dobrudja, and Russians in Bessarabia. By the Minorities Treaty signed with the Allies in 1919, Rumania pledged herself to respect all racial, linguistic, and religious differences and to permit the establishment of churches, schools, and eleemosynary institutions. These pledges were repeated in the new constitution of 1923.

Industry. Agriculture, as in old Rumania, is the main resource of the population of Greater Rumania. In 1926 there were 30,336,000 acres of arable land, or about 41 per cent of the total area; 10,270,000 acres of permanent meadow and pasture; 1,374,000 acres of trees, shrubs, and bushes; and 17,912,000 acres of woods and forests. The value of all crops in 1927 was $410,712,000, compared with $355,208,000 in 1926. In 1928 there were 4,552,166 cattle, 192,268 buffaloes, 3,075,782 swine, 12,941,000 sheep, 418,616 goats, and 1,939,438 horses.

CROPS: AREA AND PRODUCTION

Crop	Area (thousands of acres)		Production (thousands of units—bushels, except as indicated)	
	1909–1913 [a]	1927	1909–1913 [a]	1927
Wheat	9,515	7,663	158,672	96,797
Rye	1,286	695	20,644	9,553
Barley	3,378	4,360	61,677	57,409
Oats	2,119	2,680	59,776	58,688
Corn	9,644 [b]	10,427	193,209 [b]	145,475
Potatoes	343	488	41,868	......
Grapevines	216 [c]	695	37,436 [c] [e]	191,260 [e]
Tobacco	53	76	48,174 [f]	40,000 [f]

[a] 4-year average, present boundary.
[b] 2-year average, present boundary.
[c] 5-year average, former boundary.
[d] 1923–25 average.
[e] Unit, gallon of wine.
[f] Unit, pound.

Provisional figures for the 1928 acreage and production are wheat, 7,752,882 acres and 3,551,590 (metric) tons; rye, 703,137 acres and 300,579 tons; barley, 4,410,650 acres and 1,646,575 tons; oats, 2,711,020 acres and 932,768 tons; corn, 10,548,557 acres and 2,536,937 tons. The most important mining activity is that of petroleum. In 1913, 13,555,000 barrels were extracted; in 1928, 31,690,391 barrels. Refining is done in the country and most of the product is exported. Principal wells are located at Prahova, Dambovitza, Bacau, and Buzau. The wells and refineries were destroyed in 1916 to prevent their falling into the enemy's hands, but during the German occupation extensive restorations took place. Natural gas production, a new development, reached 13,305,000 cubic feet in 1926. Coal, salt, and other minerals are produced in small quantities, the production in 1926 being 2,731,362 tons of lignite, 344,062 tons of salt, 102,799 metric tons of iron ore, and 62,979 tons of pig iron. In 1927 lignite production was 2,850,011 tons. Aside from petroleum refining, grain milling, and lumbering, manufactures are little developed. Plants are devoted to textiles, leather, iron, and ceramic products. In 1925, 3445 establishments employed 208,683 workers, as compared with 1149 and 58,871, respectively in 1915.

Trade and Communications. Rumanian exports were $227,803,000 in 1927, as compared with $176,590,000 in 1926; imports for the same years were $201,975,000 and $171,662,000. In 1928 imports totaled 32,145,101,000 lei and exports 26,919,256,000 lei. Exports of cereals in 1927 were the heaviest of any post-war year and exports of petroleum products reached a record in 1928. Exports in 1927 were greatly stimulated by reduction or elimination of export taxes on the principal commodities. On June 30, 1927, there were 31 steam and motor vessels (100 tons or over) belonging to the merchant marine, with a total gross tonnage of 65,570 tons. The tonnage clearing from the Danube ports in 1927 was 9,818,800. In the same year, 2636 ships of 4,970,369 tons cleared the seaport of Constanza. The country's principal seaports are Constanza, Galatz, and Braila. In 1927 the total mileage of State railways was 8744. By the Treaty of Versailles, the Danube Commission was reconstructed to consist only of representatives of Great Britain, France, Italy, and Rumania.

Finance and Economic Conditions. For 1913–14 the budget balanced at 600,232,900 lei ($115,844,950); the budget for 1929 provided for revenues and expenditures of 38,300,000,000 lei ($231,711,000 at the rate of exchange then prevailing). Chief sources of revenue for 1929 were enumerated as direct taxes, 7,862,000,000 lei; indirect taxes and customs, 12,392,000,000; stamp taxes, 4,500,000,000; state monopolies, 8,253,000,000. The public debt on Oct. 1, 1913, amounted to $341,455,000; in 1922, the total foreign debt, exclusive of the share in the obligations of the Austro-Hungarian monarchy, was $1,025,000,000 at par of exchange then. Included in the latter were debts to the Allies and the United States aggregating $396,000,000. The internal debt consisted of obligations given to the National Bank against paper money issues. On Jan. 1, 1928, the internal debt was 23,239,200,000 lei, of which 13,769,500,000 was the consolidated and 9,469,700,000 lei, the floating debt. The consolidated external debt amounted to $66,060,560, 475,793,300 lire, 129,752,793 pounds sterling, and 499,099,500 French francs. In February, 1929, a further loan of £20,750,000 was floated and on February 8, the leu was stabilized at 813.588 to the pound sterling or a value of 10 milligrams gold. In 1929, 20,390,975,000 lei in paper currency was in circulation, as compared with 578,000,000 in 1914. The budget for 1924 was the first since the World War to contain a service for the internal and external funded debts. The failure to fund a large part of the debt, the inability of merchants to meet their foreign obligations incurred after the War, and the continued currency depreciation contributed to the commercial stagnation. In 1923 a temporary moratorium was declared. The exchange value of the leu for typical years was: 1914, $0.193 (par); 1920, $0.02; 1921, $0.012; 1923, $0.00494; 1927, $0.00604. The cost of living index: 100, Aug. 1, 1916; January, 1922, 1858; January, 1923, 2494; December, 1923, 3552; July, 1927, 3900.

History. From the opening of the World War to Aug. 28, 1916, Rumanian politicians watched the straws to detect the direction of the wind. Refusing to be bound by the secret alliance with the Central Powers, they continually sought to drive a favorable bargain with the Allies, seeking promises of (Austrian) Bukovina, (Russian) Bessarabia, and (Hungarian) Transylvania and Bánát. Teutonic successes in 1915 cooled the Rumanian ardor for a time, but the Allied victories in both the east and the west and the preparations at Saloniki in 1916 led to a secret agreement by which Rumania was to receive as the price of intervention, besides military support, a part of Bukovina, Transylvania, and the border regions to the west, and all the Bânát. See Banat of Temesvar. On Aug. 28, 1916, therefore, Rumania confidently declared war on Austria, and Rumanian troops enthusiastically marched through the defiles of the Transylvanian Alps to liberate their kinsmen from Hungary. Then, swiftly, disaster overtook the Rumanian cause. From the south, a Bulgarian Army swept into the Dobrudja to stay until the end of the War, while from the north, General Falkenhayn pursued the shattered Rumanian Army back across the frontier and into Moldavia. On Nov. 27, 1916, Bucharest was abandoned by the King and Parliament and Jassy was made the seat of government. Wallachia was overrun, large stores of grain sent to Germany, and the oil fields operated by the invader for his own purposes. Russian disintegration prevented a planned counteroffensive and Rumania was completely crushed. Some months later, she was compelled to accept an armistice dictated by Germany, and in March, 1918, to accede to the humiliating Treaty of Bucharest by which she was deprived of the Dobrudja and control over the Danube, as well as possession of her railways, wheat crops, and petroleum wells for an indefinite period. In the meantime, under the shadow of the German occupation, Parliament had passed a radical agrarian law fixing the maximum holding at 50 hectares and providing for a progressive annual distribution of large areas of land among the peasantry. By 1925, 5,713,600 hectares had been distributed.

With the fall of the Central Powers and the triumphal reëntry of the King into Bucharest on Dec. 3, 1918, the militant Nationalists, flushed by a victory in which they considered themselves participants, assumed control of the government without waiting for a parliamentary mandate and took a threatening posture toward their late enemies. The annexation of Bessarabia was declared a *fait accompli;* an army was sent into Transylvania to support the movement for independence and union with Greater Rumania. To create a diversion in the face of internal unrest and perhaps also to impress the Peace Conference, Rumania in 1919 sent an army into Soviet Hungary. Early in August, the Rumanians entered Budapest and proceeded to confiscate foodstuffs, farm animals, tools, and rolling stock. Not until Admiral Horthy was safely installed as Regent of Hungary did they quit the country. By the treaties of St. Germain (Austria) and the Trianon (Hungary), the Bucharest "peace" (above) was canceled and Rumania was given sovereignty over most of Bukovina, all Transylvania, together with a strip of the Hungarian plain west of the Transylvanian uplands, and the northeastern half of the Bánát of Temesvár. The Treaty of Neuilly (Bulgaria) confirmed Rumania in the possession of the Dobrudja. Moreover, by a treaty signed with the Allies in October, 1920, Rumania was authorized to retain Bessarabia. A minority treaty (Dec. 9, 1919) dictated by the Allies guaranteed liberal treatment of minorities in the annexed as well as the pre-war territories of Rumania. The combined result of the peace treaties was to more than double Rumania's area and population.

The years following were concerned with the vexing internal problems of constitutional reform, the agrarian question, and the general unrest brought on by tardy reconstruction measures. Ministries fell rapidly. In 1919–20 an agrarian minorities bloc tried to form a government, but it soon gave way to the ministry of General Averescu, supported by Take Jonescu, which was strongly nationalistic in temper. The minorities in Bukovina, Transylvania, and Bessarabia, were antagonized by the dissolution of their national councils; the failure to hasten the land reform measures aroused the hostility of the peasants. Meanwhile, the prisons were being filled with political prisoners. In 1921 Jonescu headed a ministry; in 1922 Jon Bratiano succeeded him. On Oct. 15, 1922, the coronation of King Ferdinand and Queen Marie as rulers of Greater Rumania was celebrated. The year marked an increasing participation of Rumania in foreign affairs. The Rumanian government renewed its adhesion to the Little Entente (q.v.), which it had formed together with Czechoslovakia and Jugoslavia in 1920, and by its firmness it forced the Russians temporarily to accede to the annexation of Bessarabia. The goings and comings of Queen Marie over Europe, and her success in marrying her daughters to the kings of Greece and of Jugoslavia, gave Rumania a certain conspicuousness perhaps hardly justified by its internal condition or its potential development. The year 1923 saw no further advance toward stability. Anti-Semitism was rife and led to frequent attacks on the Jews and on the Government for being presumably sympathetic toward Jewish aspirations. Fascism, inspired by Italian success, appeared and 100,000 Black Shirts were soon enrolled. Even the promulgation of the National Constitution (Mar. 28, 1923), which in some senses was an advanced document, did not serve to quiet the unrest. By it, minority representation was provided and full rights of citizenship were granted to Rumanian Jews; the State claimed for itself all mineral wealth, including oil, to be found in the subsoil, as well as water-power properties, etc.; constitutional guarantees were set up for the freedom of the press and against the imposition of a censorship, for the freedom of association, public assembly, etc. The failure to satisfy the peasants by a land division, the repeal of the more liberal declarations of Bessarabia and Transylvania of 1918 which established land and electoral reforms, and the recognition of the Greek Orthodox Church as the dominant ecclesiastical body, arousing resentment in the Roman Catholic Magyars, resulted in the strengthening of an opposition whose character presaged future difficulties.

The year 1924 hardly saw an alleviation of Rumania's difficult position. Threatened by Russia on one side, rebuffed by the Great Powers, with the possibility of internal dissension hanging over the country, the Government's deportment plainly showed its uneasy frame of mind. Russia abruptly terminated the Russo-Rumanian conference at Vienna in March because of the Bessarabian question. There was continual talk of Russian desire to establish a Moldavian republic centring in Bessarabia and including Kherson and Podolia. Whether Russia meant to attack or not, the Rumanian official attitude certainly favored preparedness, for a steady stream of munitions was proceeding from France into the country. In April and May, the Rumanian royal family completed a round of visits to Paris, Brussels, and London; but the financial and diplomatic purposes behind the visits ended in failure: Rumania received neither promises of military aid nor the proffer of funds to relieve her economic distress. Foreign governments were further antagonized by the mining law of July, 1924, the terms of which were very unfavorable to foreign-owned corporations. To complicate further the domestic situation, protests were frequent against the virtual dictatorship of the Bratiano brothers. From the economic and political points of view generally, Roumania's situation was quite as critical as that of her neighbors, Bulgaria, Greece, and Hungary.

As time went on, the opposition to the Bratiano régime became more and more pronounced. Among the people, it found expression in occasional huge mass meetings, such as that at Bucharest in June, 1924, and in Parliament in the frequent refusal of the opposition parties to participate in legislation. Recognizing that their division played into the hands of the Bratianos and the Liberals, the opposition made many attempts to unite their forces. Early in 1925, the fusion movement attained partial success when the National Party joined hands with the Peasant Party; their common hostility to the existing ministry was voiced at a big demonstration in Bucharest on May 17 attended by some 150,000 people. To prevent this movement from flaming out into revolution, the Government held the country under martial-law conditions. It yielded to the popular unrest sufficiently to pass a law providing for practically universal suffrage, but otherwise made few concessions. Nevertheless, its position grew weaker. Financial depression, the Bratiano policy of utilizing the state's resources for party advantage, the depressing effect on the country's economics of the Government's hostile attitude toward foreign capital, were all undermining influences. They were to some extent offset by the able handling of the country's finances, signalized by the balancing of the budget and the consolidation of the foreign debts, including that to the United States.

An assertive foreign policy, while it appealed to Rumanian nationalistic spirit, created much ill-feeling and tended to isolate the nation. Three disputes particularly stood out. The tension with Russia over Bessarabia continued but tended to decrease. The Soviet leaders realized that the Besarabians were not eager to exchange the Maniu régime for the Communist rule. With Germany there was some disagreement over the redemption of notes issued in Rumania during the war-time occupation which brought on an economic war, but this was settled in 1928, prior to the consumption of the stabilization loan. The controversy with Hungary over the expropriation of lands of Hungarian owners in Transylvania during the agrarian reform movement in 1929 was before the League of Nations.

At the close of 1925, Prince Carol formally renounced the throne, and his young son Michael was declared the heir-apparent. A regency council consisting of Prince Nichols, the Patriarch of Rumania, Miron Cristea, and the President of the Supreme Court of Appeal was appointed to act in case of the death of King Ferdinand before the 4-year-old boy became of age. When the local elections in February, 1926, went against them, the Bratiano brothers felt that a temporary retirement would be advisable and the cabinet resigned, March 27, after the Government had forced through a new electoral law which provided for control of Parliament by a party polling two-thirds of the total vote if the rest of the vote was divided among minor parties.

Instead of turning to the leader of one of the strong opposition parties in Parliament, the King asked General Averescu, generally recognized as Bratiano's understudy, to form a cabinet. In the ensuing elections in May, the ministry had little trouble in registering an overwhelming victory. The new ministry, under strong Liberal influence, continued in the main the Bratiano policies. In domestic affairs, however, it became evident that without a foreign loan the country was heading toward bankruptcy, and in foreign relations it initiated a rapprochement with Italy, whose government General Averescu was known to admire greatly. He presently arranged with Mussolini for a funding of the Rumanian debt to Italy and for a loan of 200,000,000 lire for stabilizing the leu. On Sept. 16, 1926, the two countries signed a treaty of friendship and arbitration at Rome. The pact was sharply criticized in Rumania because it did not include a ratification by Italy of the treaty of 1920 recognizing Bessarabia as a part of Rumania, which Great Britain, France, Italy, and Japan had signed, but which only the first two had ratified. Italy and Japan had refrained from taking action apparently through a desire to avoid antagonizing Russia, which had never ceased to dispute the ownership of the province with Rumania. However, on Mar. 8, 1927, Mussolini finally ratified the treaty, a step of much diplomatic significance and one which added considerably to the prestige of the Averescu government. Another important agreement was a treaty signed with France in June, 1926 (although the terms were not made public until the following January). It was a treaty of nonaggression and was considered as having the strength of an alliance. The recognition by France of the territorial *status quo* once more proclaimed that country's support of Rumania's claim to Bessarabia and brought a vigorous note of protest from Russia. Other international agreements included a renewal of the Little Entente understanding.

Despite these diplomatic triumphs, the position of the Averescu ministry remained highly precarious. Queen Marie made a tour of the United States in November, 1926. The rapidly failing health of King Ferdinand brought questions of the succession to the fore and added to the feeling of unrest. Drawing away from the Liberals who constituted his chief support, General Averescu tried to come to an understanding with the Tsaranists. When the effort failed, he resigned, June 4, 1927. Baron Stirbey formed a coalition cabinet but was soon succeeded by his brother-in-law, Jon Bratiano, who, by methods which had become almost traditional in Rumania, dominated the succeeding elections and obtained some 70 per cent of the total vote. On July 20, King Ferdinand died. The expected uprising did not occur, and the succession passed quietly to his grandson, Prince Michael.

Consolidated around the National Tsaranist Party, the opposition was now assuming such strength that its demands for political and economic reforms could no longer be ignored. It was supported also by the strong anti-Liberal attitude of Hungary, whose grievances continued to be the source of constant ill-feeling. On November 24, the political scene was suddenly altered by the death of Jon Bratiano, so long the strong man of the conservative elements. There was no immediate political overturn, however, his brother, Vintila Bratiano, taking over the leadership of the country and the Liberal Party; but the country was quite evidently weary of the whole Bratiano régime and its subversive methods. Late in March, 1928, a great march of 60,000 peasants on the capital gave expression to the popular dissatisfaction, and this was followed, early in May by a monster mass meeting of some 200,000 peasants at Alba Julia in Transylvania, where resolutions of strong opposition to the ministry were passed; but the regency council and the cabinet stood firm, and the demonstration produced no immediate change.

During the greater part of 1928, the Government sought to strengthen itself by negotiating a foreign loan, but was quite unsuccessful, partly, no doubt, because M. Maniu served notice on foreign capitals that no loan contracted by the Bratiano government would be recognized as valid when the Opposition should come into power. The problem was the pressing necessity for foreign financing of a large loan and the obvious reluctance of the foreign financiers to grant a loan to a government opposed by the majority of the population. The pressure finally became so great that the Council of Regency could no longer stand out against it. On request of the council, Premier Bratiano reluctantly resigned, on Nov. 4, 1928. Five days later, M. Maniu formed a government and immediately called new elections. These were held on December 12. Characterized as the first fair and free elections the country had known for many years, they resulted in an overwhelming victory for the Nationalist Peasant Party, which obtained 333 seats and with the adherence of small allied parties could count on some 355 votes in the Lower House out of a total of 387.

The significance of this change of government was in effect almost revolutionary. It brought into power a régime committed to a programme of liberalism all the way along the line, including fair elections, decentralization of government with full local autonomy, removal of all censorship, a receptive attitude toward foreign capital, full recognition of the right of minorities, a pacific foreign policy with strong support of the League of Nations, effective encouragement of agriculture, a sound and just tariff policy, and in general the establishment of a free Western democracy. The new government entered on its programme by abolishing martial law and the censorship and reducing the gendarmerie. Negotiations for a foreign loan which had been pending for a year were continued, and on Feb. 11, 1929, resulted in the signing of contracts in Paris for a loan of $100,000,000 to be floated on the money markets of Europe and the United States. It was to be applied to the stabilization of the leu, reorganization of the Bank of Rumania on a sound basis, and the rehabilitation of the railroads. Shortly thereafter, the loan was reported to be largely oversubscribed. The policies of the Maniu government were received with great favor by the Rumanian people, who felt that a new day was dawning for them.

In March, 1929, a law was passed giving foreign companies equal rights with Rumanian in the making of oil leases. Their attitude was evidenced in the happy temper of an immense celebration of the tenth anniversary of the birth of the new and greater Rumania, held at Alba Julia on May 19–20. It drew some 200,000 peasants from all parts of the country, whose spirit of satisfaction contrasted strongly with the tone of indignant protest which had marked the assemblage at the same place a year before. Besides the Mining Law, with the complete elimination of all restrictions against foreign capital, a number of other constructive laws were passed by Parliament in its first regular session under the new régime, ending in August. These included: the Customs tariff; the establishment of free zones at certain ports; the "lien law"—all favorably affecting foreign trade. See BESSARABIA; TRANSYLVANIA; WORLD WAR, DIPLOMACY OF.

RUMANIAN LITERATURE. Rumanian letters have reached a stage of maturity which bring them much nearer to the Western European standards, just as today, geographically, the country borders almost on the centre of the Old Continent.

In poetry, that magician of the word, Tudor Arghezi (born in 1880), has brought a new and rich ferment. Worthy of being mentioned among his contemporaries are Octavian Goga (born in 1881), a master in the art of Rumanian verse; Ion Minulescu (born in 1881), builder of sonorities and symbols; Ion Pillat (born in 1891), many-hued and of the grand old manner; Ion Barbu (born in 1895), very modern; Camil Baltazar (born in 1902), suave and intricate; A. Toma, of the sculptured verse; Ovid Densusianu (born in 1873), discreet and temperamentally aloof; Perpessicius, dignified and noble; Al. T. Stamatiad (born in 1885), of the golden bugles; N. Davidescu (born in 1888), aristocratic, in search for the unusual; G. V. Bacovia (born in 1881), strange and elusive; M. Codreanu (born in 1876), the perfect sonneteer; G. Topârceanu, sentimental, tinged with humor; Enric Furtună, warm and profound, continues the tradition of Mihail Eminescu (1850–1889) and P. Cerna (1881–1913); Barbu Lăzăreanu, of the quaint note of the popular, sweet and melancholy; Aron Cotrus (born in 1891), restless, of the soil; Nichifor Crainic (born in 1889), of the traditional line; F. Aderca (born in 1891), struggling with rebellious forms; Corneliu Moldovanu (born in 1883), classic; G. Murnu (born in 1868), translator of Homer; O. Carp (born in 1867); Cincinat Pavelescu (born in 1872), the troubadour; D. Karnabatt, of grandiose rhythm; Radu D. Rosetti (born in 1874), still young; A. Mândru; Victor Eftimiu (born in 1886), manifold; George Gregorian (born in 1886); Vasile Militaru, idyllic; Leon Feraru (born in 1887), author of *Old Shanty* and other poems; Donar Munteanu; D. Nanu (born in 1873); V. Demetrius (born in 1878); Ion Vinea, of the more advanced school; Ion M. Rașcu (born in 1890); Lucian Blaga (born in 1895), modernistic; Emil Isac (born in 1889), dashing; Demostene Botez (born in 1893), wondering at life and death; Pan Halippa, of Bessarabian source; Mircea Rădulescu; Eugen Relgis, humanitarian; A. Dominic (born in 1889), impressive; Virgiliu Moscovici; B. Fundoianu; Adrian Verea; Artur Enășescu (born in 1888); Ion Foti (born in 1887); Horia Furtună (born in 1888); Alice Călugăru; Elena Farago (born in 1878); Natalia Negru; Claudia Millian; Otilia Cazimir, the most quoted; Mihail Celarianu (born in 1893); Emanoil Bucuța; Ion Al-George; Mateiu Ion Caragiale (born in 1885); Mihail Cruceanu (born in 1887); Eugeniu Sperantia (born in 1888); Camil Petrescu; Alfred Moșoiu; George Voevidca; Adrian Maniu; Dragoș Protopopescu; I. U. Soricu (born in 1882); Şerban Bascovici; Ion Buzdugan; Marcel Romanescu; Al. A. Philipide; Ion Marin Sadoveanu; V. Russu-Şirianu; Eugen Ștefanescu-Est; G. Talaz; Tudor Vianu; V. Voiculescu; George Silviu; and Ștefan I. Nenițescu.

The sway of Dimitrie Anghel (1872–1914) left a deep imprint in the poetry of the later years. His verse is characterized by the graceful blending of the native popular and the European.

In the short story and novel, the leader is still Mihail Sadoveanu (born in 1880) in whose work Moldavia, his native province, appears in all her glory. Gala Galaction (born in 1879) excels in sincerity and his prose glitters like the bejeweled ikons in the semi-obscurity of an old monastery. V. Demetrius, the poet, is also a novelist of distinction. Liviu Rebreanu (born in 1885) began his successful career as a novelist with *Ion.* Rebreanu watches his characters and lets them act according to their impulses. *The Forest of the Hanged* shows marked progress in his craft. His latest, *Ciuleandra* (a folk dance), is a step forward in this particular field of Rumanian literature. Ion Agârbiceanu (born in 1882) gives interesting studies of fiction characters. Jean Bart (Eugeniu Botez, born in 1874) publishes under his pen-name powerful short stories and sea sketches. D. D. Patrașcanu (born in 1872) has wit and a fertile imagination.

Al. O. Teodoreanu and his brother, Ionel Teodoreanu, have conquered Rumanian audiences lately. Al. is full of the Rabelais and Anatole France kind of humor, Ionel is more solemn and epic. One discusses Ionel's heroes as though they were living creatures. The secret is the new master's great talent. The venerable Ion Brătescu-Voinești (born in 1867) has added to humanity a world of modest men and women, characters softening the hearts of generations of readers. Lately, Cezar Petrescu has emerged as a novelist of note. Others are Al. Cazaban, Vasile Pop, Caton Theodorian, Ion Ciocârlan, D. Teodorescu, Lucia Mantu, Henriette Yvonne Stahl, Hortensia Papadat-Bengescu, Vasile Savel, Constanța Marino-Moscu, Damian Stănoiu, I. Peltz, A. L. Zissu, I. Ludo, Ion C. Vissarion, Sarina Casvan-Pas, N. Batzaria, and Marcu Beza, both distinguished and versatile writers. Ion Pas shows fine qualities in his sketches and novels of factory life. The poets, Ion Minulescu, N. Davidescu, Eugen Relgis, F. Aderca, Corneliu Moldovanu, Emanoil Bucuța, have tried their hands at creating the novel, sometimes successfully. N. Pora possesses the gift of suggestion and his short stories have charm. C. Ardeleanu receives much praise for his recent works. Constantin Kirițescu attracts with his lovely world of apostles. The list of new authors is not exhausted here.

A. Davila, Victor Eftimiu, A. de Herz, Mihail Sorbul, B. Luca, Dr. A. Stern, the translator of Shakespeare, Octavian Goga, N. Iorga, G. Ciprian, and others, contribute to the theatre.

In criticism, we find N. Iorga, a scholar of eminence, Ovid Densusianu, Sextil Pușcariu, Mihail Dragomirescu, C. Stere, G. Ibrăileanu, G. Bogdan-Duică, G. Adamescu, Eugen Lovinescu, Paul Zarifopol, Tudor Tedorescu-Braniște, M. Ralea, H. Sanielevici, Aureliu Weiss, Şerban Cioculescu, I. Shuchianu, M. Sevastos, Lotar Rădăceanu, and others.

Political writers of fine calibre are Dr. Nicholas Lupu, the leader of the Peasant Party, Constantin Graur, Eugen Filotti, Emil D. Fagure, H. St. Streitman, M. Schwarzfeld, B. Brănișteanu, Iosif Nădejde, Pamfil Șeicaru, S. Grosman, Em. Socar, Horia Carp, M. Sărățeanu, and M. Schweig.

Mention must be made of the few master minds, such as Professors C. Rădulescu-Motru, S. Mehedinți, I. Petrovici, who, together with the writers referred to above, are forging the culture of contemporary Rumania.

RUMBOLD, rŭm′bōld, RT. HON. SIR HORACE GEORGE MONTAGU (1869–   ). A British diplomat. In 1890 he became British Attaché at The Hague, and was appointed to Cairo in the next year. After serving at Vienna, Madrid, Tokyo, etc., he was chargé d' affaires at Berlin, July 1–27, 1914. On the declaration of war, he returned to the Foreign Office in London. He was British Minister to Switzerland (1916–19), to the Republic of Poland (1919–20), and High Commissioner and Ambassador at Constantinople (1920–24). He attended the Lausanne Conference (1922–23), as head of the British delegation in 1923, and as deputy for Lord Curzon, signed the Treaty of Lausanne (July 24, 1923). In 1924 he became Ambassador to Spain and in 1928 was appointed Ambassador to Germany. He was made a member of the Privy Council in 1920.

RUPPRECHT, Crown Prince of Bavaria (1869–). (See Vol. XX). He commanded the 6th Army of Bavarian troops which won the battles in Lorraine in August, 1914, and later was in charge of the German front at Artois and southern Flanders. In 1916 he was made field marshal and given the chief command of the northern group of armies on the western front. He renounced his claim to the Bavarian throne at the time of his father's abdication in 1918, and was said to have privately stated his disapproval of the German foreign and military policy in the World War. He published *Mein Kriegstagebuch* (1929).

RURAL CREDIT. See Agricultural Credit.

RUSBY, Henry Hurd (1855–). An American botanist and physician (see Vol. XX). In 1917 Professor Rusby led an exploring party to the mountains of Colombia, in a search for sources of quinine. In 1921–22 he made a trip to Bolivia and Brazil, partly in the interest of identification of the so-called "courage plant."

RUSIÑOL Y PRATS, Santiago (1861–). A Spanish author and artist, who studied sculpture and painting in Paris under Clarassó, Canudas, Utrillo, and Zuloaga. His paintings and particularly his garden scenes won awards in Paris, Chicago, Barcelona, Rome, and Venice. Commencing his literary work in 1890 with a monologue, *L'home de orga,* he published the plays *L'aligría que passa* (1898, staged in 1901); *I Llibertat! La marc; La bona gent; El mistic.* Also the prose works *Anant el mon* (1896); *Oracious* (1897); *Fulls de la vida* (1898); and *El poble gris.* His works were written in Catalan and translated into Spanish, French, and other languages.

RUSSELL, Bertrand (Arthur William) (1872–). A British philosopher (see Vol. XX). During the World War, he was a pacifist and was imprisoned for six months for attacking the reputation of the American Army. He was also forced out of his chair at Cambridge University. He identified himself more and more with the radical movements, and when a delegation from the British Labor Party sailed to investigate conditions in Soviet Russia, he accompanied them. He came away disillusioned with communism and wrote of his dissatisfaction in *The Practice and Theory of Bolshevism* (1920). Sailing for China in 1920, Russell found amid the ruins of the Celestial Empire a greater promise of freedom than that of the Occident. In China, he composed a work on *The Anaylsis of Mind* (1921), in which he accepted the principal tenets of behavioristic psychology. In 1924 he visited the United States as a professional lecturer. He predicted the gradual enslavement of impoverished Europe to the mechanical civilization of America. In addition to the works memtioned, Russell published: *Principles of Social Reconstruction* (1917); *Mysticism and Logic* (1918); *Roads to Freedom* (1918); *Introduction to Mathematical Philosophy* (1919); *The Problem of China* (1922); *The A B C of Atoms* (1923); *The Prospects of Industrial Civilization,* with Dora Russell (1923); *Icarus, or the Future of Science* (1924); *What I Believe* (1925); *How to be Free and Happy* (1925); *The A B C of Relativity* (1925); *On Education* (1926); *An Outline of Philosophy* (1927); *The Analysis of Matter* (1927), and *Sceptical Essays* (1928). In 1929 appeared a new edition of *Our Knowledge of the External World.*

RUSSELL, Sir (Edward) John (1872–). An English botanist and chemist, born at Frampton, Gloucestershire, and educated at the University College of Wales and Victoria University of Manchester. He was lecturer and demonstrator in chemistry at the latter institution (1898–1901), head of the chemical department at the Agricultural College, Wye (1901–07), and soil chemist at the Rothamsted Experimental Station, Harpenden (1907–12), of which he later became director. During the World War, he was technical adviser to the Food Production Department and a member of the National Salvage Council. He wrote *Farm Soil and Its Improvement* (1923); *Plant Nutrition and Crop Production* (1926); and other works on the subject of soil chemistry.

RUSSELL, George William ("Æ") (1867–). An Irish writer and painter (see Vol. XX). He was a member of the Irish Convention (1917–18), and editor of *The Irish Statesman* (since 1923). In 1928 he lectured in the United States. His later works include *Gods of War* (1915); *The National Being, some Thought on an Irish Policy* (1917); *The Candle of Vision* (1919); *The Interpreters* (1922); *Voices of the Stones* (1925); and *Midsummer Eve* (1928).

RUSSELL, Henry Norris (1877–). An American astronomer, born at Oyster Bay, N. Y., and educated at Princeton University. He was a Carnegie research assistant at the Cambridge Observatory in England in 1903–05. In 1905 he became an assistant in astronomy at Princeton; in 1911, professor; and in 1912, director of the Observatory there. The stars were the subject of his researches. He published papers on stellar parallax, stellar evolution, and stellar statistics, as well as on binary stars and eclipsing variables. He was an engineer in the Air Service of the United States Army in 1918, as well as a member of the National Research Council. Profesor Russell became a Fellow of the Royal Astronomical Society, whose gold medal he won in 1921. In the same year, he became a research associate of Mt. Wilson Observatory. In 1922 he was awarded the Draper Medal of the National Academy of Sciences (American) and the Lalande Medal of the French Academy; in 1925 he won the Bruce Medal of the Astronomical Society of the Pacific and the Rumford Medal of the American Academy of Arts and Sciences. He is the author of *Determinations of Steller Parallax* (1911); *Astromomy* (1926); *Fate and Freedom* (1927).

RUSSELL, William Fletcher (1890–). An American university professor, born at Delhi, N. Y., and educated at Cornell University. After teaching for several years in Greely, Colo., he became assistant professor in history and sociology at the State Teachers' College, and after studying at Columbia University and serving as assistant in the philosophy of education there, he was appointed associate professor of secondary education at the George Peabody College for Teachers in Nashville, Tenn. From 1916 to 1917, he was professor of that subject. In 1917–23 he was dean of the College of Education at the State University of Iowa. Since 1923 he has been professor of education at Teachers College, Columbia University (dean since 1927). Professor Russell wrote *The Early Teaching of History in New York and Massachusetts* (1915); *Economy in Secondary Education* (1916); *Education in the United States* (1917); *Schools in Siberia* (1919); *School Finance in Iowa Cities* (1921); *Schools in Bulgaria* (1923).

RUSSELL SAGE FOUNDATION. An organization incorporated in 1907 for the improvement of social and living conditions in the United States. Its work, which gives large place to research and publication, is carried on by a staff of men and women trained in special lines of investigation and social welfare. The direct activities of the Foundation are carried on through the following departments: Charity Organization; Industrial Studies; Publications and Library; Recreation; Remedial Loans; Statistics; and Surveys and Exhibits; there is also a consultation service on problems of delinquency and penology.

From 1920 until 1929, the Charity Organization Department conducted a study of marriage laws and their administration, making investigations in 96 cities of 36 States. The Foundation published *Child Marriage*, by Mary E. Richmond and Fred S. Hall in 1925, and Miss Richmond's *What is Social Case Work?* was translated into Dutch in 1926, and into French in 1927. The department was particularly interested in youthful marriages, and partly as a result of its propaganda, laws tending to prevent child marriage were passed in several States, including Pennsylvania, New York, Minnesota, and Connecticut. The study was completed with the publication, early in 1929, of *Marriage by the State*, by Mary E. Richmond, and Fred S. Hall, and *Marriage Laws and Decisions—A Digest*, by Geoffrey May.

The Department of Industrial Studies continued to investigate, among other problems, instances of wage earners' participation in management. The Department of Recreation worked in conjunction with the Committee on the Regional Plan of New York and its Environs, completing in 1928 reports on recreation facilities and needs within New York, and on "The Neighborhood Unit," which were published in the committee's report. The uniform small-loan law, prepared by the Foundation's Department of Remedial Loans, for the protection of small borrowers, was in force in 25 States by 1929, and the department remained active in advocating the passage of the law in other States, and in encouraging credit unions.

Until 1926 the Department of Social Legislation worked for child welfare, coöperating chiefly with the Commission on Public Welfare Legislation of the District of Columbia. The activities of the consultation service on delinquency and penology resulted, in 1928, in the passage of a bill creating a committee of the House of Representatives to investigate prison labor, and the condition of Federal prisoners in county jails. In addition to reviewing all statistics published by the foundation, the Department of Statistics studies various social problems, preparing such compilations as *Employment Statistics for the United States*, 1927. As part of its work of presenting information about social conditions to the public, the Department of Surveys and Exhibits completed, in 1926, a report for the Welfare Council of New York City, listing 527 records of social studies made between 1915 and 1925. The Foundation library contained, by 1929, 27,906 bound volumes, and 96,061 pamphlets and unbound reports, and it regularly receives about 250 periodicals. The Foundation publishes, in addition to the books prepared by the special departments, bi-monthly bibliographies on various social and welfare subjects.

RUSSIA. A federal republic comprising the greater part of the former Russian Empire and officially entitled the Union of Socialist Soviet Republics, more familiarly known as Soviet Russia. It stretches over a vast expanse of territory in eastern Europe and northern Asia. Capital, Moscow.

Political Divisions. The Union of Socialist Soviet Republics consists of six Socialist Federated Soviet Republics, which are further subdivided into autonomous republics and autonomous provinces. The principal federations are (1) the Russian Socialist Federated Soviet Republic, (capital, Moscow), embracing the principal Great Russian "governments" or states of Russia in Europe and western Siberia; (2) the Ukrainian Socialist Federated Soviet Republic (capital, Kharkov); (3) the White Russian Socialist Soviet Republic (Minsk); (4) the Federation of Transcaucasian Soviet Republics (Tiflis); (5) Turcoman Socialist Soviet Republic (Leninsk); and (6) the Uzbek Socialist Soviet Republic (Samarkand). The Republic of Khoresma (Khiva) is affiliated with the Union but not a member of it. The Russian Socialist Federated Soviet Republic is composed of the following autonomous republics: (administrative centres in parentheses): Crimean (Simferopol), Bashkir (Ufa), Tartar (Kazan), Kirghiz (Orenburg), Turkestan (Tashkent), Daghestan (Makhatch-Kala), Mountain (Vladikavkaz), Yakutsk (Yakutsk), Carelia (Petrozayodsk), Buriat-Mongolian (Irkutsk); the following autonomous territories: Chuvash (Cheboksary), Kalmyk (Astrakhan), Mariisk (Krasnokokshaisk), Votyak (Izhevsk), Kabardin-Balkar (Nalchik), Zyriany (Ust-Sysolsk), Karachaef-Cherkass (Batalpashtchinsk), Oiratski (Oolala), Adigheiski-Circassian (Krasnodar); and Volga German's Territory (Pokrovsk); and Chechen Territory (Grozny).

The Transcaucasian Federation consists of three principal republics, namely Azerbaijan (principal town, Baku); Armenia (Erivan); and Georgia (Tiflis). Tiflis is the capital of the federation. Besides these, there are incorporated in the federation also the minor republics of Abkhaz (principal town, Sukhum) and Adjar (Batum). By the Treaty of Brest-Litovsk (Mar. 3, 1918), the Ukrainian Republic was detached from Russia and placed under German control but subsequently became reunited with Soviet Russia. (See UKRAINE.) The provinces of Volhynia, Vilna, Kovno, and Grodno were separated from Russia and became part of Poland, while the provinces of Erivan and Kars passed to Turkey. The border provinces of Latvia, Estonia, and Lithuania became established as independent states, and so did the Grand Duchy of Finland, while the Province of Bessarabia was annexed to Rumania. These are discussed elsewhere under separate titles.

Area and Population. The area of the Soviet Union is 8,240,483 square miles and the population, according to the 1926 census, was 147,013,600, of which 71,024,300 were males and 75,989,300 were females. The density was 17.8 per square mile. The land area within the old boundaries of Russia was 8,417,118 square miles and the population in 1897 was 129,209,000 and in 1914 (estimated) 178,379,000. The area and population of constituent socialistic soviet republics in 1926 are shown in the following table (S.F.S.R. represents Socialist Federated Soviet Republic):

	Area square miles	Population
Total, U. S. S. R.	8,240,483	146.989,460
Russian S. F. S. R.	7,624,817	100,858,000
White Russian S. S. R.	48,954	4,983,900
Ukrainian S. S. R.	174,413	29,020,300
Trans-Caucasian S. F. S. R.	71,232	5,850,700
Turcoman S. S. R.	189,658	1,030,500
Uzbek S. S. R.	131,408	5,270,200

The population is 82 per cent rural and 18 per cent urban. It is composed of 182 different nationalities, speaking 149 different languages and dialects. The death rate of the country was 20.9 per thousand in 1926, as compared with 28.3 in 1913.

The census showed a strong trend of population to the cities, in line with the industrialization of the last few years. Since the urban census of 1923, Moscow and Leningrad each has increased its population by over 500,000. Other large cities gained an average of 30 per cent in the three years between 1923 and 1926. Population of the principal cities, census of 1926–27: Moscow, 2,025,947; Leningrad, 1,614,008; Kiev, 513,789; Baku, 452,808; Odessa, 420,888; Kharkov, 417,186; Rostov-on-Don, 308,284; Tashkent, 323,613; and Tiflis, 292,973. The population as of Jan. 1, 1928, was estimated by the Central Statistical Board at 149,900,000.

Government. The form of government of the Union of Socialist Soviet Republics (U.S.S.R.) may be described as an oligarchy in the guise of a federated republic. According to the new Soviet constitution drafted in July, 1923, and ratified in February, 1924, sovereign power is vested in the supreme organs of the federation, i.e., the Union Congress of Soviets, the Central Executive Committee of that Congress, and its Presidium. The Congress of Soviets, of about 2000 members, is elected by the various congresses of the federated republics and meets for a week once a year. The Central Executive Committee is composed of two Houses, known respectively as the Federal Council and the Council of Nationalities, the former consisting of 371 members elected by the Federal Congress of Soviets according to population, and the latter of some 98 members, five elected by each federated member state and one by each of the autonomous republics or districts. Each of these two Houses elects its own Presidium, or standing committee, of seven members. Between sessions of the Federal Congress of Soviets, the Central Executive Committee is the supreme organ. It meets three times a year and is replaced during recesses by the Presidium of 21. The Central Executive Committee jointly elects Federal commissars (or ministers) on the following basis: (A) five Federal commissariats, all regional, representatives of which in the participating states are appointed by, and responsible to, the Union commissars, viz.: (1) foreign affairs; (2) army and navy; (3) foreign trade; (4) transport; (5) post and telegraphs; (B) five "combined" commissariats, each of which has parallel commissariats in the various participating states, chosen by the latter but approved by the Federal commissars, whose authority is shared by them, viz.: (1) supreme council of national economy; (2) food; (3) labor; (4) finance; and (5) workers' and peasants' inspection. The 10 commissars at the head of these commissariats, together with a president and vice president, form the Union Council of People's Commissars. This body has legislative and executive powers subject to higher authority.

The whole country is under a single system of law and the single Supreme Court subordinated to the Central Executive Committee, whose Presidium appoints 7 of the 11 members of the bench, and to which body the public prosecutor may appeal cases for final decision. One of the members of the court is a representative of the United State Political Administration (O.G.P.U.). Under the constitution, each federated republic is required to function on a soviet basis, with a central executive committee and council of people's commissars. The Federation has exclusive control of foreign relations and alone may: alter the external boundaries of the Federation; settle boundary disputes between participating republics; conclude treaties for admission of new members; declare war and conclude peace; negotiate foreign and internal loans for the Union, as well as give permission for such loans to the federated republics; regulate foreign and domestic trade; inaugurate the general economic policy of the Union, control industry and grant concessions in the name of the Union and of the separate republics; manage transportation, posts, and telegraphs; organize and command the armed forces of the Union; approve the budget and levy taxes; establish a monetary system; direct the use of land and all natural resources; control migration; shape civil and criminal legislation, labor laws, and educational and sanitary legislation for the Union; establish a system of weights and measures; issue federal statistics; promulgate legislation concerning the rights of citizens and foreigners; and grant amnesty throughout the Union. It has the power to annul any unconstitutional measure of the federated republics, and to settle any dispute between them.

The federated republics retain the meagre rights of sovereignty and autonomy not withdrawn by the constitution. Each may amend its constitution within the limits set by the federal constitution. No boundary of a republic may be altered without its consent. Any republic may withdraw at will from the Union. In short, the participating republics are given a semblance of sovereignty within their respective territories, while the absolute and final control of all important affairs, both foreign and internal, rests in the hands of the Federal government in Moscow.

The Communist Party with its 600,000 disciplined adherents is the ruling group in a nation of 149,900,000 people. The oligarchical control of the Communists is facilitated by a singularly effective indirect system of election. The electoral system of the soviets is ultimately based not on a territorial unit, such as a state, county, or township, but on an association unit, such as a factory, a soviet institution, a regiment, or ship, each body being dominated by a so-called nucleus of Communist Party members, so that the perpetuation of the power of the Communist Party is assured. Because of the impracticability of the economic-unit system in rural communities, where each farmstead represents a unit, delegates are there elected from administrative units, i.e., the village or *volost* (group of villages); but due to the system of graduated elections in the case of rural communities, passing through several successive stages before members of the central Congress (of a federated republic) are finally elected, whereas the cities and the larger industrial corporations send their representatives direct to the Congress, the votes of the masses of peasantry are quite effectively submerged.

Although a large or overwhelming majority of the delegates elected on the primary ballots in any one province or district may be non-Communist, the final ballots turn out 100 per cent Communist representation in the supreme legislative body, the Central Executive Committee of the Congress of Soviets. At its annual meeting, the Communist Party elects a central committee of 40 members, which in turn elects a political bureau consisting of seven members and four alternates. Through this body, the Communist Party directs and controls the policy of the Soviet government. Once a policy is decided on by the Political Bureau, it is referred to the Central Committee of the Communist Party, which passes it as a matter of course and has it approved by the Central Executive Committee of the Union, which it controls absolutely. To prevent friction between the various important organs of party and state, the same Communists hold offices in a number of organs, thus creating a political interlocking directorate. In the last analysis, therefore, the real governing power in Russia is the Communist Party.

Education. Public education in the Soviet Union is a charge against the six constituent republics and against the localities concerned. Local appropriations are in the aggregate somewhat larger than those of the republican government. In 1927–28, total appropriations for education were upward of $400,000,000, as compared with $317,200,000 in 1926–27 and $236,400,000 in 1925–26. In 1927–28, 11,308,333 children were in 116,373 primary and 1819 secondary schools (excluding kindergartens), nearly 46 per cent more than before the World War. There were 118,192 of these schools, as compared with 106,400 in 1913. The teaching staff numbered 337,435. In the cities, 98.4 per cent of the children of school age were in school, and in the rural districts 66.4 per cent. Since the famine year of 1921, enrollment in the schools has shown a steady growth.

In colleges and universities, the growth had been commensurate. There were 137 of these institutions in 1927–28 with an enrollment of 143,000. In addition, 4711 higher trade schools had 601,000 students. To combat illiteracy, there were conducted 46,759 schools for adults in 1926–27 with 1,516,000 pupils, as compared with 1,635,000 pupils the previous year. Among the general population (above seven years) illiteracy had decreased by one-third between 1922 and 1928. The census of 1926–27 revealed that 65.4 per cent of the males were literate and 36.7 per cent of the females. In the last pre-war census (1897), the figures were, respectively, 37.9 and 12.5 per cent.

Agriculture. Agriculture occupies an unusually important position in Soviet Russia, not only on account of the predominantly agricultural character of the country, but also because grain, and particularly wheat, is one of the principal export commodities on which the state depends for its favorable trade balance, so essential in view of its economic relations with the outside world. From an economic, as well as a political, viewpoint, agriculture presents a striking contrast to industry and trade, in that it is still primarily based on private ownership and offers some great inherent difficulties which have so far resisted the efforts of the Soviet government to place it on a socialized basis. There is a conflict between the desire for export grain and the necessity, from the Soviet point of view, of preventing the development of the class of well-to-do peasants. Under present conditions, it is the latter class who are most capable of producing the surplus grain for export; on the other hand, they are also most anxious to gain access to the free market and are opposed to the existing system of state control of the grain trade.

In dealing with this problem, the Soviet government has decided on two broad policies. One is to increase considerably the budget appropriations for the promotion of agriculture, but to distribute the assistance in such a way as to encourage the small and medium-sized proprietors and to discriminate as much as possible against the well-to-do peasant, or *kulak*. As the assistance takes largely the form of credit in the way of seeds, agricultural machinery, and fertilizer, as well as relief from taxation, it should prove comparatively easy to carry out the negative phase of that policy. The other policy calls for a more energetic effort to build up the collective forms of agriculture under direct state control. This is to be accomplished by a more systematic development of the existing communal farms, of which there are a considerable number, but which by 1929 have had no important influence on the grain supply, and by encouraging the less individually minded peasant to go into that form of communal farming. This policy involves the organization of large state farms or "grain factories," as they are referred to in the Soviet press, which by utilizing the latest technique of mass production are intended to assure the Government a dependable supply of surplus grain to carry out the programme of industrialization.

The above plans should be considered in connection with the traditional low level of agricultural technique in Russia and the uncertainties inherent in the nature of the industry which, although common to all agricultural countries, are of special significance to Russia on account of its present position of virtual economic self-sufficiency

In 1926 there were in Soviet Russia (European and Asiatic) 399,843,000 acres of plowed land, 7.6 per cent of the total area, 173,354,000 acres of meadow and pasture, and 982,047,000 acres of forests. In European Russia, the proportion of land cultivated is high, where soil and climate permit. In the Asiatic territory, there are vast areas too dry or too cold for agriculture. The total value of agricultural production for the year 1926–27 was reported as $6,574,000,000, of which grain was $1,945,000,000; animal products, $1,711,000,000; and other farm products, $1,971,000,000.

CROPS: AREA, PRODUCTION, AND YIELD PER ACRE, U. S. S. R.

	Area (thousands of acres)				Production (thousands of units—bushels, except as indicated)				Yield per acre (bushels)	
Crop	1923–1925	1925	1926	1927	1923–1925	1925	1926	1927	1923–1925	1927
Wheat	48,350	59,770	70,873	75,944	461,259	713,000	819,565	749,559	9.5	9.9
Rye	66,373	70,286	69,789	69,588	763,888	876,964	901,599	968,465	11.5	13.9
Barley	16,703	15,715	18,217	17,480	217,861	279,202	253,020	215,874	13.0	12.3
Oats	28,435	31,414	37,573	42,957	582,542	797,863	987,680	895,625	20.5	20.8
Corn	6,367	8,288	7,295	7,132	132,894	176,631	143,356	149,600	20.9	21.0
Potatoes	10,580	12,468	12,916	13,680	1,345,437	1,717,914	1,819,871	2,009,149	127.2	146.9
Sugar beets	810 [a]	1,286	1,328	1,526	3,469 [a] [b]	8,251 [b]	6,151 [b]	9,900 [b]	4.3 [a] [b]	6.5 [b]
Tobacco	155	186	213	228	260,016 [c]	390,014 [c]	386,472 [c]	348,552 [c]	1,677.5 [c]	1,528.7 [c]
Cotton [d]	615	1,609	1,731	1,984	79,348 [c]	352,449 [c]	360,890 [c]	469,871 [c]	129.0 [c]	236.8 [c]
Linseed [e]					17,396	22,302	20,472	23,621	5.6	5.4
Flax fibre [e]	3,080	3,961	4,167	4,351	541,016 [c]	823,373 [c]	780,038 [c]	749,574 [c]	175.7 [c]	172.3 [c]
Hemp fibre [e]	1,833	2,283	2,337	2,321	830,330 [c]	1,072,552 [c]	956,991 [c]	1,124,361 [c]	453.0 [c]	484.4 [c]

[a] 1921–1925.
[b] Unit, metric ton.
[c] Unit, pound.
[d] Season ending following year.
[e] Not including Turkestan and Transcaucasia.

Agricultural production for 1927–28 was valued at $6,836,200,000, or 108.2 per cent of the 1913 production (figure includes returns of farms, forests, fisheries, stock raising, and hunting).

In 1928 the grain crop was 74,292,103 metric tons from 98,698,000 hectares, as compared with 74,128,000 metric tons in 1927. The wheat crop (included above) was 22,399,000 metric tons, as compared with 20,389,000 in 1927. Total pre-war production of all grain in the same territory was estimated at 75,000,000 metric tons. The cotton crop of 1928 was estimated at 860,000 tons (unginned), as compared with 632,000 tons in 1927 and 744,300 in 1913. Other technical crops registered gains, except sunflower seed, which showed a decline of 16 per cent from the year 1927.

At the beginning of 1928, horses numbered 30,931,000; cattle, 67,327,000; and swine, 20,222,000. All classes of live stock except horses were above the pre-war figures. In the autumn of 1928, there were 32,000 tractors in use, as compared with 500 in 1913. Owing to the fact that the grain crop of 1927 was about 2,000,000 metric tons less than that for 1926, coupled with increased consumption, grain exports for the agricultural year ending June 30, 1928, fell to 520,000 metric tons, from 3,086,000 the previous year. Due to failure of crops in the Ukraine, the 1928 acreage in grain was 15,000,000 acres less than in 1927. Preliminary data received by the Central Statistical Administration indicated an increase for 1929 of from 5 to 6 per cent over the 1928 acreage. The area sown to cotton in 1929 was 3,142,000 acres, an increase of 18.4 per cent over the 1927 acreage and of 82.3 per cent over the 1913 acreage.

Industry. The total value of industrial production was reported as $6,768,000,000 in 1926–27, an increase of 10.4 per cent over the previous year. The value for the "census" or large-scale industries was $5,720,000,000 and that for small-scale industries was $1,049,000,000. About 90 per cent of all industries is controlled by the state. The value of the 1927–28 industrial output, at pre-war prices, was given at $4,822,975,000, or about 26 per cent above the 1913 figure.

The average number of workers in coal mines during 1927–28 was 224,173; in iron and steel, 551,656; in the chemicals industry, 76,511; in the textile industries—cotton, 498,930; wool, 62,005; linen, 87,562. In all large state industries, there were about 2,164,580 workers employed during 1927–28. Including small plants, but not counting village and town handicraft industries, the total is about 15 or 20 per cent larger.

The aggregate output of electric-power stations in all industrial branches was placed at 527,000 kilowatt hours, of which 132,300 kilowatt hours were used in the iron and steel industry, 100,300 in the coal-mining industry, 58,000 in the machine-building industry, 71,600 in the textile industry, and 33,200 in the silicate industry. The capacity of all electric stations in 1929 was estimated at 2,638,000 kilowatts. About 56 per cent of the energy supplied goes to industries, 28 per cent for lighting purposes, and 16 per cent for tramways.

INDUSTRIAL PRODUCTION
(Figures for 1927 and 1928 are for 12 months ending Sept. 30)

		1913	1927	1928
Coal	1000 metric tons	33,814	30,913	36,300
Petroleum	1000 bbls.	62,834	74,439	83,327
Peat	1000 metric tons	1,500	4,703	4,900
Iron ore	do	9,514	4,815	5,977
Manganese ore	do	1,221	1,618	1,155
Pig iron	do	4,207	2,963	3,281
Steel (Martin)	do	4,246	3,586	4,150
Rolled iron	do	3,509	2,731	3,367
Copper (smelter)	metric tons	......	16,500	15,900
Gold (90 per cent fine)	pounds	135,864	93,600	102,000
Cement	1000 metric tons	......	1,557	1,837
Glass	metric tons	......	282,000	328,000
Acids	do	......	257,575	294,684
Alkali	do	......	242,612	284,777
Salt	1000 metric tons	1,998	1,908	2,180
Sugar	do	1,513	1,337	1,885
Cigarettes	millions	25,888	39,445	......
Wood pulp	metric tons	......	128,300	132,000
Paper and cardboard	do	......	279,500	306,196
Matches	millions boxes	3,703	4,200	5,457
Cotton yarns	tons	......	268,400	312,600
Cotton cloth	millions yards	......	5,247	5,604
Woolen yarns	tons	......	41,200	46,300
Woolen cloth	1000 yards	......	185,286	214,510
Linen yarns	tons	......	67,612	63,184
Linen fabrics	1000 sq. yards	......	232,924	210,173

The growth of textile equipment (in thousands) is shown below:

Item	Cotton		Wool		Linen	
	1926–27	1927–28	1926–27	1927–28	1926–27	1927–28
Spindles	6,151	6,217	248.5	252	278.3	275
Looms	158.2	159.1	8.1	8.2	11.1	10.8

The industrial output for 1927–28 was over 20 per cent above 1926–27 and 25 to 30 per cent above the pre-war level. The year was the first since the War in which the industrial advance was dependent wholly on new construction and equipment. In 1921 the industrial output was only 15 per cent that of 1913. The only large-scale industry still below the pre-war level in 1928 was that of ore mining.

Foreign Trade. Foreign trade in Soviet Russia is a state monopoly and is carried on by the Commissariat of Foreign Trade through various official institutions and branches within the Soviet Union, which are represented by foreign-trade delegations abroad, chiefly at Berlin and London, and by corporations organized under the laws of the respective countries in the form of commercial companies, whose entire stock, however, is held by the Soviet government. With the expansion and ramification of foreign-trade operations, it became impossible for the central Commissariat to handle the entire volume of trade, and a system of licensing the largest commercial and industrial bodies to carry on their trading operations independently of the Commissariat was resorted to. During recent years, several private concerns also have been authorized to carry on the foreign trade within certain limitations as to the nature and the outside amount of imports permissible and subject to an equal division of all profits with the Soviet government.

SOVIET IMPORTS ACROSS EUROPEAN FRONTIERS
(Fiscal year beginning October 1)
[In rubles—1 ruble = $0.515]

	1924–25	1925–26	1926–27	1927–28
Industrial equipment	68,891,000	108,741,000	146,406,000	247,300,000
Raw materials and semi-manufactured products	315,897,000	365,298,000	381,617,000	435,983,000
Including:				
Cotton	121,897,000	104,450,000	120,651,000	134,866,000
Wool	39,240,000	31,448,000	35,323,000	42,582,000
Hides	15,417,000	22,857,000	37,650,000	38,508,000
Other	139,343,000	206,543,000	187,993,000	220,027,000
Agricultural machinery and tractors	28,883,000	43,028,000	23,040,000	20,678,000
Consumers' goods	195,766,000	117,144,000	45,308,000	95,261,000
Miscellaneous	34,335,000	39,466,000	27,438,000	20,837,000
Total imports	643,772,000	673,677,000	623,809,000	820,059,000

SOVIET EXPORTS ACROSS EUROPEAN FRONTIERS

	1924–25	1925–26	1926–27	1927–28
Grain	51,280,000	155,763,000	201,787,000	34,228,000
Butter	27,575,000	30,850,000	34,224,000	39,120,000
Eggs	25,657,000	23,629,000	28,954,000	40,462,000
Poultry	5,025,000	2,936,000	7,112,000	10,687,000
Meat	1,132,000	2,305,000	4,850,000	16,073,000
Flax and tow	52,200,000	43,919,000	19,267,000	20,703,000
Furs	60,078,000	63,220,000	80,319,000	113,990,000
Timber	63,209,000	52,498,000	71,135,000	80,256,000
Oil products	62,767,000	69,487,000	82,813,000	98,239,000
Maganese ore	17,891,000	21,285,000	24,090,000	13,752,000
Miscellaneous	141,030,000	123,232,000	132,689,000	167,971,000
Total exports	507,844,000	589,124,000	687,240,000	635,481,000

The foreign trade turnover over all frontiers is shown in the following table:

1913	$1,490,495,000
1922–23	199,300,000
1923–24	484,910,000
1924–25	666,925,000
1925–26	733,130,400
1926–27	762,869,500
1927–28	886,830,000

The unfavorable balance of trade for 1927–28 was $88,580,000, as compared with a favorable balance of $28,989,500 for 1926–27. The change was due to the big drop in grain exports. Exports other than grain increased in 1927–28 by 33 per cent. The trade over the Asiatic frontiers, which is principally with Persia, China, and Japan, increased by about 50 per cent in 1927–28. The trade over the European frontiers was: Exports, 635,481,000 rubles; imports, 820,059,000 rubles; total, 1,455,540,000 rubles ($744,453,000), an increase of 12 per cent over 1926–27.

The principal exports are grain, oil products, furs, timber, butter, eggs, manganese ore, and oil cakes. The principal imports are raw cotton, industrial machinery, agricultural machinery including tractors, metals, leather, wool, tea, and paper. In 1927–28, nearly 90 per cent of the imports consisted of production goods, i.e., raw materials and machinery.

The principal countries taking Soviet exports are England (26 per cent), Germany (22 per cent), Latvia (7.5 per cent). France (7 per cent), and Persia (5.6 per cent). The principal countries furnishing Soviet imports are Germany (23 per cent), United States (20.5 per cent), England (14.2 per cent), and Persia (5.4 per cent).

The principal Soviet imports from the United States are cottton, industrial equipment, agricultural machinery, metals, chemical products, binder twine, automotive equipment, and typewriters and adding machines. According to figures of Soviet trade organizations in the United States, purchases of American products for shipment to the Soviet Union in 1927–28 aggregated close to $100,000,000, or about two and a half times the annual pre-war figure.

Soviet purchases in the United States, by commodity groups during recent years:

	1925–26	1926–27	1927–28
Raw materials	$34,515,306	$50,230,991	$37,990,612
Semi-manufactured goods	622,974	1,924,948	1,491,398
Industrial and electrical equipment	4,085,742	10,867,479	12,209,845
Automotive equipment	291,311	1,614,166	2,802,295
Agricultural machinery, live stock, etc.	8,117,053	6,617,953	15,199,157
Other goods	1,060,911	716,715	1,537,843
Total	$48,693,297	$71,971,715	$91,231,048

The principal Soviet exports to the United States are furs, manganese, precious metals, sheep casings, flax and tow, hides and skins, bristles, and licorice root.

The figures for American-Russian trade by Soviet customs statistics, are as follows:

	Exports to United States	Imports from United States
1913	$ 7,290,000	$ 40,730,000
1923–24	4,377,500	49,955,000
1924–25	14,471,500	103,618,000
1925–26	15,759,000	62,881,500
1926–27	11,948,000	74,984,000
1927–28	14,368,500	91,231,048

Finance and Currency. The process of currency inflation and depletion of the gold stock in Russia started soon after the outbreak of the War. The Imperial régime, however, increased the outstanding notes only moderately and did not differ in this respect from the inflation policy prevailing in almost all belligerent countries. Shortly after the outbreak of War, the statutory restriction which provided that the paper money issued by the Imperial Russian Bank should not exceed its gold reserve by more than 3,000,000,000 rubles was abolished, and the right to convert paper rubles freely into gold was abrogated. On July 27, 1914, the outstanding notes amounted to 1,633,000,000 gold rubles and were covered by 1,744,000,000 gold rubles, a reserve of 107.4 per cent. During the three years and four months between the outbreak of war and the inauguration of the Soviet régime, the paper in circulation increased over elevenfold. The Soviet decree of July 25, 1918, made "the purchase, sale, or possession of precious metals in bullion or gold punishable by imprisonment of not less than 10 years in hard labor and the confiscation of the entire property of the culprit." The only currency authorized was the Soviet paper ruble, not backed by any reserve or security but circulating by virtue of its acceptance by all government institutions, trusts, and trading-stores. With the inauguration of the "new economic policy" and the legalization of private trading, the Soviet ruble began to depreciate rapidly. When trade with the outside world was resumed, involving purchases on a large scale from the peasantry and the concomitant exhaustion of the gold reserve appropriated by the Soviet government, heavy budget deficits began piling up; these were met by more issues of paper money, and inflation assumed gigantic proportions.

The decree of Oct. 17, 1920, designated the possession of gold, silver, platinum, foreign exchange, etc., as legal, but subject to compulsory delivery to the state against a compensation fixed by the Commissariat of Finance according to average market value. All transactions in valuables or currency were still completely prohibited. The decree of Nov. 18, 1921, granted to the State Bank the monopoly of purchase and sale of foreign currency and precious metals in coin and bullion. From this indirectly followed the right to sell money or valuables to the State Bank but not to purchase them from the Bank. The decree of Apr. 4, 1922, abrogated the principle of compulsory delivery to the state of property in precious metals or foreign exchange; but it permitted the free circulation of precious metals in the form of bullion only, leaving in force the monopoly of the State Bank on the purchase and sale of coin and foreign exchange. By decree of July 27, 1922, state and coöperative institutions were permitted to accept gold or precious metals in coin in payment for goods or services, provided immediate deposit thereof was made to their accounts with the State Bank.

In December, 1922, the issue of so-called *chervonets,* bank notes by the State Bank was authorized; these eventually became standard currency. These notes of 10-ruble denomination were secured according to law by gold, silver, and stable foreign exchange, to the extent of not less than one-quarter of face value, the balance being covered by drafts, notes, warehouse receipts, and other transferable collateral. Ever since the inception of its note issue, however, the State Bank has maintained the gold security in reserve of the *chervonets* notes at 50 per cent of face value. The decree of Jan. 29, 1923, abolished the monopoly of the State Bank on purchase and sale of foreign currency and admitted trading in gold and silver bullion, in foreign currency, and in checks and bills of exchange. The *chervonets* notes have retained their parity with the gold ruble in terms of Soviet currency and circulate at par with the pound sterling and practically so with the dollar. At the same time, the sound or purchasing value of the entire mass of paper-ruble currency outstanding was dropping precipitously. On Jan. 1, 1923, it was estimated at 101,900,000 gold rubles; on June 1, at 88,702,000; on Jan. 1, 1924, at 59,500,000; and on February 1, at only 39,000,000 rubles. The total Soviet paper money in circulation on Jan. 1, 1924, was about 178,000,000,000,000,000 rubles. Of this astronomical amount, 31,000,000,000,000,000 had been issued in October, 45,000,000,000,000,000 in November, and 80,000,000,000,000,000 in December. By Jan. 1, 1924, *chervonets* bank notes assumed a predominant position as a medium of exchange. A series of decrees promulgated during the last week of February and during March, 1924, introduced a reform in the Russian monetary system. By a decree effective on February 15, the Soviet paper ruble was abolished, and the *chervonets* bank note was made standard currency. By the second and third decrees issued on February 29 to regulate application of the first decree, the system of reckoning in index rubles based on 1913 prices was abolished, and the payment of fixed wage rates in *chervonets* rubles was substituted for their payment in Soviet currency, as based on the cost-of-living index. On Mar. 10, 1924, announcement was made that Soviet paper currency would be redeemed for *chervonets* notes at the rate of 500,000 rubles of 1923 issue (each of which is equal to 1,000,000 original Soviet rubles), for one *chervonets* ruble. Treasury bills of 1-, 3-, and 5-ruble denominations were put in circulation instead, not backed by any security but exchangeable for *chervonets* notes at any of the state-controlled banks. In addition, silver and copper coin was put in circulation. By May, 1, 1924, there were issued 87,000,000 rubles of the new Treasury bills, 20,000,000 rubles of silver, and 3,000,000 rubles in copper, a total value of 110,000,000 rubles of fractional currency; the amount of *chervonets* bank notes in circulation rose to 305,000,000 rubles, making a total of 415,000,000 rubles in circulation, with the fractional currency amounting to about 25 per cent of the total, as against 40 per cent prior to the War.

By the end of June, 1924, Soviet currency was established on a gold basis, and since that time there have been no unsecured paper issues. The budget of Soviet fiscal years, ending September 30, in millions of rubles (1 ruble equals $0.515) were as follows:

	1924–25 (actual)	1925–26 (actual)	1926–27 (actual)	1927–28 (actual)
Revenues	2,905.1	3,900.7	5,201.3	6,426.9
Expenditures	2,875.6	3,867.8	5,151.3	6,008.

Revenues for 1927–28 showed gains in all departments except the agricultural tax, as compared with the preceding year. Revenues from loans were 670,000,000 rubles, an increase of 142 per cent over the same period of the preceding year. The Federal budget for 1928–29 was fixed in preliminary figures at 7,731,500,000 rubles.

Currency in circulation on Jan. 1, 1929, was 2027.8 million rubles, as compared with 1670.8 million rubles on Oct. 1, 1927. The retail-price index (prices of 1913 equal 100), as of Oct. 1, 1928, was 210.8, as compared with 198 as of Oct. 1, 1927. The wholesale-price index was 176.1, as compared with 170 the previous year. The balance sheet of the State Bank as of Oct. 1, 1928, showed liabilities and assets of 4,371,397,000 rubles, and increase of 508,203,000 rubles, as compared with Oct. 1, 1927. The capital was 250,000,000 rubles. Deposits and current accounts were 1,553,125,000 rubles, an increase of 260,196,000. Assets of bullion, coin, precious metals, and foreign currency were 291,022,000 rubles, a decrease of 8,900,000.

Transportation. In 1929 the railway mileage of the Soviet Union was 48,125 miles, as compared with about 36,000 in 1913 and 42,000 miles in 1917. Under the five-year plan drawn up for the railways, construction of 11,500 miles of line is planned for the period, to cost $950,000,000. In 1926–27 the revenues from operation were $768,277,000 and expenditures $650,960,000, giving a net profit of $117,317,000, as compared with $91,567,000 the previous year. In 1927–28 revenues from operation were $898,675,000. Average daily freight loadings were 31,183 in 1926–27, as compared with 27,868 the previous year. Freight transported in 1927–28 totaled 150,611,000 tons, as compared to 135,728,000 tons in 1926–27. New locomotives built in Soviet plants during 1927–28 numbered 480, as compared with 441 the previous year. The number of permanent and temporary employees in 1927–28 was 1,070,000. There were 7000 miles of airplane lines in operation in 1928.

Internal Waterways. The length of navigable mileage in European Russia amounts to 25,545 miles and in Asia to 30,100 miles, besides longer mileage suitable for rafting purposes only. The river fleet in 1913 within the 1924 Soviet borders consisted of 3925 power-driven cargo boats of 682,528 aggregate indicated horse power; 20,573 sailing and other vessels, with a total capacity of 12,907,000 long tons. On Jan. 1, 1926, on the inland waterways, there were 3245 vessels of 530,278 tons, of which 464,789 tons were state owned. The volume of river transport in 1913 was 44,364,000 long tons and 16,200,000 passengers; in 1928 the amount of goods transported was 37,000,000 metric tons and the number of passengers carried in 1927 was 15,900,000.

Merchant Marine. In 1914 there were 1005 steamships, averaging 826 tons gross registry, of average capacity of 487 tons; 55 motor-driven vessels of 380 tons deadweight average, and 238 tons average capacity. In 1927 the merchant marine consisted of 346 vessels (of 100 tons or more) of 308,882 gross tons.

History. The outbreak of the War in August, 1914, produced a mighty demonstration of Russian Pan-Slavism. Internal dissensions and strikes were submerged in a wave of patriotism. The Duma rallied to the support of the Czar, and the representatives of dissentient nationalities made striking asseverations of loyalty. All Russian political groups, except the Bolshevist wing of the Social Democratic Party, expressed their resolution to spare no effort in assisting the Government to maintain the country's integrity and to defend coreligionists and kinsmen abroad. Even leading anarchists espoused the national cause with enthusiasm. The Government made some attempt to conciliate discontented minorities. The struggle with the Finnish Diet was suspended; the Poles were promised, by proclamation of the generalissimo, Grand Duke Nicholas, a grant of early autonomy and ultimate reunion under the Russian sceptre with their fellow-nationals of Germany and Austria; and restrictions on Jews, Catholics, and Lutherans lapsed temporarily. The permanent abolition of the sale of vodka decreed shortly after the beginning of hostilities met with widespread popular support. Large social groups were organized to aid in the prosecution of the War: local provincial councils formed the All-Russian Union of Zemstvos, and Municipal Councils were similarly federated into a national society. These bodies rendered valuable service in auxiliary relief work, although continually hampered by a suspicious attitude on the part of the national Government. The dynasty had been given a unique opportunity to retrieve its misdeeds and blunders by placing itself wholeheartedly at the head of a great popular movement; but Czar Nicholas II, although well-meaning, was narrow-minded and weak. Surrounded by reactionary nobles, priests, and bureaucrats, he "utilized the temporary heat of national altruism and patriotism in order to forge iron links in the chain of social inequality and political absolutism."

The Russian invasion of East Prussia met with an overwhelming catastrophe in the Battle of Tannenberg, but simultaneously Russian arms gained signal successes against the Austrians in Galicia. Reform in Poland was delayed while reactionary and ultra-nationalistic officials devoted themselves to energetic measures for Russifying conquered Galicia. During the winter of 1914–15, although the Russians held their own on the eastern front, they showed few signs of sweeping like a "tidal wave" on Berlin or Vienna, as optimistic Allied publicists hoped. At the opening of the Duma in February, 1915, Premier Goremykin expressed unwavering confidence in ultimate victory, and the majority of the Legislature seemed to share his faith. Meanwhile, the Russian Foreign Minister, Sazonov, had taken diplomatic measures to insure the acquisition of Constantinople. The Czar's Government hailed with delight the opportunity afforded to declare war on Turkey (Oct. 31, 1914). On Nov. 14, 1914, the British Ambassador at Petrograd informed Sazonov that Russia might have Constantinople, and during the following March (1915), a secret arrangement was consummated with France and Great Britain, whereby Russia was also to get the whole of Turkey in Europe except a district around Adrianople and Kirk-Kilisse; the Asiatic shores of the Bosporus; and about 80 miles of the Black Sea coast in Asia Minor, all in return for according the British and French like satisfactions in other regions. At that very moment, an Anglo-French expeditionary force was engaged in trying to force the Dardanelles in response to a Russian plea for a relief of pressure on the Caucasus front, where the Turks had concentrated their main strength. Russia failed to coöperate with the Allies in that tremendous undertaking, so vital to her interests and so essential to Entente victory, and with what now appears to have been consummate folly, fathered by greed, the Russian cabinet definitely vetoed the plan to obtain Greek military aid in opening the Straits; the Greeks, so Petrograd feared, might preëmpt Constantinople. The débâcle which eventuated had a direct causal effect on Russia's subsequent collapse, since it deprived her of a line of communications which, if kept open, would have facilitated the shipment of supplies and munitions to her poorly armed legions. In a struggle of machinery and specialized technical equipment such as the War was proving, Russia was ill prepared for battle; a land of primitive agriculturists, in a semi-feudal society, geographically cut off from assistance, she lacked the requisite resources and industrial organization.

The year 1915 had opened rather brightly for Russia. To be sure, the Government was experiencing great financial difficulties, but France and Great Britain lent valuable assistance in sustaining Russian credit, and a large loan was floated in America. In the spring and summer of 1915, the armies in the west being deadlocked, a gigantic Teutonic force was concentrated on the eastern front, and the Russians suffered a series of disastrous defeats. Russian generals, several of whom had conspicuous ability, were grievously handicapped by intolerable social and economic conditions. Russia's illiterate peasant armies, valorous but woefully short of munitions and supplies, could not cope on equal terms with the disciplined and well-armed troops of the Central Powers. During May and June, General von Mackensen, with combined Austro-Hungarian and German Armies, expelled the Russians from Galicia; immediately thereafter, General von Hindenburg, the victor of Tannenberg, directed a mighty thrust at Russian Poland. By October, 1915, all of Poland, together with most of Lithuania and Courland, was in the hands of the enemy powers, and the military prestige of Russia was destroyed. Up to October, 1915, Russia had lost approximately 2,500,000 men: 500,000 dead, 1,000,000 wounded, and 1,000,000 taken prisoner.

The Meeting of the Duma. The reverses in the field had profound repercussions on political life. Patriots assailed the Government for its criminal inefficiency and accused leading generals of incompetence. An early session of the Duma and the selection of a really representative national ministry were demanded. Premier Goremykin made some concessions to the critics. He superseded his unpopular Minister of the Interior, Makarov, by the more liberal Prince Cherbatov. On June 25, Sukhomlinov resigned the war portfolio and was replaced by General Polianov. Other reactionaries were dismissed and more acceptable conservatives appointed to succeed them. These changes postponed the impending crisis, but the situation was serious in the extreme when the Duma reassembled on August 1. The Duma, while expressing fervent loyalty and patriotism, demanded that the Government collaborate with the people in a more democratic spirit. Goremykin promised fuller coöperation in the work of national defense and planned to create advisory boards including experts and delegates from the Zemstvos, Municipal Councils, the Duma, and the Council of the Empire, to assist the ministers of war, commerce, communications, and agriculture. The Duma liberals, aroused by revelations of treason and corruption in government and army circles, demanded greater reforms. In late August and early September, 1915, under the leadership of the Constitutional Democrat, Milyukov, a bloc of liberal and moderate groups was constituted, embracing all elements in the Duma except the extreme reactionaries and Nationalists on the Right and the extreme radical Social Democrats on the Left. The programme of the bloc involved: (1) the reconstruction of the ministry on a more representative basis; (2) the reconcilation of discontented nationalities and aggrieved social classes; (3) the reform of local administration; (4) punishment of delinquent commanders and officials; and (5) the vigorous prosecution of the War. Simultaneously (September 5), the Czar with a magnificent gesture assumed nominally supreme command of the army, and Grand Duke Nicholas was transferred to the Caucasus.

After the German drive had spent its vigor, reaction triumphed over reform. To the consternation and anger of the Liberals, an imperial decree unexpectedly prorogued the Duma (September 16). In October, Khovostov, from the extreme Right in the Duma, replaced Cherbatov as Minister of the Interior, with the avowed purpose of strengthening the machinery of "benevolent but firm authority." One ministerial change followed another until on Feb. 1, 1916, "the very acme of reaction was reached with the retirement of Goremykin and the succession of Boris Stürmer, an ultra-conservative and an oppressive landlord reputed to be pro-German in his personal sympathies."

The Stürmer Ministry. The opening days of the new administration were signalized by important Russian victories in Asia Minor, including the capitulation of the great Turkish stronghold of Erzerum (February 16). The Duma, reconvened on February 22, was honored for the first time by the personal attendance of the Czar. Nevertheless, relations with the ministry continued critical and controversial. Finance occasioned a sharp debate; an income tax was levied, and recourse was had to British, French, and American loans. Liberal groups denounced the Government for its failure to establish a greater measure of political liberty and for its harsh treatment of Finns and Poles. There was also a disorderly debate on the continued persecution of the Jews. New changes in the ministry followed these attacks. Khovostov and Polianov resigned the interior and war portfolios, respectively, and General Sukhomlinov, the ex-Minister of War, was imprisoned for treasonable negligence in conduct of his office. Meanwhile, Russia's military fortunes were appreciably reviving. During the winter of 1915–16, Russia's lines were reformed, her arsenals replenished, and her command reorganized. In the summer of 1916, she coöperated with the Allies in a series of coördinated offensives. Under General Brussilov, the Russians inaugurated a vigorous drive along the Sereth River at the beginning of June. By the middle of August, the entire Province of Bukovina had been conquered and some 350,000 men taken, together with enormous stores of equipment. Russia's sudden rise reassured all the Allies. It contributed to Allied successes in the West, and it was the chief factor in encouraging Rumania to enter the War on the side of the Allies (August, 1916). Russia, however, consented with ill grace to Rumanian demands for future compensation and subsequently displayed short-sighted duplicity in neglecting to aid her neighbor and ally against the terrific Teutonic onslaught. Meanwhile, the internal situation in Russia had grown alarming, for the recovery of the army from its defeats and demoralization in 1915 was not accompanied by a restoration of political stability at home. The Czar and his advisers had learned no lesson. They persistently ignored the symptoms of economic distress manifest throughout the empire and gave no consideration to widespread demands for political reform. Against the Stürmer ministry, a mass of grievances speedily accumulated. The Premier muzzled public opinion, forced the resignation of the patriotic Sazonov, appointed extreme reactionaries to office, prorogued the Duma from July 3 to November 14, promulgated obnoxious autocratic decrees, and endeavored to repress popular organization (especially the All-Russian Union of Zemstvos, the Union of Municipalities, and the War Industries Committee), formed to promote popular coöperation with the Government and to assist in the vigorous prosecution of the War. On October 4, Stürmer ordered all meetings of these organizations to be placed under police surveillance and entrusted the administration of the interior to Protopopov, the most zealous prosecutor of liberals in all Russia.

The Trepov Ministry. These measures aroused a storm of protest and united all factions against the Government. Shortly after the Duma met (November 14), Stürmer resigned, only to be succeeded by a reactionary of the same stamp, Alexander Trepov. The Duma did not relax its criticism. In the midst of a stormy session during the closing days of 1916, Professor Milyukov, leader of the Constitutional Democrats, vehemently assailed the Government, being supported by several other speakers who made sensational disclosures concerning the almost traitorously inefficient prosecution of the War. The Duma, the Imperial Council, and the Council of Nobles, all passed resolutions excoriating the "dark forces" tending to paralyze the national organism and to create confusion in all departments of the Government. Despite the spread of popular disaffection during the winter of 1916–17, the Government adhered to its traditional methods of secrecy, suspicion, repression, and intrigue. The Czar was hopelessly dominated by his consort, Czarina Alexandra Feodorovna, and she in turn was under the hypnotic influence of hypocrites and charlatans, especially the notorious Gregory Rasputin (q.v.).

Friend of Goremykin, Suhkomlinov, Stürmer, and Protopopov, with whom he coöperated to frustrate nascent liberalism and constitutionalism, Rasputin exercised such a baleful influence on the course of events that his assassination at the end of December, 1916, caused much rejoicing. It was a grim portent of immanent revolution. The situation at the opening of 1917 was extremely tense and abnormal. The armies at the front sullenly maintained their positions, but were war-weary and distrustful of their leaders. The factory workers were deeply affected by internationalistic and socialistic ideas, while the peasants were suffering from the heavy toll of conscriptions and the economic demands arising from a war which they had never understood. The prevailing sentiment, especially among the intellectuals, was despair as to any improvement under the reactionary government.

The Golitzin Ministry. On Jan. 9, 1917, Prince N. Golitzin, a typical bureaucrat, replaced General Trepov as Premier. Other reactionary appointments followed, and the reopening of the Duma was deferred from January 25 to February 27. The Government was openly charged with aiming "to provoke a futile rebellion, to suppress the rebellion by force, to quell by terrorism an agitation for reform, and to entrench Russian autocracy anew in power for another century." On February 25, a secret arrangement was concluded with France whereby Russia was to get a free hand in drawing her western frontiers, i.e., around Poland, in return for the granting of a similar freedom to France along the Rhine. This devious diplomacy was nullified by the subsequent course of events. A grave shortage of food in Petrograd and other cities made matters still worse. The Duma reconvened on February 27, amid overawing police guards. Workmen to the number of 100,000 in Petrograd and 25,000 in Moscow went on strike as a political manifestation on behalf of the Social Democrats. The food crisis became acute. Bread riots occurred. On Mar. 11, 1917, the Czar's government ordered the Duma and the Council of the Empire to dissolve and the workmen to return to their jobs. The workers refused to obey, and the Duma declined to disband, declaring that it was now the sole constitutional authority in Russia. The revolution was at hand.

The Revolution and the Provisional Government. After several days of critical uncertainty, the Petrograd garrison was won over, the organs of autocracy ceased to function, and the revolution spread with lightning speed to the armies in the field and to distant provinces. The forced abdication of the Czar (March 15) in favor of his brother, the Grand Duke Michael, and Michael's refusal to accept the crown unless it were proffered by the will of the people, ended the three-century rule of the Romanovs. In Petrograd, authority was divided between the Duma and a newly constituted Soviet (Council) of Workingmen's and Soldiers' Delegates. By an agreement between them, a bourgeois provisional government recruited from the Duma and responsible to it was established under the premiership of Prince George Lvov, a liberal landlord, president of the Union of Zemstvos and member of the Constitutional Democratic Party. His ministry embraced seven other members of his party, including Milyukov as Foreign Minister, three Octobrists, including Guchkov, who held the war portfolio, and one Social Revolutionary, Alexander Kerensky, as Minister of Justice.

The provisional Government was speedily recognized by foreign countries. With equal celerity, the policies of the discredited autocracy were reversed. Finland's constitution was restored; the Poles were promised unity and self-determination; and the Jews received a sweeping bestowal of equal rights. Thousands of political offenders were released from prison or recalled from exile. Freedom of speech, of association, of the press, and of religion were proclaimed, and it was announced that a National Constituent Assembly would shortly be designated by universal suffrage to frame a permanent constitution for Russia. The new ministry advocated a democratic régime for revolutionized Russia, but "unlike the democracies of western Europe, the Russian revolutionary movement would have to base itself on an electorate of educated bourgeois and prosperous independent farmers than on a mass of illiterate, poverty-stricken peasants, and on noisy groups of ill-disciplined urban workers." Moreover, the great mass of peasants and proletarians were not satisfied with promises of political democracy and individual liberty; they desired a far-reaching social and economic transformation. More representative of the bulk of the Russian people than the bourgeois provisional Government were the extra-legal Soviets of Workmen's, Soldiers', and Peasants' Deputies, which, modeled on the initial Petrograd organization, were constituted throughout the country and in the army. The first National Congress of Soviets held at Moscow (April, 1917) demanded fundamental agrarian reform, the participation of workmen in the management of industry, the democratization of the army, and the continuance of belligerency only on the basis of a peace programme involving "no annexations and no indemnities."

There was a wide gulf between these aims of the Soviets, which were dominated in the rural regions by Social Revolutionaries and in the towns by the Menshevist faction or the Social Democrats, and those of the middle-class government of Lvov. The latter desired to subordinate internal reforms in Russia to the vigorous prosecution of the War. Milyukov, as Minister of Foreign Affairs, adhered to the diplomatic traditions of the old régime, favoring the maintenance of national prestige, cordial coöperation with the Allies, and the complete realization of imperialist aims as embodied in the secret treaties. The demobilization of the army, the war-weariness among the mass of the people, and the hostile attitude of the Soviets, forced the resignation of Milyukov, Guchkov, and other moderately conservative ministers, and on May 16, 1917, the ministry was reconstructed along more radical lines, Kerensky, as Minister of War, becoming the dominant figure, overshadowing Premier Lvov.

The Kerensky Government. Kerensky made strenuous efforts to terminate the War successfully, while simultaneously endeavoring to assure both political democracy and social reform, and although extremely eloquent and well-intentioned, the new leader lacked statesmanlike prevision, clearness of purpose, and strength of will. "After attaining to a unique position at the head of revolutionary Russia, Kerensky entangled himself in a net of contradictory measures, of ill-judged assertions of authority, and of weak-minded compromises and renunciations." His ministry encountered the opposition of Constitutional Democrats who feared anarchy, of the Bolshevists who were growing more influential in the Soviets, and of German emissaries fostering separatism among the subject nationalities and pacifism among the soldiers, workmen, and peasants. He was unable to secure a repudiation by the Allies of the obnoxious secret treaties or a restatement of war-aims on the basis of "no annexations and no indemnities." Under the circumstances, it was impossible to infuse patriotic enthusiasm into the Soviets, and the disintegration of discipline in the army led to disastrous defeat during the attempted Brussilov offensive of July, 1917. All the gains of 1916 were obliterated in one crowning catastrophe, and the Germans extended their lines in the Baltic provinces. The Austrians recovered all of Galicia.

Even more alarming than these defeats at the front was the continued growth of internal chaos. Although, numerically speaking, it was a mere insignificant minority of the Russian people, the extreme faction of Bolsheviks which had consistently opposed the War since its outbreak, began in the spring of 1917 to acquire immense prestige among the war-weary masses who were more eager for the social millennium than for military victory. The Bolsheviks adhered to their principles in frankly repudiating political democracy and refusing to coöperate with the bourgeoisie or even with the Social Revolutionaries and Mensheviks in the hour of supreme national crisis. This subversive propaganda was facilitated by the return of a long-exiled leader, Nikolai Lenin (the pseudonym of Vladimir Ulianov), a man of noble extraction who had become a doctrinaire Socialist with an international reputation. Lenin's chief accomplice in his formidable assaults on Russian society and the provisional Government was Leon Trotsky (a pseudonym for Bronstein), a man of middle-class Jewish origin, who likewise had been a political exile and who returned to Russia in May, 1917. The Bolsheviks vociferously agitated for peace, outlined a tempting programme of immediate social reforms including expropriation of the landed nobility and industrial self-government, and made their slogan "All power to the Soviets." In June, at the All-Russian Congress of Soviets assembled in Petrograd under the presidency of the Menshevik leader, Tcheidze, Lenin pronounced a furious indictment of the provisional Government and of Kerensky. His attack was unavailing, however, and he was overruled by the moderates. Following the collapse of the Russian offensive in July, Prince Lvov and the other Constitutional Democrats in the ministry resigned (July 17). A Bolshevist uprising was repressed by Kerensky with the aid of the Menshevist Petrograd Soviet, Lenin fleeing to Finland where he remained until October. On July 20, Kerensky became head of the provisional Government. He still hoped to save Russia, but the odds were against him. An extraordinary conference representing various parties, the Zemstvos and municipalities, universities, the army, factory workmen, and peasant communities, which met in Moscow late in August, revealed a state of complete paralysis and confusion among the leaders of the country. In September, Kornilov, who had succeeded Brussilov as generalissimo, attempted to assume a military dictatorship, after concerting plans to that effect with Kerensky, but the latter turned against him and took control of the army. This affair caused a recrudescence of revolutionary zeal and a violent rush to the Left. Meanwhile, anarchy increased in everyday life. The peasants were seizing the large estates, dividing the spoils, and executing summary justice on those who had long oppressed them; urban workmen were dispossessing factory-owners. The Soviets called a Democratic Conference in Petrograd on September 27, to represent peasants and proletarians, but no bourgeois elements. All proposals for a new and more capable coalition government failed.

The Bolshevist Revolution. The weakness of the Government was the strength of the Bolsheviks. Gradually, they supplanted the Mensheviks in control of urban Soviets, and by promising speedy agrarian reforms, they weaned the peasants away from the Social Revolutionaries and Kerensky. Trotsky, imprisoned after the July fiasco, was subsequently released, only to succeed the Menshevist president of the Petrograd Soviet and to renew his activities by organizing Red Guards subservient to Bolshevist wishes. During October, Kerensky made one last effort to bolster up his government by establishing a Council of the Republic with a membership drawn from all the political parties, and principal associations and institutions. It was of no use; the day of reckoning had come. The provisional Government had failed to fulfill popular aspirations or to overcome the force of opposition. By extravagant promises of peace, by irresponsible attacks on the much-harassed Government, and by the use of traditional political methods of intimidation and intrigue, the Bolsheviks managed to control a large majority of the delegates newly elected to the Congress of Soviets. Having formed a Military Revolutionary Committee and assured themselves of the support or benevolent neutrality of the Petrograd garrison, the Bolsheviks utilized their Red Guards to execute a *coup d'état* (Nov. 6–7, 1917). Kerensky had provided no adequate defense, and the conflict was brief. The members of the provisional Government were taken into custody, Kerensky alone evading capture. On November 8, the change was formally recognized by the All-Russian Congress of Soviets, which immediately sanctioned the establishment of a Council of People's Commissars with Lenin as Premier and Trotsky as Commissar for Foreign Affairs.

In accordance with the anti-capitalist tenets of their faith, with the anti-imperialist pronouncements of the Zimmerwald manifesto of 1915, and with their promises to the war-weary masses, the Bolsheviks resolved to conclude peace with the Central Empires at any price. Proposals to the Allied governments for the immediate conclusion of an armistice and the restatement of war-aims on the "no annexations, no indemnities" basis eliciting no answer, the Bolsheviks enraged the Entente rulers by publishing the "secret treaties." An armistice was concluded with Germany, Austria, Turkey, and Bulgaria at Brest-Litovsk on Dec. 17, 1917. Here on December 22, despite Allied protests, a formal Peace Conference was inaugurated. The idealistic peace proposals advanced by the Bolsheviks were accepted by the Germans "in principle" but entirely vitiated in practice. Early in January, the conference reached an impasse owing to extreme Teutonic demands and insistent Bolshevist propagandizing. On February 10, the Soviet government announced that it could not conclude peace but would not renew warfare. The Central Powers, however, terminated this solemn farce by reopening hostilities. Trotsky gave up the Foreign Office for the war portfolio and was succeeded by Tchitcherin, who coöperated with Lenin in bringing about a renewal of negotiations. A drastic set of peace terms was finally incorporated in the Treaty of Brest-Litovsk, signed on Mar. 3, 1918. By this convention, the huge and heterogeneous empire was diminished and transformed into an essentially national state of an area comparable with that existent before Peter the Great. The same period witnessed the retransfer of the national capital from Petrograd (Peter's town) to Moscow. The Bolsheviks were obliged to relinquish Finland, Poland, Estonia, Livonia, Courland, Lithuania, Ukrainia, Bessarabia, and part of Transcaucasia, which, although not annexed to the Central Powers, were dominated and economically exploited by them. Russia thereby lost 26 per cent of her population, 27 per cent of her arable land, 32 per cent of her average crops, 26 per cent of her railway system, 33 per cent of her manufacturing industries, 73 per cent of her total iron production, and 75 per cent of her coal fields.

Bolshevist Domestic Policy. In the meantime, the Bolsheviks were consolidating their power in such areas as still remained under their control. Internal opposition was repressed with an iron hand. By means of revolutionary tribunals and summary proceedings, they inaugurated a régime of systematic terrorism to extirpate reactionaries, hostile liberals, and lukewarm moderate revolutionaries. Among the many who perished in the years 1918–19 were ex-Czar Nicholas II and his family, who were killed at Ekaterinburg on July 16, 1918. Though the Bolsheviks expected that the state, which they regarded as purely a "capitalist organ," the tool of a dominant class in society, would be rendered superfluous with the ultimate realization of communism, nevertheless they believed that during the transitional period of "dictatorship" the proletariat would require an instrumentality of control fully as coercive as the capitalistic state. It was not political democracy, it was force which these would-be communists utilized to establish and perpetuate their rule. The National Constituent Assembly, finally elected by equal, direct, universal, and secret suffrage in November, 1917, embraced a considerable majority of social revolutionaries and others who were anti-Bolshevik in sympathy. The Council of People's Commissars, not finding this organ of democracy sufficiently subservient, postponed its meeting till January, 1918, and finally dissolved it altogether. The All-Russian Congress of Soviets, purged of militant anti-Bolsheviks, automatically became the supreme repository of legislative power.

Individual liberties, political democracy, and the prosecution of the War were all shelved while the new Bolshevist government embarked on a radical course of social and economic experimentation and revolution. A series of decrees issued in November, 1917, and subsequently, pronounced the doom of the capitalistic régime. All special privileges were abolished, and obligatory labor was enjoined on all citizens. Private ownership of land was abolished without compensation, and all real estate was nationalized, the peasants being permitted to occupy such land as they actually cultivated. Mines, forests, and railways were appropriated by the state, and factories were transferred to the management and operation of workingmen. The national debt was repudiated, private banking resources confiscated, and foreign trade made a government monopoly.

The Russian Orthodox Church was disestablished on Jan. 23, 1918, and its wealth expropriated. No church organizations were permitted to own property. Private schools were suppressed and considerable attention was given to the development of national public schools, owned and directed by the state, in which loyalty to Bolshevist principles was to be inculcated.

The substance of these Bolshevist principles, precepts, and practices was enshrined in the constitution of the Russian Socialist Federated Soviet Republic, adopted on July 10, 1918, by the fifth All-Russian Congress of Soviets. By this document, all central and local authority was formally vested in Soviets of workers', soldiers', and peasants' delegates. For Soviet elections, all citizens and resident aliens over 18 years of age, male and female, who earned their living by "productive labor," and all revolutionary soldiers and sailors were enfranchised, but the right to vote was denied to all capitalistic producers, landlords, private merchants, clergymen, and certain other classes. The centre or source of all power was to be the All-Russian Congress of Soviets, consisting of representatives from the city Soviets on the basis of one delegate for every 25,000 electors, and from provincial Soviets on the basis of one delegate for every 125,000 inhabitants—the franchise being thus heavily weighted in favor of the urban workers, the main supporters of Bolshevism. The All-Russian Congress thus constituted was empowered to elect an All-Russian Central Executive Committee of some 200 and later 300 members to serve as the controlling executive, legislative, and administrative organ while the Congress itself was not in session. The Central Committee in turn was to designate a supreme central administrative cabinet, the Council of People's Commissars, composed of 18 members responsible to the Central Committee and through it to the Congress and subject to recall at any time. Individually, these commissars were to preside over various departments such as those of foreign affairs, war, interior, justice, labor, etc.; and collectively, they were responsible for the general conduct of affairs and the execution of Soviet policies. The commissars who exercised the real authority were thus about five steps removed from direct popular election and control, if such a thing might be said to exist in a country where the Bolshevists (Communists), a mere minority party of some 600,000 highly disciplined members, controlled the machinery of government and the organs of public opinion. The drastic way in which they had fulfilled popular longings for peace, for land, and for proletarian privileges assured them a modicum of popular support; and this, together with their arbitrary use of force, kept them in power.

Foreign Interference and Counter-revolutions.—The Treaty of Brest-Litovsk, far from ridding Russia of the Teutonic "peril," proved a prelude to sustained intervention in her internal affairs during 1918. Such Russian economic resources as were susceptible to German seizure were exploited to bolster up Germany's war-weakened military and economic machinery then making its supreme effort on the western front. Separatist nationalities in Finland, Estonia, Latvia, Lithuania, Poland, and the Ukraine, emancipated from Russian control by the Treaty of Brest-Litovsk, were encouraged to set up anti-Bolshevist governments under German surveillance. In order to check Bolshevist propaganda in central Europe, financial, and military support was extended to Russian counter-revolutionary leaders. Only the complete collapse of the Central European coalition in October and November, 1918, saved Russia from further German interference.

The defection of Russia from the Allied cause was naturally resented by the governments of France, Great Britain, Italy, Japan, and the United States. The revelation of the secret treaties, the negotiation of a separate peace, the repudiation of Russia's immense foreign indebtedness, the inauguration of a communistic régime with its attendant nationalization of property and inevitable reign of terror, all taken in conjunction with the apprehension aroused by the avowed Bolshevist ambition to effect a world-wide social revolution, infuriated Allied public opinion against Russia. In March, 1918, Allied intervention in Russia began in earnest, ostensibly to revive the eastern military front and to prevent German recuperation at Russian expense, but also with the ulterior purpose of setting limits to the activities of the Bolshevists and of striking anti-capitalist communism in its very stronghold. A rigorous economic blockade was established, and expeditionary forces were landed at Murmansk in northern European Russia and at Vladivostok on the Eastern coast. Truly, the year 1918 was a period of terror and turmoil for all Russians. Even with the triumph of Allied arms in the War, intervention in Russia did not cease. "The Allies occupied northern Russia, the Crimea, and most of Siberia; members of the dissolved National Constituent Assembly set up at Omsk an anti-Bolshevist government which claimed to be the legal successor to Kerensky's provisional government; and certain reactionary Russian Army officers, such as Generals Denikin and Wrangel in southern Russia, and General Yudenitch, in the Baltic area, rallied Ukrainians, Cossacks, and adventurers to their standards, and with Allied support, undertook military campaigns against the Bolshevists."

In the spring of 1919, the Paris Peace Conference, disturbed by the spread of Bolshevism, endeavored to find some solution of the Russian imbroglio, but no settlement could be attained (see PEACE CONFERENCE AND TREATIES). Following the breakdown of these negotiations, the Allied governments reverted to supporting the various counter-revolutionary factions which, in conjunction with the Allied expeditionary forces, hemmed in and harassed Soviet Russia from all sides.

Chaos reigned in all eastern Europe throughout 1919, but in the course of time, the Bolshevist government managed both to ward off foreign intervention and to suppress domestic revolts. The counter-revolutionists quarreled among themselves; the Russian proletariat and peasantry feared the triumph of reactionary royalism and the undoing of hard-won social and economic reforms; the spirit of nationalism impelled large numbers of non-Bolshevik Russians to coöperate in resisting foreign aggression; and finally the Allied governments had too divergent interests and were too exhausted by the long-continued strain of war to be able or willing to unite in a vigorous policy of coercion. The Allied expeditionary forces were withdrawn from northern Russia in the autumn of 1919 and, from Siberia in the spring of 1920, except Vladivostok, which remained temporarily under Japanese control. The various border states, Poland, Finland, Lithuania, Latvia, and Estonia, were still encouraged to wage incessant warfare with Russia and were utilized from time to time as bases for fomenting and launching additional counter-revolutionary movements; but with the withdrawal of active Allied military opposition, the Bolshevist Armies were enabled to deal more effectively with these lesser opponents. Yudenitch was driven out of the Baltic area; Denikin was expelled from southern Russia and forced to take refuge in Constantinople; Admiral Kolchak, temporarily victorious in extending his anti-Bolshevist dictatorship from Siberia into eastern European Russia during 1919, sustained serious reverses in battle, was captured, and was executed in February, 1920.

The French, however, continued throughout 1920 to make trouble for Russia and incited the Poles to wage aggressive war (see POLAND) with the aid of the Ukrainians, and the counter-revolutionist, General Wrangel, Denikin's successor in southern Russia. It was of no avail. On Oct. 1, 1919, Estonia, Latvia, Lithuania, and Finland had united in proposing the negotiation of peace with Russia, and during the next year treaties were made between these states and the Bolshevist government. On Feb. 2, 1920, Russia and Estonia signed the Treaty of Dorpat providing for Estonian independence and for reciprocal commercial advantages. By the Treaty of Moscow, July 12, 1920, the independence of Lithuania was recognized. War with Latvia was terminated by the Treaty of Riga, Aug. 1, 1920, by which Russia acknowledged the independence of Latvia and her sovereignty over Livonia, Courland, and Latgallia. Finland signed a peace at Dorpat on Oct. 24, 1920, by which her independence was confirmed, boundaries adjusted to include the district of Petchenga in the north, and portions of Eastern Karelia assigned to Russia. Russia also endeavored to come to terms with the Poles, but it was not until after a series of defeats and victories on both sides resulted in a stalemate and the Treaty of Riga (Oct. 12, 1920, confirmed in final form, Mar. 18, 1921) that a settlement was finally achieved, stipulating Polish independence and the rectification of the eastern boundary of Poland. Meanwhile the Bolshevists had successfully evicted General Wrangel from the Crimea and reconquered the Ukraine which was once more attached to Great Russia by a treaty signed Dec. 28, 1920, consolidating the administration of economic and military affairs in such fashion as to leave the Soviet government of the Ukraine with the merest shreds of independence in foreign affairs, agriculture, education, and justice. Other border peoples, also, which had temporarily broken away, were regained by the Moscow commissars, who interpreted their dogma of self-determination in such fashion as to permit armed assistance to Red factions in neighboring states. In the Caucasian republics of Azerbaijan and Armenia, Red troops helped to establish Soviet governments late in the year 1920, and in the following year, Georgia was sovietized. In December, 1922, these three republics were joined to form the autonomous Transcaucasian Socialist Federated Soviet Republic.

In Central Asia, Russian Turkestan was brought under firm control, and the Khanates of Khiva and Bokhara were transformed into Soviet republics despite the efforts of a brilliant Turk, Enver Pasha, to include them in a fantastic Pan-Turanian state (see PAN-TURANIANISM). These areas were also regrouped, in 1924, and the new autonomous republics of Uzbek and Turkoman formed.

Most of Siberia, after the fall of Kolchak, was reincorporated into Soviet Russia, and the short-lived Far Eastern Republic, in the eastern extremity of Siberia, returned to the fold in 1922. The process of reintegration culminated in the signature of a treaty, Dec. 30, 1922, providing for the virtual federation of Soviet Russia, Soviet Ukraine, Soviet Trancaucasia, and the White Russian Soviet Republic. On the basis of this treaty, a new constitution was promulgated on July 6, 1923, establishing the "Alliance" or "Union of Socialist Soviet Republics."

The new constitution superseded the series of bilateral treaties by which the various areas had been bound to the Russian Republic until then, and naturally removed much of the administrative confusion which had existed prior to its adoption. In 1924 the republics of Uzbek and Turkoman became partners to the new constitution, so that from then on, the U. S. S. R. consisted of six autonomous soviet republics, each of which was guaranteed the right to withdraw from the union at any time. A unique form of government was provided for (see *Government*).

Despite perennial prophecies to the contrary, the Bolshevist government proved unexpectedly stable; it survived domestic insurrections, counter-revolutionary movements, and foreign intervention during the troubled years from 1918 to 1921; by 1924 it had attained a not inconsiderable measure of domestic support and foreign recognition; the year 1929 saw it on a firmer foundation than ever; but its leaders were unable to achieve either of their two major objectives: (1) the successful and complete communization of Russian society; (2) the precipitation and consummation of a world-wide proletarian revolution.

Aside from any inherent fallacies in Bolshevist doctrines (see BOLSHEVISM; COMMUNISM; SOCIALISM) and obvious technical limitations of Bolshevist leadership, there were many virtually insuperable obstacles to the achievement of communistic reforms in Russia. These embraced such factors as: (1) the almost universal ignorance of the lower classes, on whose intelligent and voluntary coöperation the success of such ventures largely depended; (2) the persistent hostility of dispossessed property-owners and of foreign capitalists; and (3) the agricultural, industrial, and commercial demoralization of Russian society resulting from the War and already manifest when the Bolshevists seized power in November, 1917. The next four years saw confusion worse confounded.

Agrarian Situation.—The widespread prevalence of agrarian unrest and the peasants' passion for land had been potent factors in the subversion of the old régime. Approximately 85 per cent of the population of Russia was classed as rural, and the problem of adjusting the theories of the revolution to meet the interests of this great class was a source of much concern to the Soviet authorities. The land expropriation and redistribution which accompanied the Bolshevist *coup d'état* augmented the total land holdings of the peasantry from 70 per cent of the total cultivated acreage to 96 per cent in European Russia proper and from 55 per cent to 96 per cent in the Ukraine. In this process, not only were virtually all the large landed estates wiped out, but larger peasant holdings disappeared as well, so that by 1922 farms of 35.7 acres or less comprised 95 per cent of the total. The basic principle of the law of February, 1918, was the abolition of all private ownership of soil; all land was to be distributed on the basis of an "equalized land tenure" to individuals for cultivation. The individual holder became virtually an employee of the state; the produce, after a deduction of enough to meet his current requirements, became the property of the state. The great mass of peasants failed entirely to comprehend that this law confiscated their land as well as that of the erstwhile privileged classes. Conflicts between peasants and former urban workers and others who desired to benefit by the new policy led to a restatement of the land policy in a new law (February, 1919) which, while not prohibiting individual farmers, declared definitely in favor of "large Soviet estates, rural communes, group agriculture, and all other forms of collective use of land," and stated that "all forms of individual use of the land" were "merely temporary and doomed to disappearance."

In the years following the land-socialization policy, there was a marked decrease in the area under cultivation. This and other circumstances, notably crop failures, forced the Government to take two highly important steps in the reversal of that policy. First, in the spring of 1921, the principle that the entire produce of the farmer belonged to the state was virtually abandoned. All peasants who paid a fixed tax in kind were given the right to dispose of any surplus as they pleased. In the second place, in the spring of 1921, the fundamental law of land possession was completely revised. While it reiterated the basic principle that "the land belongs to the state" and repeated the prohibition against the purchase, sale, and mortgage of land, it completely abandoned the idea that "all forms of individual use of the land should be regarded as merely temporary and doomed to disappearance." The peasants were given not the technical ownership but the actual possession of the land. The old village communities were allowed to continue their practice of permanent group possession with periodical repartition to members for actual use, but at the same time the individual peasant family was to be permitted to break away from these communities and to acquire direct possession, perpetual and hereditary.

The new law was thus almost identical in principle with Stolypin's agrarian measures of 1907 and 1910. In short, it was a distinct recognition of the individualistic tendencies of the mass of the peasants, coupled with a continued attempt to guard against any return to economic inequality in land possession. A new system of graduated land taxation helped toward the same end of maintaining social equilibrium. Agriculture constituted the one line of production in Russia where human enterprise was practically unaffected by the communist régime from the start. Indeed, after 10 years of Bolshevist rule, 90 per cent of all agricultural output which went to market was produced by private peasant proprietors, while the state-owned farms and agricultural coöperatives combined produced only 10 per cent. By 1923 Russian agricultural production aggregated 75 per cent of the pre-war average. A poor harvest in 1924 was succeeded by four good crop years, and the total sown area in 1928 (over 260,000,000 acres) was almost equal to the pre-war sown area. It was estimated that the agricultural output for 1928 would equal 104 per cent of that of 1913. Given a little more freedom in the matter of the export of their surplus, the peasant would doubtless attain greater prosperity than he ever had in the days before the War.

Industrial Situation.—Industrially, Russia in 1917 had been severely strained by the War. The breakdown of the railways and shipping not only interrupted trade and deprived the peasants of implements and supplies but prevented the shipping of foodstuffs to the industrial cities. Here, the expropriation of factory owners and the prohibition of trade completely dislocated the normal economic relations of society, for the workmen proved too ignorant to operate the great industries without technical assistance. "Industrial production dropped to the lowest ebb, due to the system of management by workmen's committees, lack of incentive for human endeavor, the scheme of universal state maintenance of the working classes, equalization of all working personnel, irrespective of the degree of responsibility or nature of work performed." Various measures for stimulating production by all kinds of premiums and penalties were utilized and discarded in turn. The dwindling of available reserves of materials and productive equipment, and the menacing diminution of agricultural acreage noted above threatened the proletariat with starvation, and menacing strikes occurred in Petrograd, Moscow, and other cities during the winter of 1920–21. The Soviet government was compelled to modify the application of its communistic policies. Technical experts and managers were restored to their positions at relatively high salaries. Trading in commodities, at first prohibited, then winked at, became openly tolerated, and was finally legalized in May, 1921.

The "New Economic Policy."—On April 7 of the same year, the original plan of complete state confiscation of all industrial products was modified to permit industrial enterprises to allocate a certain portion of their output to workmen as wages and premiums, the workmen in turn being free to dispose of these products in the open market. This was the beginning of the so-called "New Economic Policy" (N.E.P.), characterized by Lenin as a "strategic retreat," which marked the gradual abandonment of communism through the successive phases of collectivism and state socialism to a system of quasi state capitalism. Under the new system, nearly all the basic industries were organized into several hundred state trusts and syndicates, chartered "on a commercial basis with the aim of acquiring profits" (by a decree of Apr. 10, 1923).

A governmental cabinet department which was known as the Supreme Economic Council was to control these trusts in the matters of prices, fixed capital, and the appointment of managing boards. Except in these respects, the trusts were legally independent and responsible, and accountable to the state for only about 50 per cent of their profits. Ten per cent of the profits were to go for the welfare of the workers, thus providing the necessary economic incentive to better work, and the balance was to go to the surplus fund of the trusts for further expansion and reserves. Whenever desirable, the Government could use the money received from one trust to subsidize another.

Further, private initiative was admitted by leases of less essential enterprises and by concessions and participation in mixed companies, in which, however, the controlling interest was to be held by the state. The principal banks continued under government control, and foreign trade remained a government monopoly. Labor armies and compulsory labor in general were abolished, as well as all forms of rationing. The ordinary system of employment and wage-earning was restored, with the interference of trade-union and factory committees in the management of works reduced to a minimum.

Distribution could take place through any one of five agencies: State or syndical wholesale and retail establishments, coöperative retail stores, private retail stores, rural fairs, and the government export bureau. The approximate turnover in wholesale and retail internal trade in 1926 was 49 per cent through the state's agencies, 30 per cent through coöperatives, and 21 per cent through private trade. By 1922 Russian industry reached 22 per cent of pre-war production, a measurable increase over previous years; in 1923 the figure had increased to 35 per cent, and in 1924 to 45 per cent. In 1927 it was estimated that the total industrial output for 1928 would equal 124 per cent of that of 1913.

Meanwhile, further changes in policy were taking place. A State Planning Commission, the Gosplan, was established in 1923 to coördinate all phases of industry, and to outline a general economic programme for the next 5 to 15 years. It was the Commission's task to "integrate in detail the economic life of 150 millions of people over a 6000 mile stretch of territory." Its chief objectives were to bring Russia's economic output up to the pre-war level as quickly as possible, and then to make Russia as nearly self-sufficient as practicable. In 1927 the Gosplan was headed by an expert governing board of 16, with a central of 500 assistants. "No major step in industry could be taken without the visa of the Gosplan." After spending years in the compilation and study of statistics, the Gosplan, in the spring of 1927, published in a 300-page book a plan upon which industry was to operate for the next five years. It was a daring experiment and bore watching on the part of the rest of the world.

In 1925 restrictions on private trade were further ameliorated, and the taxes on private trade lowered. Despite these changes, and despite the fact that credit was made easier, private industrial trading began to decrease in 1926 and 1927 because of the increasing competition of the coöperatives. In this respect, industrial conditions were quite different from agricultural ones. A further decree, of April, 1925, permitted farmers to employ hired labor under a regular wage system, and to extend the legal eight-hour working day during the busy seasons. On the other hand, a decree of November, 1927, provided for the gradual introduction of the seven-hour day into industry.

The year 1928 brought with it greater liberality in the matter of autonomy for factory managements, and in September of the same year, the Government announced "a programme of extension and liberalization of the policy of granting concessions to foreigners. The new policy included the importation of construction materials duty free and simplification of the taxing scheme." Concessions to foreigners were granted in such fields as mining, the manufacture of machinery and artificial silk, cotton growing, and leather tanning. On June 1, 1928, there were 97 foreign concessions in operation, 14 of these being controlled by Americans. Incidentally, the W. A. Harriman Company, in September, 1928, surrendered as unprofitable a concession, acquired in 1925, to exploit the manganese fields of Chiaturi. A Soviet trust took over the venture, and in 1929 came to an agreement with the United States Steel Corporation whereby the latter contracted to purchase from 80,000 to 150,000 long tons of manganese a year for five years. Another change of Soviet policy occurred on Oct. 4, 1925, when prohibition was repealed and the distilling of 40 per cent vodka made a government monopoly.

These compromise policies inaugurated by Lenin and his more moderate associates naturally had a stimulating effect upon industry and foreign and domestic trade, but they were vigorously assailed by the Communists of the extreme left wing, and there was much dissension in party councils. The personality, intellect, and will power of Lenin, however, overbore all opposition, and even during his prolonged illness in 1922 and 1923, his policies prevailed; but following his death on Jan. 21, 1924, the Communist Party was definitely split over the question of a successor. At first, a triumvirate consisting of Joseph Stalin, Kamenev, and Zinoviev assumed control, but by 1925 Stalin emerged as the sole head of the Communist Party, and therefore as virtual Dictator of Russia. Kamenev, Zinoviev, and Lenin's old friend, Trotsky, formed a sort of opposition group. Their chief points of difference resulted from Stalin's plan to improve relations both with the foreign world and with the peasants, while Trotsky still wanted a world revolution and the exclusion of foreign capital. Soon Zinoviev and Trotsky were expelled from the party, and in 1927 and 1928, respectively, they were exiled. The specific charge against Trotsky was the illegal organization of an opposition party. Stalin's dominance meant the continuation and extension of the N.E.P.

The Communist Party, Education, and Religion. The foundation of the Russian government was the Communist or Bolshevist Party, which, by 1929, had about 800,000 active members—mostly veteran revolutionists or their trained disciples. With no special privileges to compensate them, these Communists had always to be at the disposal of the Government, had to devote their spare time to preaching the doctrines of their political faith, had to be ready to defend the system with their lives, and were subject to severe penalties for infractions of the rigid rules established. Annual "purifications" purged the party of lukewarm or recalcitrant members. Additional members were recruited from a list of "candidates" (numbering between 300,000 and 400,000 in 1928) who were graduates of the Komsomol or Communist Youth Organization. This organization had about 2,000,000 members who were between the ages of 16 and 23 years in 1929.

Below the Komsomol was the Pioneers or Communist Children's Organization, with a membership of 2,000,000 children between 10 and 16. Numerous constitutional and extra-constitutional means were employed to keep the party in absolute control of the Government: (1) The disfranchisement of all whose interests might make them possible counter-revolutionists. (2) The according of a greater proportionate representation to the urban districts than to the rural districts. (3) The employment of indirect rather than direct methods of election to the national Congress. (4) The reservation of all important governmental positions for members of the Communist Party. (5) A strict censorship of anti-Bolshevik speech and press, and frequent resort to imprisonment for political offenses; indeed, in 1918 the Cheka, a special police instrument of Red Terror, was established. After having put to death thousands of political opponents of Communism, the Cheka was abolished in 1922, though arrests and executions continued. (6) The prohibition of the organization of any opposition party. (7) The excellent organization and direction of the Communist Party itself. At its head were a secretary general (first Lenin, then Stalin) and a Political Bureau, or Politburo, which absolutely governed the entirety of the party membership.

Realizing that the ignorance of the masses was one of the greatest obstacles both to an improvement in the country's prosperity, and to the spreading of their doctrines, the Communists determined to make every possible attempt to educate the people in general, and simultaneously to impress upon them the soundness of socialistic principles. Lack of money prevented the carrying out of an extensive educational programme anywhere but in the large cities. Many villages remained without any schools whatever. Adult education in the cities was provided for by a sort of university extension system.

The first decade of Bolshevist rule was also marked by bitter controversies over religious teaching in the schools, the confiscation of church property, the attempts of the Government to encourage the "Living Church" movement, and the trials and executions of various prominent prelates, both Russian Orthodox and Roman Catholic, on charges of treason. There was a marked tendency toward the abandonment of Christianity on the part of such Bolshevists as were not Jews, and toward the substitution of somewhat bizarre Communist ceremonies for the Christian ritual of baptism and death; marriage became a civil contract, readily dissolved by mutual consent, but not more than three divorces were permitted to the same person in any one year.

In the spring of 1922, a Soviet decree requisitioned whatever church treasures remained, on the ground that they were to be used for famine relief work. The decree inaugurated a new wave of religious persecution during which several hundred priests were arrested, and many others shot. The Patriarch of the Orthodox Church, Tikhon, was imprisoned in a monastery in Moscow. The religiosity of the Russian peasants, however, was so great that the Government decided to bore from within by lending support to a group of Communist priests who urged a series of radical reforms. Early in 1923, this group called a conference of members of the Orthodox clergy and laity, and in solemn session deposed Patriarch Tikhon as a counter-revolutionary. Despite this, Tikhon was released by the Government, and until his death on Apr. 7, 1925, a majority of the church members continued to look up to him as Patriarch. His successor, the Metropolitan Peter, was also arrested, but finally, in the summer of 1927, Metropolitan Serge, the former Keeper of the Patriarchal Throne, concluded an agreement with the governmental authorities and announced his loyalty to the Soviet State. Nevertheless, religious conditions were still in a state of uncertainty and turmoil in 1929. Churches could be leased from the state without charge by any group of not less than 20 members of a congregation. No religion could be taught in state or private schools, but instruction might be given the children at home if the parents so desired. Religious classes might be organized for persons above the age of 18.

Foreign Relations. At the outset, the Bolshevist doctrinaires eschewed imperialism as a phase of the capitalism they sought to destroy, and true to the tenets of their creed, they renounced the concessions and privileges acquired by pre-revolutionary Russian governments in Turkey, Persia, Manchuria, and Mongolia. This anti-imperialist policy, at first manifested chiefly in negative form, soon assumed the positive aspect of a vigorous and widespread attempt to arouse the Asiatic races against Anglo-French domination and "exploitation." Afghanistan was incited by Bolshevist propaganda and encouraged by a Russian alliance to make war on the British Empire and to emancipate itself from British tutelage. With the Nationalist government of Turkey, the Moscow anti-imperialists likewise negotiated an alliance against European imperialism, but in this case, the interests of the Allies were not sufficiently harmonious to make the treaty an effective force; the divergence of aims was seen most clearly at the Lausanne Conference (see PEACE CONFERENCE AND TREATIES), when the Turks showed themselves willing to compromise with Western Europe regarding the freedom of the Straits, while the Russians, anxious to exclude British and French warships from the Black Sea, held out for the absolute closure of the Straits to vessels of war.

After long negotiations, the Russian government concluded two agreements with China on May 31, 1924, concerning the Chinese Eastern Railway in Manchuria and other disputed matters. Russia gave up all special rights, privileges, and concessions that the Czarist government had secured from China prior to 1917, but the Chinese Eastern Railway was to continue under joint Sino-Russian control (see also below). The value of such diplomatic gestures as means of emphasizing Russia's self-appointed rôle of antagonist to European imperialism was enhanced by the propagandist activities of the Third International, theoretically a federation of Communist parties of all countries, but actually a propagandist organization, officered by leading members of the Russian government, dominated by the Russian Communist Party, and adhered to by only an insignificant minority of Socialists outside Russia. This organization was formed in 1919 with Zinoviev at its head for the purpose of preparing the ground for the heralded world revolution. In 1926 Zinoviev was succeeded by Bukharin.

The Third International directed its inflammatory agitation both toward the subject peoples of Asia, and toward the capitalistic nations of the West. The latter phase of its activity was particularly offensive to the United States government, the former to Great Britain. On more than one occasion, the propagandist activities of the International made it exceedingly difficult for the Russian government to carry on friendly negotiations with other countries.

The vigor shown by the Bolshevik government in suppressing counter-revolutionary movements and in reintegrating at least part of the old Russian Empire wrought a radical change in the attitude of the Western Powers. Post-war Europe needed commerce, and the British in particular were manifesting serious concern about the necessity of restoring normal economic life in central and eastern Europe to provide sources of food and raw materials and markets for British manufactured goods. They were also anxious to diminish or eliminate causes of friction with the Bolshevists, so as to prevent trouble in Persia, Afghanistan, and India. These considerations did not operate with equal force in the case of France, Japan, and the United States. The French, mindful of the 26,000,000,000-franc debt which the Bolshevists had repudiated, steadfastly refused to countenance any recognition of Soviet Russia. The United States firmly refused to recognize the Soviet government as representing the Russian popular will. Japan sought to profit by the temporary eclipse of her neighbor to enhance her interests in Siberia. On Jan. 16, 1920, the Supreme Council at Paris announced the lifting of the blockade around Russia and the prospective reëstablishment of trade relations, although Allied statesmen were at one in emphatically repudiating any desire or intention of recognizing the Bolshevist dictatorship. During the remainder of 1920, the British, despite French opposition and the complications resulting from the Russo-Polish War, carried on negotiations for a trade agreement. Questions of propaganda and of Soviet policy in Asia were also subjects of acrimonious correspondence (See PERSIA; AFGHANISTAN; TURKESTAN; etc.) Finally, on Mar. 16, 1920, a trade agreement was signed, involving the *de facto* recognition of Russia, the removal of all hindrances to a resumption of economic relations, the mutual abandonment of propaganda against the institutions of the respective signatories, etc. On this agreement as a prototype were modeled numerous agreements with other countries from 1921 to 1924. Germany signed an agreement on May 6, 1921; Norway, Sept. 2, 1921; Austria, Dec. 7, 1921; Sweden, Mar. 9, 1922 (failed of ratification); Italy, May 29, 1922 (also failed of ratification); Czechoslovakia, June 5, 1922; and Denmark, Apr. 24, 1923.

The problem of Russia proved the storm centre at the important Genoa Conference (Apr. 10–May 14, 1922). Russia desired complete recognition and an Allied loan, but the French continued to insist that Russia should respect the rights of private property and recognize her past debts. The sole tangible result of the conference was the signing of the Russo-German Treaty of Rapallo, providing for mutual cancellation of debts and war claims, which still further infuriated the French. The year following, Genoa saw little headway made in the reacceptance of Russia into the family of nations, but late in 1923 and early in 1924, its prospects visibly brightened. De jure recognition was gained from Poland in December, 1923; from the Labor government of Macdonald in Great Britain, Feb. 1, 1924; from Austria, Norway, and Italy in February; and from Sweden and Greece in March.

Within the next few years, most of the other important countries of the world, except the United States, followed suit. France, under the influence of the Socialist Herriot government, accorded recognition on Oct. 28, 1924. On Apr. 26, 1926, Germany and Russia concluded another treaty whereby Germany promised to remain friendly to Russia in the face of any coalition, apparently even League coalition formed to boycott Russia economically.

Anglo-Russian relations, however, did not continue amicable for long. The publication in 1924 of the famous Zinoviev letter which purported to show that the British Labor Party and the Third International were working in harmony, the arrest in October, 1925, of some British Communist leaders in London and the resultant discovery of definite links between the British and Russian Communists, and the Russian subsidy of the striking miners in the British coal strike of 1926 all led to the break which occurred in May, 1927. After a raid of the Soviet trading headquarters (Arcos, Ltd.) in London on May 12, the British government on May 24, 1927, once again broke off relations with Russia on the ground that, contrary to the agreement of 1921, the Soviets were carrying on subversive activities in England. This time, however, the other countries did not follow England's lead, so that England and the United States remained the two important countries that refused diplomatic recognition.

So far as its relations with the League of Nations went, Russia at first disregarded it completely, as another capitalist stronghold. But from 1922 on, Russia participated in a number of League economic and disarmament conferences. Its most spectacular participation came in April, 1928, when the Russian delegate to Geneva, Litvinov, urged the abolition of all armies and navies throughout the world. The Germans were sympathetic to this attitude, but the viewpoint of the former Allied powers was presented by Lord Cushendun of England, who charged Russia with proposing the scheme so as to make it easier for the Third International to spread its Communist propaganda throughout the world, And there the matter rested, with Russia remaining as one of the two great nations still outside the League. On Aug. 19, 1928, however, the Soviet government signed and ratified the Kellogg Pact.

With the rise to power of Chiang Kai-shek in China, Bolshevist influence there began to decline. Beginning with 1927, the Chinese Nationalist government definitely abandoned its former policy of coöperation with the Bolshevists and began to suppress Communism wherever it raised its head. On Apr. 6, 1927, Chinese officials raided the Russian Embassy in Peking, claiming that it was being used as a headquarters for propaganda. Only the determination of Stalin to avoid an open break kept the peace between the two countries at the time. Then, on May 27, 1929, some Chinese raided the Russian Consulate General at Harbin. The Chinese Minister of Foreign Affairs, Dr. C. T. Wang, denied that the Nationalist Government was connected with the raid, but while the matter was under investigation, the Chinese officials in Harbin on July 10 arrested some, and deported other, Russian officials and employees of the Chinese Eastern Railway, again on the ground of Communist propagandism. On July 18, Russia recalled her consular and commercial representatives from China, and throughout the rest of the month and August, negotiations continued with both sides protesting their desire for a peaceful solution of the dispute. An aggravating series of border incidents complicated the parleys, and both sides mobilized troops along the frontier.

Meanwhile, other powers, especially the United States and Germany, were trying to mediate and to recall to the mind of the disputants the fact that both had signed the Kellogg Pact in the previous fall.

Bibliography. The best summary of the state of affairs in Russia after 10 years of Bolshevist rule was presented in *Soviet Russia in the Second Decade*, edited by Chase, Dunn, and Tugwell (New York, 1928).

See the articles on FINLAND; ESTONIA; LATVIA; POLAND; ARMENIA; AZERBAIJAN; GEORGIA; BOKHARA; TURKESTAN, RUSSIAN; KHIVA; CHINA; JAPAN; WRANGELL ISLAND; NAVIES OF THE WORLD; WORLD WAR; and WORLD WAR, DIPLOMACY OF THE.

RUSSIAN LITERATURE. In its early stages, the World War had little effect upon Russian literature. This had always maintained an independent attitude toward the Government, if not actually a hostile opposition to everything that was undertaken by the officials, and many writers became frankly defeatists at the outbreak of the great struggle. Andreyev, with his play translated as *The Sorrows of Belgium*, is perhaps the chief author who expressed himself as in sympathy with the conflict in which his nation was engaged.

With the outbreak of the Revolution in 1917, and its completion by the accession to power of the Communists in October of the same year, there came a very sharp break in the continuity of Russian literature. The better-known authors who followed in the tradition of Chekhov, as Kuprin, Bunin, and their friends, went abroad. They have written copiously, but very little of their work seems destined to survive. They have written largely of the past life in a form that is a treatment neither of contemporary subjects nor of historical matter and they leave a curious effect upon the reader, as if they were writing of a dream world which is not and never can be again. They are at their best where they deal with foreign or remote periods, as Merezhkovsky in *The Birth of the Gods* (Tutankhamen in Crete), Grebenshchikov in *Churayevy* (the study of Russian sectarians in Siberia), or Aldanov in his trilogy on the French Revolution.

Of distinctively war books, we may mention Andreyev's journalistic *S. O. S.*, an appeal to the Allies against the Bolsheviks, and the writings of Ataman Krasnov. His novel, *From the Two-headed Eagle to the Bolsheviks*, is a typical "White" novel, which outlines the crimes of the new Government. It is frankly propaganda, but, especially in the battle scenes, it is of real value. The same is true of *The Road to Calvary*, by Count Alexis N. Tolstoy, where there is a lurid description of Petersburg on the very eve of the War.

When we pass to the literature within Russia, we find a very different situation. Conditions became steadily worse after 1918 and Maxim Gorky played a most important rôle in interceding with the Government on behalf of the starving writers. He has continued his literary autobiography in *Among People* and *My Universities* and these works are far more interesting than any of his new fiction.

The outstanding poet of the time in Russia was Alexander Blok, who died in 1921. *The Twelve* describes the progress of a revolutionary patrol through the streets of Petrograd on a stormy night; and as they move along, they are led invisibly by Christ, who passes on ahead without regard to the shots and the chaos. The poem sums up all of Blok's earlier work and is easily the greatest product of the revolution. *The Scythians* is another of his poems which is a challenge to western Europe and stresses the gulf that separates Russia from both Europe and Asia.

Among other outstanding poets of the period, may be mentioned Ana Akihmatova, a singer of love, Vyacheslav Ivanov, Pasternak, and Erenburg. We have also the peasant poetry of Klyuyev and Yesenin. Nikolay Klyuyev stressed the Russian popular traditions in his work and even turned Lenin into a peasant saint. Sergey Yesenin, for a while the husband of Isadora Duncan, was a poet of real talent, but he could never orient himself in the seething world around him and ultimately committed suicide in 1925, leaving behind him a collection of poems both vulgar and pious that reveal the struggle that went on in his soul. Vladimir Mayakovsky swung the entire Futuristic movement into a support of the Soviet government and for a while became almost the poet laureate of the movement; but his popularity soon broke with the authorities. We may mention also Demyan Bedny, as a representative of the proletarian poets, but few of these have accomplished anything of importance.

With 1922 prose literature in Russia began to revive, at first haltingly, but with ever more power until it came again to seize the leadership from poetry. In much of this, especially at the beginning, narration was subordinate to description. This was due to the influence of Remizov and Byely, who had developed this style before the War. Among the writers who took part in this movement, we must stress the rôle of Evgeny Zamyatin, who had much to do with training the younger writers during the revolutionary period. Then came the Scrapion Brothers, a group of various tendencies which was formed in Petrograd and attracted much attention. Leo Lunts, who died in 1924, was among this group. Perhaps the outstanding member of this group is Vsevolod Ivanov, an adventurer and a self-taught man. Naturally, he is a master in scenes of action rather than of thought, and such stories as *The Child* are most effective in giving an example of the psychology of the Red Armies.

Here belongs also Boris Pilnyak (Boris Andreyevich Wogau), with his novels *The Bare Year* and *Ivan-da-Maria*. These novels follow Remizov and Byely in not telling a story directly, but they contain many scenes of sweeping interest and reveal many of the types of the revolution, attractive and the reverse.

With the growing establishment of order, we find the strengthening of prose and perhaps the master is I. Babel, a man of Jewish origin who was associated with the cavalry leader, Budenny, and who in his *Konarmia* (*The Cavalry Army*), has given realistic and surprising pictures of the civil war in Russia, without glossing over any scenes of horror and bloodshed. Babel has been highly regarded by the Soviet authorities and ranks perhaps as the leading author of the present day.

Among others, we may mention Konstantin Fedin (*Cities and Years*). Here we have a contrast between the old intelligentsia, who are unable to act, and the new order of life, which demands courage and efficiency and loyalty. The same is found in *Cement*, by Gladkov, where a peasant by his sheer energy and determination succeeds in putting a factory into working order, and is contrasted with the inefficient talk of many of the educated class. This is characteristic of much of the new literature which has freed itself from the glorification of weakness which was so depressing in the pre-war writers.

Many of these writers are not fully convinced Communists, but are called rather *Poputchiki*, or Companions. Their writings and success bring up certain controversies and, particularly in literary criticism, there are many schools of Marxists, formalists, and others discussing the theories and nature of literature and their connection with the Soviet State.

The drama has continued to develop. There are still the Moscow Art Theatre, the Studios attached to it, the theatre of Evreinov, and others. In general, the Russian theatre is in a high state of prosperity and is developing on many novel and original lines.

In conclusion, it may be said that there is the general impression that Russian literature has survived the chaos of the War and is now definitely launched on a new period, but it is still too early to know how much of the older tradition will be taken over into the new structure.

RUSSIAN SOCIALIST FEDERATED SOVIET REPUBLIC. See RUSSIA.

RUST OF WHEAT. See PLANTS, DISEASES OF.

RUTGERS UNIVERSITY. A nonsectarian institution at New Brunswick, N. J., founded in 1766. The student enrollment in 1914 was 850, as compared with 3972 in the fall of 1928. In 1918 the trustees established the New Jersey College for Women as an affiliated institution, not coeducational; in the fall of 1928, it had 1082 undergraduates included in the university's registration above. The faculty of Rutgers increased during the period 1914–28 from 55 to 235 members and the library from 76,643 to 172,100 volumes. In 1916 the university celebrated the one hundred and fiftieth anniversary of its founding as Queen's College by Charter from George III of England. In 1928 the endowment amounted to $3,854,823 and the total income to $2,353,880. Total assets were valued at more than $12,000,000. The John Howard Ford Dormitory was built and furnished in 1914. A ceramics building and several buildings for the Agricultural College were erected. The State College for the Benefit of Agriculture and the Mechanic Arts, maintained by the Trustees of Rutgers, was designed by the Legislature as the State University of New Jersey in 1917. In 1925 the Voorhees Memorial Chapel, a recitation building for the Women's College, the Hegeman Dormitory and a physics building were erected; in 1928 a music building was built for the Women's College. President, John M. Thomas, D.D., Litt.D., LL.D.

RUTH, GEORGE HERMAN (1894–). Professional baseball player, known to all fandom as the "Babe," born at Baltimore, Md. He joined the Baltimore International League Club in 1914 and was sold to the Boston Club of the American League in 1915. He was bought by the New York American League Club in 1920 for $150,000, the largest sum ever paid for a ball player. As a member of this club, he established a world's record by knocking out 59 home runs during the season of 1921 and for his all-around work in 1923 was voted the most valuable player in the American League. In 1927, after knocking out 60 home runs, he signed a three-year contract with the "Yankees" at a salary of $70,000 a year. He published *Babe Ruth's Own Book of Baseball* (1928).

RUTHENIA. See CZECHOSLOVAKIA; GALICIA, EAST.

RUTHERFORD, SIR ERNEST (1871–). A British physicist (see VOL. XX). He was Cavendish professor of experimental physics and director of the Cavendish Laboratory at Cambridge University (1919–) and professor of natural philosophy at the Royal Institution. He was made an honorary fellow of Trinity College, Cambridge (1919), was president of the British Association for Science (1923), and of the Royal Society (1925), and received the Order of Merit (1925), the Copely (1922), and Franklin (1924) medals. His later work was concerned with the structure of the atomic nucleus. See PHYSICS.

RUTHERSTON, ALBERT DANIEL (1881–). A British painter, born in Bradford, Yorkshire. He attended the Slade School in London, where he won the Figure Competition Prize with "Confession of Claude." At first, he followed the realistic impressionism of the time, examples of this period being "La Vente au Poulets" and "The Brook." Then he began the use of water colors, and slowly developed his linear style of a pencil or ink line, and a water color or gouache wash. This method, perfected by 1913, was reminiscent of the calligraphy and feeling of Chinese and Persian art. Besides his ordinary work, much of which was done on silk, he was an illustrator and a designer of wall papers and decorations for the stage. Typical illustrations of his work are "The Garden of Eden" (1910); "Chloe" (1919); "The Entrance to the Quarries at Beer" (1921), and "Winter" (1924). In the latter year, he began etching for the first time. Galleries where he is represented include the British Museum, Victoria and Albert Museum, Dresden, and the Imperial War Museum. He was editor of The Contemporary British Artists series, and published *Decoration in the Art of the Theatre,* and *Memoir of Claud Lovat Frazer* (with John Drinkwater, 1923). Consult *Arthur Rutherston,* by Reginald Morier Yorke Gleadowe (1925).

RUTHVEN, ALEXANDER G(RANT) (1882–). An American zoölogist, born at Hull, Iowa, and educated at Morningside College and the University of Michigan. He was instructor in zoölogy and curator of the museum (1906–12), and professor of of zoölogy and director of the museum (1911–) at the University of Michigan. From 1927 to 1929 he was chairman of the department of zoölogy and director of the zoölogical laboratories there. In the latter year he was named president of the university to succeed Dr. Clarence Cook Little. His publications were on the reptilia, and he collaborated with Schull and La Rue in *Principles of Animal Biology* (1920).

RYAN, HARRIS JOSEPH (1866–). An American electrical engineer, born at Powell's Valley, Pa., and educated at Cornell University. He became an instructor in physics and professor of electrical engineering at the university from 1888 to 1905 when he accepted a call to a similar professorship at Stanford University. During the World War, he was director of the anti-submarine laboratory of the National Research Council at Pasadena, Calif. He gave much attention to methods for electrical-engineering tests and measurement; the laws governing relation of size and separation of conduction; and electric pressure at which corona and power waste appear in high-pressure power transmission lines. He is a member of the National Academy of Sciences and numerous other learned societies. In addition to many papers and monographs on electrical subjects variously contributed, he wrote *Textbook of Electrical Machinery* in collaboration with H. H. Norris and G. L. Hoxie.

RYAN, JAMES HUGH (1886–). A Roman Catholic clergyman, rector of the Catholic University of America. Born in Indianapolis, Ind., he was educated in parochial schools there, and at Duquesne University, Pittsburgh; Mt. St. Mary's Theological Seminary, Cincinnati; and the American College, Rome. He received the degrees of Ph.D. from the Roman Academy (1908); S.T.D., University of Propaganda, Rome (1909), and LL.D. (honorary), Marquette University (1929). Ordained to the priesthood at Rome in 1909, he was instructor of psychology at St. Mary-of-the-Woods College, Indiana (1911–21); and instructor (1922–26), associate professor (1926–28), and professor (1928–29) of philosophy at the Catholic University of America. In 1928 he was appointed rector of that institution. He was also executive secretary of the National Catholic Welfare Council (1920–28), Domestic Prelate to the Pope (1927), and Protonotary Apostolic (1929). His publications include *A Catechism of Catholic Education* (1922); *An Introduction to Philosophy* (1924); *The Encyclicals of Pius XI* (1927). Since 1927 he has been editor of *The New Scholasticism.*

RYAN, JOHN AUGUSTINE (1869–). An American theologian and sociologist. He was born in Dakota County, Minn., studied at St. Thomas Seminary, St. Paul, Minn., and at St. Paul Seminary, and was ordained to the Roman Catholic priesthood in 1898. After four years of graduate study at the Catholic University, Washington, D. C., he became professor of moral theology and economics at St. Paul Seminary, where he remained 13 years. Since 1915 he has held the chair of moral theology and industrial ethics at the Catholic University. He is director of the Social Action Department of the National Catholic Welfare Council. He wrote *A Living Wage* (1906); *Alleged Socialism of the Church Fathers* (1913); *Distributive Justice* (1916); *The Church and Socialism* (1919); *Social Reconstruction* (1920); *The Church and Labor* (1920); *The State and the Church* (1922); *Declining Liberty* (1927).

RYAN, JOHN DENIS (1864–). An American capitalist, born in Michigan. He was a director and official in the Anaconada Copper Mining Company and other important mining companies and in 1918 was appointed director of aircraft production by President Wilson. In the same year, he served as second Assistant Secretary of War and director of the Air Service. He was also a member of the war council of the American Red Cross and later became a member of the Red Cross central committee.

RYKOV, ALEXEY IVANOVITCH (1881–). A Russian Soviet public official born at Saratov, the son of a peasant, and educated at the University of Kazan, where he studied engineering. He was many times jailed for political reasons. In 1903, while studying economics at Geneva, he met Lenin, and from that time the two were close friends. Rykov led the revolt of 1905 so successfully that he was elected to the central committee of the Social Democratic Labor Party. In the first Bolshevik cabinet, he was People's Commissar for the Interior; later, he was head of the Supreme Council of National Economy. He was first vice president of the Council of People's Commissars of Russia and was virtually Premier during the illness of Lenin, on whose death he became president of both the Union of Socialist Soviet Republics and the Russian Socialist Federated Soviet Republics. Among his first acts as Premier was the order of an issue of silver coins to provide small change for the peasants and the formulation of plans for a better working relationship between the farmers and the industrial workers. He wrote much in the field of economics.

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SAAR (zär) **BASIN.** A region created by the Peace Conference, contiguous to the northeast boundary of France. Area, 738 square miles; population in 1910, 649,509; in 1926, 773,764, of whom 125,800 were in the town of Saarbrücken. The inhabitants before 1919 were entirely German, except for some 3000 French. The basin, a continuation of the great Lorraine coal field, was drawn to coincide with the mines and their dependent industries, as well as with the limits of the coal deposit. In 1912–13 coal produced amounted to 17,473,000 tons (6 per cent of the total German output, though 40 per cent as great as the total French); steel produced, 2,080,000 tons. Glass and pottery works came next in importance. There were 72,700 miners employed, and some 50,000 other industrial workers. In 1920, 9,198,714 tons of coal were produced, and in 1927, 13,600,000 tons, including the privately owned Frankenholz mine. Pig iron totaling 1,936,184 metric tons and crude steel totaling 2,073,051 metric tons were produced in the Saar in 1928. This was an increase of 9 per cent over the 1927 output for both metals and an increase in pig iron productions over that for 1913 of 41 per cent. The total production of fabricated steel by Saar mills in 1928 was 1,621,661 tons.

The final disposition of the Basin hinges on the successful culmination of the struggle between the principles of annexation and reparation. On the score of historical and ethnographical rights, French claims for outright annexation were of course lamentably weak, while strategically, there could be no reason for the cession in the light of the forced demilitarization of the left bank of the Rhine; but as compensation for the willful destruction of French coal mines at Lens and Valenciennes, there was every ground for serious consideration of the French position. The final solution, as embodied in Articles 45–50 of the Treaty, was to turn over to the French in absolute ownership all the coal deposits of the territory, the value of the mines to be credited to the German reparation account; to give the French the right to improve the existing systems of communication, or to create new ones; to employ French currency; and to incorporate the area in the French customs régime.

To avoid the indignation which would have been evoked by outright French annexation of the territory, the Peace Conference made the Saar Basin a separate state, to be administered by an international governing commission of five members, representing the League of Nations. These were to be named by the League Council for one year. The commission was to have full sovereign rights including those of levying taxes and dues. Before modifications of the law or new taxes, except customs, could be effected, the commission had to consult elected representatives of the population. This was, however, to be a temporary expedient. For the ultimate determination of the Basin's status, a plebiscite in 15 years (1935) was provided for by the Treaty. Then, every person of over 20 years who had been a resident in 1919 was to have the right to vote for one of three possibilities: the international status in force at the time, union with France, or union with Germany. In the event of the reëstablishment of German sovereignty, the mines were to be repurchased by Germany.

On Jan. 10, 1920, the League of Nations took control, after a period of military occupation; eight days later, the French took over the mines. One of the first acts of the commission was the extension of the free customs union between the Saar and Germany for five years.

SAARINEN. Gottlieb Eliel (1873–). A Finnish architect, born in Kantasalmi. As architect for the railway stations in Helsingfors and Wiborg and for the city halls in Lahti and Joensuu, Finland, he acquired an international reputation which was furthered by his design of a plan for Sofia, Bulgaria, and structures in other European countries, the United States, and Australia. The Cranbrook School at Cranbrook, Mich. is a notable example of his work.

SABATINI, Rafael (1875–). An Italian author and dramatist. Born at Jesi, he settled in England after being educated in Switzerland and Portugal. He wrote many exciting highly colored romances dealing with various critical periods of history. Several of his books, notably *Scaramouche* and *The Sea Hawk*, were made into highly successful motion-pictures. His writings include: *The Tavern Knight* (1904); *The Lion's Skin* (1911); *The Life of Cesare Borgia*, a history (1912); *Torquemada and the Spanish Inquisition*, a history (1913); *The Gates of Doom* (1914); *The Sea Hawk* (1915); *The Snare* (1917); *Scaramouche* (1921); *Captain Blood* (1922); *Fortune's Fool* (1923); *The Carolinian* (1925); *Bellarion* (1926); *The Nuptials of Corbal* (1927), and *The Hounds of God* (1928). He wrote several plays in collaboration with others.

SABOTAGE. Legislative action against sabotage made its appearance in the United States in 1917 and reached its crest in 1919. By that time, no less than 15 States, Alaska, and Hawaii had enacted such laws. The States were Arizona, California, Idaho, Iowa, Kentucky, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, Oklahoma, Oregon, South Dakota, Utah, and Washington. Most of the laws were aimed at "criminal syndicalism," which was defined to include advocacy of sabotage. Several laws were more specific. Thus Arizona defined sabotage as willful and malicious injury to property, or violation of the constitutional or statutory rights of another, as a means of accomplishing industrial or political ends. Nebraska's definition covered railroad property, highway bridges, manufacturing plants or equipment, or any farm or manufactured product. Sabotage was defined by North Dakota as setting grain or food products on fire or poisoning any work or food-producing animal with an intent to hinder or lessen the food supply. Montana defined sabotage as malicious, felonious, intentional, or unlawful damage, injury, or destruction of property; and Washington made it a felony to injure or derange property in order to obstruct any industrial enterprise, to interfere with the management, or to advocate such tactics. The movement against "criminal syndicalism" and sabotage, apparently a product of war psychology, practically stopped with the legislative grist of 1919. Kentucky, in 1922, and Idaho, in 1925, by amendments made their laws less severe.

SACKETT, Frederick Moseley, Jr. (1868–). A United States Senator. He was born at Providence, R. I., and graduated at Brown University (1890), receiving the LL.B. degree at Harvard in 1893. He practiced law at Columbus, Ohio (1893–97) and at Louisville, Ky. (1898–1907) and was president of the Louisville Gas Company and the Louisville Lighting Company (1907–12). Since 1900 he has been engaged in coal mining. In the World War, he was Federal Food Administrator for Kentucky. He was elected U. S. Senator from Kentucky (as a Republican) for the term expiring in 1931, by a majority of 24,500. In the Senate, he has had the chairmanship of the committee on expenditure in the Executive Departments and has been a member of the committees on District of Columbia, Finance, Interstate Commerce, and Military Affairs.

SACKVILLE-WEST, Victoria (Mrs. Harold Nicolson) (1892–). A British author of varied talents who was born and brought up at Knole, Sevenoaks. Her works of fiction included *Heritage* (1919); *Grey Wethers,* a romantic novel (1919); *The Dragon in Shallow Waters* (1921); and *The Heir,* short stories (1922). She also wrote *Seducers in Ecuador; Poems of West and East* (1917); *Knole and the Sackvilles,* an exceedingly personal narrative of her ancestors (1923); *Passenger to Teheran,* a description of her travels in Persia (1926); *The Land,* an account of the year's cycle in poetry, awarded the 1927 Hawthornden Prize (1926); and *Aphra Behn, The Incomparable Astrea* (1927). She edited and wrote a historical preface to the *Diary of Anne Clifford* (1923).

SAD'LER, Sir Michael Ernest (1861–). A British educator (see Vol. XX), master of University College, Oxford (1923–). He resigned as vice chancellor of Leeds University in 1922. He was chairman of the Teachers' Registration Council (1915–22), president of the Calcutta University Commission (1917–19), and was made Knight Commander of the Star of India in 1919. Besides his many reports on education, he wrote *Our Public Elementary Schools* (1926).

SAINT CATHERINE, College of. A Roman Catholic College for women at St. Paul, Minn., founded in 1911. The number of students increased from 61 in 1914 to 415 in 1927–28, and the members of the faculty from 11 to 40 in the autumn of 1928. A summer session was held in 1928 with an enrollment of 200. The number of volumes in the library increased from 6000 in 1914 to 25,000 in 1928; kindergarten and pre-school courses were added; and Mendel Hall, a five-story science building, was constructed. President, Sister Antonia.

SAINT ELIZABETH, College of. A Roman Catholic college for women, conducted by the Sisters of Charity at Convent Station, N. J., founded in 1899. The student enrollment increased from 91 in 1913–14 to 302 in 1927–28; the faculty was increased from 22 to 35 members; and the library from 9000 to 16,000 volumes. The annual income increased from $30,700 to approximately $189,086. There was no endowment, but the sisters gave their services without remuneration. The curriculum was considerably enlarged, with additional courses in the departments of English, history, music, home economics, and sociology, and a course in leadership of Girl Scouts; and usual facilities for athletics were offered, especially in hockey, soccer, basketball, baseball, tennis, and riding. A new residence hall, with accommodations for 200 students, was completed in 1926, toward the erection of which the Alumnæ Association contributed $157,000. Dean, Sister Marie José Byrne, Ph.D.

SAINT-GEORGES DE BOUHÉLIER. See Bouhélier, Saint-Georges de.

SAINT GERMAIN, Treaty of. See Austria; Peace Conference and Treaties.

SAINT JEAN DE MAURIENNE, Agreement of. See Peace Conference and Treaties; War, Diplomacy of the.

ST. JOHN'S COLLEGE. A college of liberal arts and sciences for men, at Annapolis, Md., founded as King William's School in 1696. The enrollment increased from about 200 in 1915 to 266 in the autumn term of 1928, and the faculty from 13 members to 27. The R.O.T.C. unit was discontinued in 1926. Orientation courses in literature and social sciences are given to freshmen. President, Enoch B. Garey, LL.D.

ST. LAWRENCE UNIVERSITY. An institution for the higher education of men and women at Canton, N. Y., founded in 1856. The registration for the autumn term of 1928 was 4170, distributed as follows: College of letters and science, 830; theological school, 28; law school, 3312. The faculty numbered 124. The endowment funds of the institution amounted to $2,316,520, and the income for the year to $162,133. The library contained 52,000 volumes. Richardson Hall was erected in Brooklyn during the year 1928 for the law school, which is maintained there. Announcement was made in November, 1928, of the gift of $100,000 to the University from S. L. Carlisle & Co., of New York City, to be available at the rate of $20,000 a year over a period of five years, and to be used by the University to promote the teaching of forestry. President, Richard Eddy Sykes, D.D.

SAINT LOUIS, sānt lo͞o′ĭs *or* lo͞o′ē. The chief city of Missouri. The population increased from 687,029 in 1910 to 772,897 in 1920 and to 848,100 in 1928 by estimate of the U. S. Bureau of the Census. The metropolitan area in 1928 had a population of 1,315,000. A proposal for the consolidation of the city of St. Louis and the county of St. Louis into a single municipal governmental unit was defeated at the polls on Oct. 26, 1926. In 1923 the Missouri Supreme Court declared invalid the zoning ordinance of 1918 under which many plans had been made and much work done by the City Plan Commission. The court held that under the charter no such police power was given to the city and that zoning could be undertaken only through eminent domain.

In 1919 the citizens approved a bond issue of $3,000,000 which included items for the elimination of grade crossings and the reconstruction of existing streets. In 1923 a bond issue of $87,372,500 for public improvements was carried by unprecedented majorities. Of this total approximately $12,000,000 was for a new water-supply system at Howard's Bend on the Missouri River, $14,450,000 for street openings and improvements, $8,000,000 for electric street lighting, $4,000,000 for a new Civil Court House, $19,000,000 for sewers, $3,800,000 for parks and playgrounds, $4,500,000 for hospitals and institutions, $6,000,000 for a memorial plaza, and $5,000,000 for a municipal auditorium, facing the plaza, with seating capacity for 12,000 persons. In 1925 the first step was taken in the development of the Civic Centre by the voting of $5,000,000 for the acquisition of 45 acres of ground and $10,000,000 for buildings to be located thereon. In 1928 a fourth bond issue of $2,000,000 was approved for the construction of a municipal airport by enlarging the Lamber-St. Louis Field to 693 acres. By 1929 the major part of these improvements had been carried out. Olive Street, one of the main thoroughfares, had been widened to 100 feet for a distance of 22 blocks; the new Civil Court House, the first unit of the projected Civic Centre, was completed; and the Missouri River water-supply system was put in operation, its principal feature being a 100,000,000-gallon reservoir at Stacy Park, the highest point in St. Louis County, constructed at a cost of $1,150,000. The most important sewer project was the River des Peres sewer and channel, for which $11,000,000 in bonds had been voted. In the year 1928 the Chain of Rocks Bridge, 680 feet long, was constructed across the Mississippi River.

The public-school system of St. Louis includes 132 elementary schools, 13 schools for backward children, 6 junior high schools, 7 senior high schools, 1 part-time school, and 1 technical-vocational school, with an attendance of more than 101,000 pupils. There are also many private schools and the Washington and St. Louis universities and Harris Teachers' College. In Forest Park, one of the three largest municipal parks in the United States, there are located the St. Louis Art Museum; the Municipal Open-Air Theatre, in which light opera is presented for 12 weeks each summer by the Municipal Opera Company; the Jefferson Memorial, containing the Lindbergh Trophy Collection; and the St. Louis Zoölogical Garden, which was started under an ordinance passed in 1913 and which has been supported, like the Art Museum and the Public Library, by the revenue of a mill tax. The Missouri Botanical Garden, popularly called Shaw's Garden, in the southern section of the city, ranks second to Kew Gardens in London for the wide variety of its shrubs, plants, and flowers. The city's 65 parks in 1928 aggregated 2413 acres.

St. Louis is an important railroad centre, 29 railroads, 21 of which are main trunk lines, radiating in all directions. In 1928, 10 new tracks were added to the original 32 tracks of the Union Station at a cost of approximately $5,000,000 The city is served also by the Federal barge system on the Mississippi River. Statistics compiled by the U. S. Census of Manufactures showed that the number of wage earners had increased from 107,919 in 1919 to 109,428 in 1927, wages from $108,557,326 in 1919 to $134,915,061 in 1927, and the value of products manufactured from $871,700,438 in 1919 to $937,416,402 in 1927. By 1929 according to local estimates there were 3269 industrial establishments, representing 357 lines of manufacture. St. Louis has 58 banks with total resources of $681,658,033; bank clearings in 1928 amounted to $7,566,304,781. The city is also the home of the Federal Reserve Bank of the eighth district and has a Federal Land Bank and a Federal Credit Bank. The assessed valuation of property in 1928, according to local estimate was $1,172,002,100; the net debt in 1927 was $34,388,000.

SAINT LOUIS SYMPHONY ORCHESTRA. See MUSIC, *Orchestras.*

SAINT MARY'S FALLS CANAL. See SAULT SAINTE MARIE, CANALS AT.

SAINT MIHIEL. See WORLD WAR, *Western Front.*

SAINT PAUL. The capital of Minnesota. The population increased from 214,744 in 1910 to 234,698 in 1920, according to the Federal census, and to 358,162 in 1928, according to local estimate. The city has been under the commission form of government since 1912, but for several years there has been agitation for the adoption of the city-manager plan. In 1917 a city-planning ordinance was passed, providing for a city-planning commission of 25 members appointed by the mayor. This commission recommended improvements designed to give better routing of traffic across and around the city in order to relieve the congestion of the business districts. The next year a zoning ordinance was adopted, providing for six use districts, including three residence, one commercial, one light industrial, and one heavy industrial, and four height districts in which the heights of buildings varied from 40 to 150 feet. In 1927 a city-wide group, known as the United Improvement Council, was organized for the purpose of considering the physical needs of St. Paul. The programme which they prepared was authorized by the voters at the general election in November, 1928. Among the improvements for which a $15,077,000 bond issue was voted, were: new court house, city hall, and auditorium, greater development of the municipal airport and barge terminal, widening of streets, extension of sewer and water-supply systems, parks and playgrounds, branch libraries, and other projects.

A school bond issue of $3,000,000 was voted in 1917, and in 1919 the $6-per-capita limit for school taxation was removed. The following year, a second bond issue of $5,000,000 was voted for the construction of new school buildings and the remodeling of old ones. By 1925, 17 new buildings had been erected, including grade, junior, and senior high schools. In 1926 St. Paul had 80 public schools with a student enrollment of 41,603; its school properties were valued at more than $15,000,000

In June, 1926, the voters of St. Paul authorized a bond issue of $295,000 for the acquisition of land for a municipal airport and $450,000 for the development of a river barge terminal. The airport, 150 acres in extent, was situated on a bend of the Mississippi River adjoining a well-developed industrial section one mile from the downtown district. In the 1928 municipal-improvement programme, an additional $550,000 was included to increase the size of the airport and to install additional hangars and other necessary equipment. The 1928 bond issue also included $150,000 to be expended on further development of the river barge terminal in connection with the activities of the Inland Waterways Corporation, operating the Mississippi River barge line from Minneapolis and St. Paul to New Orleans. Belt-line connections with the nine railroads entering St. Paul were also completed.

In 1926 three concrete-arch bridges were constructed across the Mississippi River: the Robert Street Bridge, the Inter-city Bridge, and the Cedar Street Bridge. The Robert Street Bridge, which was built at a cost of $1,800,000, had a 264-ft. channel span, a 56-ft. clear roadway, and two 10-ft. sidewalks. The total length of the bridge, including approaches, was approximately 1900 feet. The Inter-city Bridge, which had five arches of the rib type, three of 300-ft. and two of 139-ft., span, was 1516 feet long between abutments and was built at a cost of $1,322,984. The Cedar Street Bridge was designed with seven arch spans of the two-rib type, two with clear spans of 265½ feet and five of 93 feet, the total length between abutments being 1146 feet. The roadway was 112 feet above water, and the estimated cost of the bridge was $1,076,000. In 1928 St. Paul had 86 parks. totaling 2200 acres and valued at $6,465,489. The establishment of Highland Park in 1921 in the southwestern part of the city opened up that section to residential development.

In 1927, 21,449 persons were employed in approximately 625 industrial establishments in St. Paul and received $28,163,350 in wages; the value of products manufactured was $160,330,540. The principal lines of manufacturing were: printing and paper products, fur goods, shoes, drugs, meat packing, dairy products, automobiles, machine and foundry products. Bank clearings increased from $576,156,228 in 1910 to $1,626,301,000 in 1928. In 1928 the city had 36 banks with total deposits of $170,000,000 and resources of $189,350,000. The value of building permits issued in 1927 was $10,128,589. The assessed valuation of property in 1928 was $271,868,177; the net debt was $26,744,522.

SAINT PETERSBURG. See Leningrad.

SAINT PIERRE AND MIQUELON, mē-*ke*-lôn′. The principal islands of two groups off the south coast of Newfoundland, belonging to France. Total area, 93 square miles; population (1926), 4030, which is increased to 12,000 during the fishing season. The only activity is cod fishing. Great gains were made in cod fishing during and after the World War, as the trade records reveal. Imports for 1913, 1920, and 1927, were 4,536,745, 4,846,742, and 165,801,030 francs. Exports for the same year were 6,201,798, 28,047,100, and 127,409,172 francs. Receipts for 1927 were 8,985,250 francs and expenditures, 8,983,469 francs. The budget for 1928 balanced at 10,011,500 francs.

SAINTS'BURY, George Edward Bateman (1845–). An English critic and literary historian (see Vol. XX). His list of honarary degrees was lengthened by an LL.D. from Edinburgh University in 1919. His later works include *The Peace of the Augustans* (1915); *A History of the French Novel* (2 vols., 1917, 1919); *Notes on a Cellar Book* (1920); *A Letter-Book* (1922); *A Scrap Book* (1922); *A Second Scrap Book* (1923) *Collected Essays and Papers* (4 vols., 1924), and *A Last Scrap Book* (1924).

SAINT THERESA, College of. An institution for women, founded by the Sisters of St. Francis at Winona, Minn., in 1910. The college is a member of the North Central Association of Colleges and it is accredited by the Association of American Universities. It confers degrees of bachelor of arts, bachelor of science, and bachelor of science in nursing. The student body in 1927–28 numbered 553. Between the time it was founded and 1928, the College acquired buildings of an estimated value of $2,000,000; a productive endowment of $500,000. A chapel and a faculty house were finished in 1924. In 1920 the Saint Clare School of Education was organized in connection with the college to train Sisters for the parochial schools, the first fully organized and accredited school of its kind in the country. A dormitory to accomodate 450 students was opened in January 1929. President, Sister Mary Aloysius Molloy, Ph.D.

SAJOUS, sȧ′zhōō′, Charles E. de M. (1852–1929). An American physician (see Vol. XX). From 1921 until his death, Dr. Sajous was professor of endocrinology in the University of Pennsylvania. He was made an associate of the French Academy, an officer of the French Legion of Honor, and a knight of the Order of Leopold (Belgium). In 1922, his well-known work, *The Internal Secretions and the Principles of Medicine,* passed through its tenth edition and in the same year his *Analytic Cyclopædia of Practical Medicine* appeared for the ninth time. In 1926, he published *The Strength of Religion as Shown by Science.* Dr. Sajous resigned as editor of the New York *Medical Journal* in 1919, after having served in this capacity since 1911.

SAKHALIN, sä′kȧ-lyĕn. An island off the east coast of Siberia. The region to the north of the parallel of 50 degrees is Russian territory and part of the Sakhalin Province. It has an area of 14,668 square miles and a population of 34,000 (1915). Eighty per cent of the region is covered with forest and lumbering is the chief occupation. Japanese Sakhalin, or Karafuto, had an area of 13,934 square miles and a population of 203,573 at the census of 1926, as compared with 39,846 in 1913. Under the Japanese, the exploitation of their territory was rapidly pushed. The herring fisheries had the greatest economic value, while the presence of great forests indicated that lumbering and papermaking would soon become important. Pulp mills have been established. An enlightened government interest encourages agriculture, and settlers are provided with land, domestic animals, and seed. Three coal basins yielded 275,819 tons in 1926. The budget for 1928–29 balanced at 27,340,000 yen. In 1920 Japanese forces occupied the Russian portion as a result of the so-called Massacre of Nikolayevsk, the capital of Sakhalin Province on the Amur River, when all the Japanese residents, numbering about 350, were slain. Responsibility was difficult to establish, and against the protests of the Russians, the Japanese troops stayed on. At a Russo-Japanese conference held on Sept. 4, 1922, Japan demanded reparations as the price of withdrawal. In January, 1925, Japan and Russia reached an agreement by the terms of which Japan was to evacuate Russian Sakhalin by May of that year. See Japan; Russia; Siberia.

SALANDRA, sȧ-län′drȧ, Antonio (1853–). An Italian statesman (see Vol. XX). At the outbreak of the World War, he opposed Italy's joining her forces with Germany and Austria on the ground that they were the aggressors. The majority of the Italians supported him, and when opposition caused him to resign in May, 1915, feeling on behalf of Salandra and the Allies rose to such a height that it actually threatened the throne. "War or a republic" was the cry. The King refused to accept Salandra's resignation, and in 10 days Italy entered the War on the side of the Allies. Salandra's premiership lasted until June, 1916. At first, he was a supporter of the Fascist régime, and was Italian representative in the Council of the League of Nations until 1926, when he resigned and withdrew his support from the Fascist government. Afterward, he took no active part in politics, although appointed senator in May, 1928, by the King.

SALISBURY, sạlz'ber-ĭ, JAMES EDWARD HUBERT GASCOYNE-CECIL, FOURTH MARQUIS OF (1861–). An English statesman born in London and educated at Eton and University College, Oxford. He was a Conservative member of Parliament from 1885–1903, when he succeeded to the title on the death of his father, and was chairman of the Church Parliamentary Committee until 1900, Under-Secretary for Foreign Affairs (1900–03), and Lord Privy Seal (1903–05). He resigned the latter office to become president of the Board of Trade. After a long period of inactivity, he reëntered the Government as Chancellor of the Duchy of Lancaster (1922–23), Lord President of the Council (1922–24), and again Lord Privy Seal (1924–29). In 1925 he became leader of the House of Lords. In 1926 he was the leader of the Empire Parliamentary Delegation which visited Australasia. He received many honors including the Order of the Garter in 1917.

SALMON, THOMAS WILLIAM (1876–1927). An American physician and psychiatrist, born in Lansingburg, N. Y., who received his medical degree from the Albany Medical College in 1899. He was on the staff of the U. S. Marine Hospital Service (1903–15), medical director of the National Committee for Mental Hygiene (1915–21), and a member of the staff of the Rockefeller Foundation. During the World War, he was consultant in neuro-psychiatry to the American Expeditionary Forces in France and for making possible the control of shell shock among the troops, he received from Congress the Distinguished Service Medal. In 1921 he was appointed professor of psychiatry at Columbia University. He had served as president of both the American Neurological and American Psychiatric associations. On Aug. 13, 1927, he was drowned off Westbrook, N. Y.

SALONIKI. See WORLD WAR, *Balkan Front.*

SALTEN, FELIX (1869–). An Austrian essayist, novelist and dramatist, born in Budapest. He wrote the novels *Die Hinterbliebenen* (1899); *Herr Wenzel auf Rehberg* (1906); *Künstler-Frauen* (1908); *Die klingende Schelle* (1914); *Der Hund von Florenz* (1921); *Martin Overbeck* (1927); and *Bambi* (1928), and the plays *Vom andern Ufer* (1908); *Das stärkere Band* (1912); *Kinder der Freude* (1916). Other works were of a critical nature: *Wiener Adel* (1905); *Das Österreichische Antlitz* (1909); *Gestalten und Erscheinungen* (1913); and *Schauen und Spielen* (1921).

SALT LAKE CITY. The capital of Utah. The population increased from 92,777 in 1910 to 118,110 in 1920 and to 138,000 in 1928 by estimate of the U. S. Bureau of the Census. Since 1914 smoke-regulating ordinances and a use zoning law have been adopted and a municipal bathhouse built. In 1915–16 the water supply of the city was nearly doubled by the construction of two dams in Big Cottonwood Canyon, impounding 550,000,000 gallons of water, and in 1927 construction was begun on Echo Dam, 1800 feet long and 125 feet high, to furnish storage for the Salt Lake Basin irrigation project. Bank clearings fell from $825,366,260 in 1919 to $661,686,278 in 1921 and rose again to $785,320,679 in 1923 and to $956,846,063 in 1928. Building permits increased from $4,060,496 in 1919 to $5,361,376 in 1928. Among the structures erected during that period were: Hotel Utah, Walker Bank, Clift, Kearns, Newhouse Hotel, Desert Bank, and Continental Bank buildings. In 1927, 4709 persons were employed by 216 industrial establishments and received $5,965,151 in wages; the value of products manufactured was $35,114,793. In 1927 Salt Lake City had 48 public schools, including 7 junior high schools and 2 high schools, with an enrollment of 31,542 pupils. Until 1929 the Utah airport ranked second only to Chicago in the number of emanating lines. It was the converging point for all air mail from the Pacific coast to eastern points and, vice versa, the diverging point for all air cargo from the East to the Pacific coast. The assessed valuation of property in 1927 was $194,146,000; the net debt was $9,034,000.

SALVADOR, säl'vȧ-dōr'. The smallest of the Central American republics, with an area (officially estimated) of 13,176 square miles and a population (census of 1923) of 1,360,382 (estimated in 1928, 1,688,129). The official estimate for 1913 was 1,225,835. In 1927 there were 1557 primary teachers in 859 government schools, while the number of pupils was 47,467. Populations of the large cities (estimated in 1927) are San Salvador, the capital, 100,000; Santa Ana, 74,200; San Miguel, 37,000; San Vicente, 33,000. On June 7, 1917, an earthquake and volcanic eruption did much damage to the capital and partially destroyed several smaller towns. An earthquake of great intensity again shook the city of San Salvador on Apr. 28, 1919.

Industry. Coffee culture is the leading activity, and an average of 65,000,000 pounds is exported annually. The 1928 production was 120,000,000 pounds. Sugar made considerable advances, with a 1927 production of 7742 tons, valued at $1,000,000. Cacao, rubber, tobacco, and wheat for local consumption are being given increasing attention. After 1914 gold and silver mining showed possibilities, especially in the departments of Morazán, San Miguel, and La Union. The foreign trade from 1913 on increased regularly: exports in 1913, $9,011,112; in 1920, $17,943,827; in 1927, $14,100,000. Coffee averaged 89 per cent of the export value in 1927. Other exports are sugar, henequen, gold and silver coin, balsam, hemp, hides, and rubber. Imports in 1913 were valued at $6,174,000. In 1922 they were $7,426,760, and in 1927, $14,785,000. Leading imports are cottons, hardware, flour, drugs, and chemicals. Trade with the United States in 1913 was imports, $2,491,000; exports, $2,824,000. Imports from the United States in 1927 were $6,876,000; exports to that country (in 1925) $2,807,000. Salvador has begun to develop industrially and, besides supplying many articles for domestic consumption, exports manufactured products to neighboring countries. Local mills manufacture cotton and silk fabrics, leather goods, fibre goods, cigars, cigarettes, sugar, etc. Electrical power is being used. Stock raising also is gaining in importance.

Finance. For 1914–15 the revenues were $6,286,470 and the expenditures $6,263,878. For 1927 they were $10,257,246 and $10,899,764. The budget for 1928–29 provided for revenues of $11,566,000 and expenditures of $11,601,243. The national debt in 1913 was $10,995,854. On Dec. 31, 1927, it was $24,255,851. A $6,000,000 loan was negotiated in the United States in 1922. Payment of $1,835,487 for service of the loan for 1929 was made Apr. 22, 1929. The three banks of issue on Dec. 31, 1926, had notes in circulation to the value of $8,059,500. The colon in 1919 was fixed at $0.50 and by the law of July 16, was made the monetary unit.

Communications. In 1927, 349 miles of railway were open, all of narrow gauge. The International Railways line from east to west was completed in 1922 when the third section was opened from San Vicente to Cojutepeque. The railway starts at La Union. In 1927 there were 2602 miles of telegraph wire and 3940 miles of telephone line. An airplane service was established between San Salvador, Guatemala City, and other Central American points in 1928. In 1929 the 80-mile railway between Salvador and Guatemala was completed at a cost of approximately $12,000,000. This brought Salvador nearer to the markets of the United States.

History. Salvador was the first country to move toward effecting a better understanding among Central American states. On June 24, 1920, it sent out an invitation for a general meeting, and conferences were begun at Antigua in Guatemala on Nov. 1, 1920. On Jan. 21, 1921, a pact was signed by Salvador, Honduras, and Guatemala for a Central American Union, thus crowning with temporary success the aspirations of a century. Salvador was the only Central American country not to declare war on Germany. In 1913 Salvador signed an arbitration treaty with the United States and a commercial treaty in 1919. Considerable local ill feeling was generated toward the United States because it was felt that the Bryan-Chamorro Treaty of 1916, in giving the United States a naval base on Fonseca Bay, violated Salvador's sovereignty. Suit was made before the American Court of Justice, and although the complaint was successful, both Nicaragua and the United States disregarded Salvador's contention. Peace was general in the country after 1914, as a result of the insistence of the United States. President for 1919–23, Jorge Meléndez; for 1923–27, the Vice-President, Alfonso Quinónez Molina, was raised to the Presidency; for 1927–31, Dr. Pio Romero Bosque. See CENTRAL AMERICAN UNION.

SALVARSAN. See SYPHILIS.

SALVATION ARMY. A religious organization aiming to evangelize the masses considered outside the influence of churches, founded by the late Gen. William Booth in London in 1865, and incorporated in New York State in 1899. In the years between 1914 and the opening of 1928, the number of corps and outposts in the United States increased from 852 to 1655. By 1929 the Salvation Army employed, throughout the world, 152,958 local officers and bandsmen; 62,265 singers; 35,109 corps cadets; and 10,000 persons without rank. Its institutions included 1630 social agencies; 1186 day schools; 31 naval and military homes; 149 hotels for men, and 53 for women; 5 inebriates' homes; 100 children's homes; 24 industrial schools; 112 women's industrial homes; 79 maternity homes; 176 slum posts; and 140 labor bureaus. The Salvation Army continued work among prisoners, and each year provided summer outings, and Christmas and Thanksgiving dinners for the poor.

In the United States, the Salvation Army is divided into four territories, with headquarters at New York, Chicago, San Francisco, and Atlanta, the latter having been added in 1926. Each territory maintains a training college, and in 1928 a second institution was opened at San Francisco; each also publishes two weekly periodicals, the *War Cry* and the *Young Soldier.* In 1928, 85 new Salvation Army buildings were opened in the United States, and an administrative centre which will provide rooms for 400 business girls was started on the site of the national headquarters at 120 West 14th Street, New York City.

The most significant event in the recent history of the Salvation Army was the meeting of the high council in London, attended by 64 territorial leaders from all parts of the world, including Evangeline Booth, national commander in the United States. After considerable controversy, the council, in February, 1929, voted to remove William Bramwell Booth, general of the Army, from office on the ground that illness had rendered him unfit for service. He died June 17, 1929, and Commissioner Edward J. Higgins, chief of the staff, was elected his successor. Other important events were the ceremony at the cornerstone laying of the proposed International Training College in Denmark Hall, South London, in 1928, and the unveiling of the Mile End Memorial to William Booth in the same year. The activities of the Salvation Army were extended to Dutch Guiana in 1928, bringing the number of countries and colonies in which the Army was active to 86.

SALZBURG, zälts′burk. A province of the Republic of Austria. Its area in 1910 and 1923 was 2761.9 square miles. Its population in 1910 was 214,737; in 1923, 223,023. See AUSTRIAN REPUBLIC.

SAMOA. See PACIFIC OCEAN ISLANDS.

SAMOA, AMERICAN. American Samoa with a gross area of 75 square miles, comprises the island of Tutuila and several other small islands in the Pacific Ocean. The population in 1926 was 8685, compared with 7251 in 1912 and 7376 in 1916. The people are almost entirely Samoans. In 1920 these included 3166 males and 3019 females.

Products. The soil of American Samoa is rich and well-adapted to the growing of fruits, which include the orange, lemon, lime, citron, mango, alligator pear, pineapple, banana, and other native fruits. The vegetables grown include the bread fruit, taro, and yam. Sugar cane is grown to some extent, especially for the leaves which are used for thatch on the native houses. Coffee also has been grown in small quantities with success and tobacco is grown by the natives for native consumption. The most important product of the soil, however, is the coconut, which is used as food for the natives, while the water of the green nuts is used for drink. Copra, the dried kernel of the ripe coconut, forms the chief article of commerce, and is the only export from American Samoa. It is shipped to foreign countries where oil is expressed from it. This oil is in great demand in the manufacture of coconut butters of various kinds, soaps, oil for salads, and for other purposes. The annual output of copra is about 1300 tons.

Industries. There are practically no industries in the islands. Copra is dried by spreading it in the sun. Native women manufacture floor mats and sleeping mats from the leaves of the pandanu, but these are not often for sale. War clubs, fans, baskets, hats, and necklaces of shells and beads are made to sell to tourists.

Trade. Copra is the only considerable export. Imports have decreased in value since 1920, and totaled $147,577 in 1927, of which $65,086 came from the United States. Exports of merchandise to the United States in 1927 totaled $40,852 in value. This was a decline from $102,895 in 1924 when total exports were $150,250. In 1925 the total exports amounted to $150,333, the largest since 1917 when they were $198,499.

Finance. American Samoa has no public debt. The bank is conducted under the supervision of the officials. The customs revenues are used for the upkeep of roads, schools, and general island government expenses. The navy tax fund is chiefly used for the pay of native officials.

Transportation. A monthly schedule is maintained between San Francisco, Honolulu, Pagopago, and Sydney, by the Oceanic Steamship Company. Over 50 miles of roads have been constructed since American occupation.

Education. The foundation of the school system of American Samoa is the parish school conducted by the native pastors of the various denominations. There is no government supervision except that by law all children between the ages of 6 and 13 are required to attend school regularly. Schools are maintained by Roman Catholics, Wesleyans, Mormons, and by the London Missionary Society. Since 1904, the Marist Brothers have conducted a special district school at Leone. Prior to 1921, there was but one school which could actually be called a government or public school. In January of that year, Governor Evans instituted plans for a widespread development and expansion of the public-school system throughout Samoa. A Board of Education was appointed and as a result, Tutuila was divided into 13 school districts and the Manua district into two, for the purpose of establishing a graded school in each of these districts. By 1928, 19 such graded schools had been established. The average attendance in the various schools is about 2500.

Health and Sanitation. As a result of sanitary supervision, education, and free medical treatment, the natives of American Samoa have increased in numbers 41 per cent under the American occupation, from 1900 to 1920. The prevailing diseases are hookworm, influenza, and filariasis. At various times, there have been serious epidemics of measles. Malaria, cholera, and smallpox are unknown in Samoa. The Government maintains dispensaries and a sanitation inspector makes public inspection of all villages. As a result, health conditions in the island have remained good.

SAMUEL, Harold (1879–). A British pianist, born in London. He studied under Dannreuther and Stanford at the Royal College of Music. While the universality of his taste and his extraordinary art were immediately recognized by connoisseurs, it was not until 1921, when he gave in London a Bach week, playing the major works on six successive days, that he brought the general public to his feet. With this same Bach programme, he created a sensation at his American début (New York, Jan. 18–23, 1926). Since then, he has been an annual visitor in the United States.

SAM'UEL, Rt. Hon. Sir Herbert (Louis) (1870–). An English public official (see Vol. XX). He was Chancellor of the Duchy of Lancaster, and Postmaster-General, both for the second time in 1915–16. He was Secretary of State for Home Affairs (1916), chairman of the House of Commons' Committee on National Expenditure (1917–18), and president of the Royal Statistical Society (1918–19). In 1919 he was British Commissioner to Belgium and in the next year became High Commissioner of Palestine (1920–25), where the handling of a delicate situation caused by the fierce clashing of mutually hostile nationalities called forth all his ability in diplomacy and fair dealing. He was chairman of the Royal Commission on the Coal Mining Industry (1925–26), which attempted to find a solution that would avert a the coal strike of 1926. Since 1927 he has been chairman of the Liberal Party. He was returned to the House of Commons in 1929. In 1917 he published *The War and Liberty.*

SAN ANTONIO. The largest city of Texas. The population increased from 96,614 in 1910 to 161,379 in 1920 and to 218,100 in 1928, by estimate of the U. S. Bureau of the Census. The 1928 city-planning project was undertaken to determine the present and prospective needs of the city and to make a definite city plan for its future guidance. Since the discovery of oil in 1915, San Antonio has become the centre of a large oil-producing territory. The first field was discovered at Somerset, 18 miles south of the city; large fields were subsequently discovered at Luling, Mirando, and Calliham. In 1923 a bond issue of $4,150,000 was voted for public improvements, including $2,800,000 for a flood-protection programme and an additional $200,000 to be added to the $500,000 previously voted for a municipal auditorium. This auditorium, which was completed in 1928, in its baroque Spanish treatment is architecturally one of the outstanding features of the city. In the same year, there was completed the group of buildings erected by the Smith Properties Corporation at a total cost of $7,500,000; these included the Plaza Hotel and the Smith-Young Tower, an office building 35 stories in height. Seven junior-high-school centres have been completed since 1920 at a cost of $1,500,000. In 1927, 6363 persons were employed in 335 industrial establishments in San Antonio and received $6,385,000 in wages; the value of products manufactured was $45,165,000. In 1929 the city spent $2,455,000 on street maintenance and widening. Building permits increased in value from $2,619,060 in 1919 to $16,467,066 in 1928. The assessed valuation of property in 1927 was $203,899,000; the net debt was $23,385,000. Bank clearings in 1928 amounted to $870,751,991. The U. S. Army has concentrated at San Antonio its large aviation fields; Kelly, Brooks, and Duncan fields have a combined area of 2634 acres and cost $3,643,125. In 1929 Randolph Field, for the training of army air candidates, was under construction at a cost of approximately $15,000,000. The Southern Air Transport Company has established, adjacent to the municipal airport, a large training school at which all aviators, receiving preliminary training at the other 25 fields owned by this company, receive their final instruction.

SANDBURG, Carl (1878–). An American poet and editor, born at Galesburg, Ill., and educated at Lombard College of that city. He served as a private in the War with Spain in 1898, was secretary to the Mayor of Milwaukee, Wis., from 1910 to 1912, and in 1913 went to Chicago, where he became associate editor of the magazine, *System.* He did newspaper writing for a while, received the Levinson Prize from the *Poetry Magazine* in 1914, and had a half share in the prize of the Poetry Society of America in 1919 and 1921. One of the first to follow Masters in the use of free verse, Sandburg soon came to be recognized as the leader of the Western poets. His verse was harsh and unrythmic; his themes tended to be brutal and showed too great a fondness for the so-called primitive character of American civilization. But there was also beauty in his poetry and a sensitiveness which even his realistic preoccupations could not obliterate. His writings include: *Chicago Poems* (1915); *Corn Huskers* (1918); *The Chicago Race Riots* (1919); *Smoke and Steel* (1920); *Slabs of the Sunburnt West* (1922); *Rootabaga Stories* (1922); *Rootabaga Pigeons* (1923); *Selected Poems* (1926); *Abraham Lincoln—the Prairie Years* (2 vols., 1926); *The American Songbag,* a collection of folk songs and ballads (1927); and *Good Morning, America,* poems (1928).

SANDERSON, JULIA (MRS. B. BARNETTE) (1884–). An American actress and singer, born at Springfield, Mass. She made her début with the Forepaugh Stock Company in Philadelphia and in 1902 came to New York City, where she first appeared at the Casino in *Winsome Winnie* and later as Mrs. Pineapple in *A Chinese Honeymoon* and in other popular rôles. After playing in *The Honorable Phil* in London, she returned to the United States and was in various musical comedies.

SANDRE, THIERRY (1890–). The pseudonym of Charles Moulié, a French writer who was born at Bayonne and educated at the Collège d'Arras and the lycée of Lille. He received an excellent literary training as secretary for Binet-Valmer, Pierre Louys, and Gilbert de Voisins. His first attempts at writing were translations from the Greek and Latin. He was also a poet, his pre-war volumes being *Les Mignardises* and *En Sourdine.* During the World War, in which he was in the artillery, he wrote *Fleurs du desert,* and many other poems, including a series, *Sur le grand péril des cités.* Then he turned to prose and in 1924 received the Prix Goncourt for *Le Purgatoire,* his experiences as a prisoner in Germany, and *Le Chèvrefeuille,* a war story. His other works include *Mousseline* (1924); *L'histoire merveilleuse de Robert le Diable* (1925); *Panouille* (1926); and *Les yeux fermés* (1928).

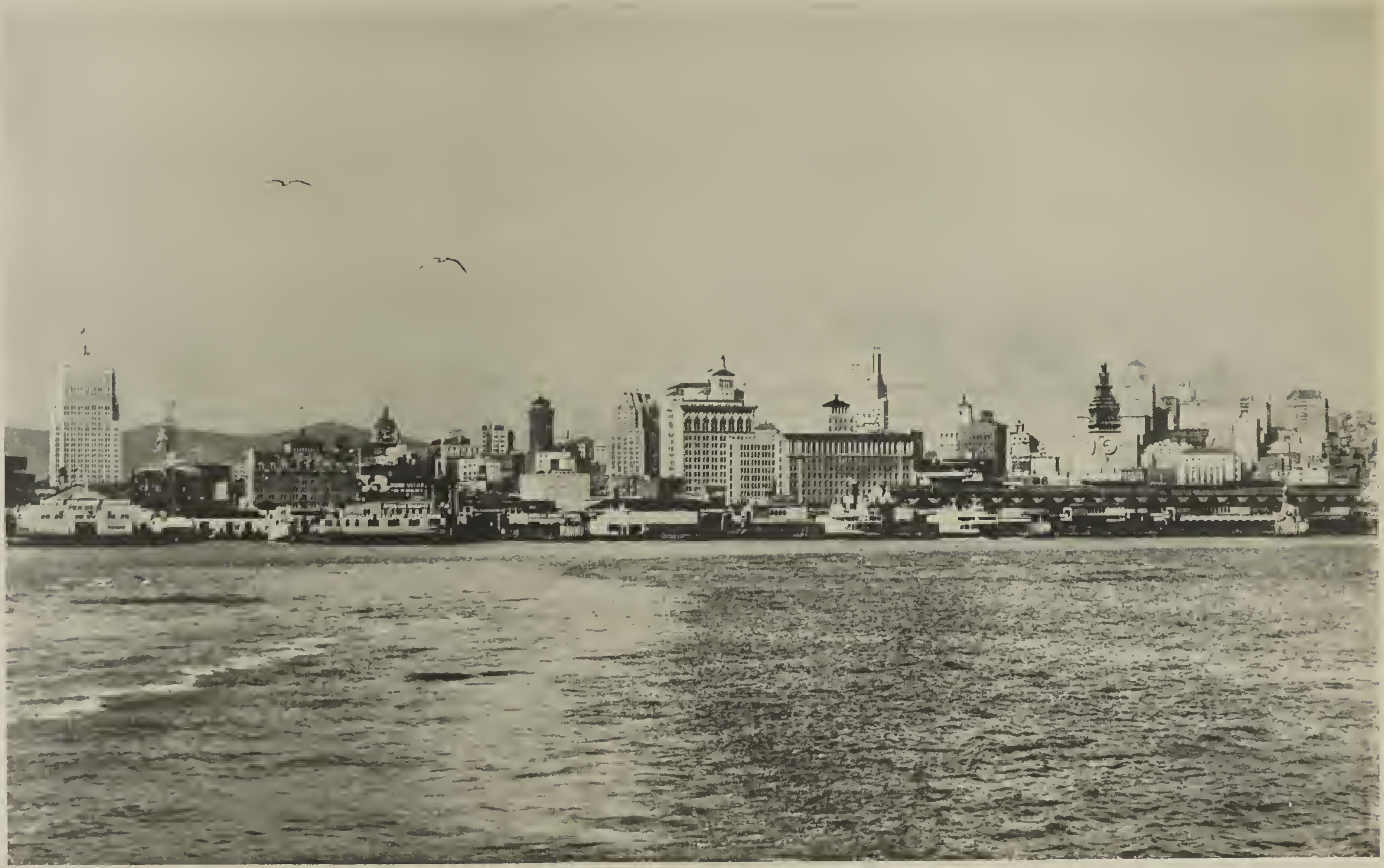
SANFORD, EDWARD TERRY (1865–). An American jurist. Born at Knoxville, Tenn., he studied at the University of Tennessee and at Harvard (A.B., 1885; LL.B., 1889), was admitted to the bar and served as Assistant Attorney General of the United States (1907-08) and as United States district judge for the eastern and middle districts of Tennessee (1908–23). Since 1923 he has been Associate Justice of the United States Supreme Court.

SAN FRANCISCO. The second city in size in California. The population increased from 416,912 in 1910 to 506,676 in 1920 and to 585,300 in 1928, by estimate of the U. S. Bureau of the Census. An important part of the city's development since 1914 has been the creation of the Civic Centre. The original buildings, fronting the five-acre plaza, were: the City Hall, a four-story building erected at a cost of $3,500,000; the Public Library, built in Italian Renaissance style and costing $1,153,000; the State of California Building, erected at a cost of $1,350,000 to house State courts and other offices; and the Municipal Auditorium, erected for the Panama-Pacific International Exposition in 1915, commemorating the opening of the Panama Canal, at a cost of $1,086,000. In 1929 a war-memorial group of two buildings was under construction. One building was to house a war-relics museum, the other was to serve as a concert hall. Among the important commercial structures erected recently were the Pacific Gas & Electric Co., the Telephone, the Russ, and the Stock Exchange buildings. After careful study and mapping under the direction of the city engineer, the City Planning Commission completed and secured the adoption in 1921 of an ordinance dividing the city into six use zones. The 150th anniversary of the city's founding by Spanish settlers was celebrated in October, 1926.

Between 1923 and 1929, the construction of three important bridges was undertaken. The Carquinez Straits Bridge, spanning the upper reach of San Francisco Bay between Vallejo and Valcona, was opened to traffic in May, 1927. It consists of two 1100-ft. spans, and its design, of the cantilever type, provides for earthquake resistance. The Dumbarton Highway Bridge, constructed across the lower end of San Francisco Bay in 1926, is one of the largest toll bridges in the West. The San Francisco Bay toll bridge between Little Coyote Point and Mt. Eden is 7.1 miles long from shore line to shore line and was completed in 1929 at a cost of $7,500,000.

In 1925 a vehicular tunnel was constructed at the Market Street Ferry Terminal at a cost of approximately $350,000. Its total length was 986 feet. Half of the expense was met by the Harbor Commission; the Market Street Railway Company and the Municipal Railways each contributed one-eighth of the cost and the city the remainder. Since 1910 the city has been developing the Hetch Hetchy Water Supply System from the Tuolumne River, 168 miles away. By 1929 the O'Shaughnessy Dam in Yosemite Park and the adqueduct to the Moccasin power plant had been completed and the plant itself was yielding some $2,000,000 revenue yearly in power sales. In 1928 a bond issue of $65,000,000, was voted to provide for the purchase of the distribution system of the Spring Valley Water Company and the completion of the last link of the aqueduct, the 45 miles of steel pipes across the San Joaquin Valley. See WATER SUPPLY.

The Harbor of San Francisco, which extends from the confluence of the Sacramento and San Joaquin rivers at the northeast end of the bay to a point in Santa Clara County at the south, covers an area of 450 square miles. There are 43 docks and piers operated by the California State Harbor Commission and interconnected by a belt-line railroad. These docks and piers afford more than 18 miles of berthing space with 168 square miles of cargo area. In 1929 two new piers, each costing more than $2,000,000, were constructed. San Francisco ranks second only to New York in total amount of water-borne commerce; in 1927 this commerce amounted to 24,281,188 long tons. In 1928, 7555 vessels of 18,100,440 registered tons arrived at the port, and 7705 vessels of 17,895,006 registered tons departed. Exports in 1928 were valued at $201,440,402 and imports at $198,301,326. More than 75 steamship com-



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SAN FRANCISCO

VIEW OF CITY FROM THE BAY

panies operate vessels regularly in and out of the port of San Francisco. The municipal airport at Mills Field was opened in May, 1927. In 1928 there were 355.16 miles of street railway in San Francisco under the operation of three companies. The construction of the Twin Peaks Tunnel, 2¼ miles long, 25 feet wide, and costing $4,750,000, completed in 1917, made possible the development of a large new residential section. Two bond issues, passed in 1928, made available $10,780,000 for the construction of nine boulevards, seven of which were designed to improve traffic conditions on routes leading to the San Francisco-San Mateo county line. In 1928 San Francisco had 70 parks and playgrounds. The Fleishhacker Playfield, fronting on the Pacific Ocean, contained one of the largest outdoor swimming pools in the world.

The school system of San Francisco was thoroughly revised in 1922, following for the most part the recommendations incorporated in a report of a survey of the schools made by the U. S. Bureau of Education at the request of the city. Between 1920 and 1928, $5,000,000 was expended in purchasing sites, $17,000,000 on buildings and equipment, and $2,000,000 on maintenance and repairs. During this period, three new high-school buildings, each costing approximately $1,500,000, four large junior-high-school buildings, and 29 elementary-school buildings were erected. In 1929 there were 87 elementary schools, 9 junior high schools, 8 high schools, 4 evening high schools, 5 evening elementary schools, 1 part-time school, and 1 ungraded school. The total enrollment in 1928 was 102,173.

The industries of San Francisco are diversified, the U. S. Census of Manufactures reporting 181 different classifications. In 1927, according to the San Francisco Chamber of Commerce, 42,078 persons were employed by 2086 industrial establishments and received $61,108,185 in wages; the value of products manufactured was $437,925,582. In 1926 San Francisco had 21,006 retail establishments, whose annual sales amounted to $442,173,000, and 3980 wholesale establishments, whose annual sales amounted to $1,430,882,600. The clearings of the San Francisco banks in 1928 amounted to $11,491,219,374; the city is also the home of the Federal Reserve Bank of the twelfth district. In 1928, 8056 building permits representing a value of $37,766,731 were issued. The assessed valuation of real and personal property in 1928 was $1,055,867,698; the bonded debt was $94,538,600.

SANGER, Margaret H. (Mrs. J. Noah H. Slee) (1883–). An American birth control advocate. She was active in birth control propaganda after 1914. Frequently arrested, she served a 30-day sentence in 1916. Mrs. Sanger was editor of the *Woman Rebel*, which gave way in 1917 to the *Birth Control Review*. The latter publication was the organ of the American Birth Control League in which were grouped prominent club women and social workers interested in the population question. Mrs. Sanger, as president of the league, directed an international propaganda for breaking down the taboos on birth-control information. She lectured in various parts of the United States and in Japan, and called to her support English publicists like Harold Cox, editor of the *Edinburgh Review*, and Havelock Ellis. She organized the first World Population Conference, held at Geneva in 1927. Besides writing numerous pamphlets, Mrs. Sanger was the author of the following books: *What Every Girl Should Know* (1914); *What Every Mother Should Know* (1916); *The Case for Birth Control* (1917); *Woman, Immorality, and Birth Control; Woman and the New Race*, with a preface by Havelock Ellis (1920); *The Pivot of Civilization* (1922); *The New Motherhood*, with introductions by Harold Cox and Havelock Ellis (1922); *Happiness in Marriage* (1927); *Motherhood in Bondage* (1928). See Birth Control.

SANGSTER, Margaret Elizabeth (Mrs. Carroll M. Sheridan) (1894–). An American author, born in Brooklyn, N. Y. She became associate editor of the *Christian Herald* in 1913 and in 1918 she visited Belgium, Germany, and France as correspondent for that periodical. Her poems and stories include: *Friends o' Mine* (1913); *Real People and Dreams* (1914); *Cross Roads* (1919); *The Island of Faith* (1921); *Your Book and Mine* (1923); *Five Thousand a Year* (1924); *The Hill of Ambition* (1925).

SANKEY, Rt. Hon. Sir John (1866–). An English jurist and public official, who was educated at Lancing College and Jesus College, Oxford. He was called to the Bar, Middle Temple, in 1892, and served as chancellor of the Diocese of Llandaff (1909–14); judge of the King's Bench Division (1914–28); Lord Justice of Appeal (1928–29), and as Lord High Chancellor in the Labor Cabinet formed in 1929. He was chairman of the Coal Industry Commission (1919) and its report recommending nationalization of British coal mines was designated as the Sankey Report. Knighted in 1917, he became a member of the Privy Council in 1928.

SANKEY COMMISSION. See Great Britain. *History*.

SAN MARINO, mȧ-rē′nō. A republic of Europe located in the peninsula of Italy. Area, 38 square miles; population, 13,013, in December, 1928, as compared with 10,489 in 1910. Revenues and expenditures for 1926–27 balanced at 4,145,179 lire and for 1927–28 at 4,053,072 lire. There is no public debt. The treaty of friendship with Italy was renewed in 1914 and 1920. Representatives of San Marino are to be found at London, Paris, Rome, and Barcelona. The chief exports are wine, cattle, and building stone.

SAN REMO CONFERENCE. See Peace Conference and Treaties; Reparations.

SANTAYANA, sän′tȧ-yä′nȧ, George (1863–). An American philosopher of Spanish extraction (see Vol. XX). He resigned from the faculty of Harvard University in 1912, and lived thereafter in England and on the continent. He collaborated in 1920 with a group of other American philosophers in the publication of the *Essays on Critical Realism*. Here, the attempt is made to save philosophy from mentalism and skepticism through the revival of the classic distinction of essence and existence, both notions conceived as independent of the knowing subject. In his subsequent development, Santayana seemed to move away even from such critical realism. His *Scepticism and Animal Faith* (1923) and his "Preface to a System of Philosophy" (*Yale Review*, 1924) show him replacing the immutable and eternal Platonic essences with relativistic knowledge, postulated by human faith and according to human needs.

His other works since 1914 include *Egotism in German Philosophy* (1916); *Character and*

Opinion in the United States (1920); a collection of *Soliloquies in England* (1922); *Dialogues in Limbo* (1925); *Winds of Doctrine* (1926); *Platonism and the Spiritual Life* (1927); and *The Realm of Essence* (1928). In 1923 he published his selected and revised *Poems.*

SANTO DOMINGO, săn′tō dō-mĭn′gō, (DOMINICAN REPUBLIC). A West Indian state occupying the eastern part of the island of Haiti. The area is estimated at 19,332 square miles. The population in 1928 was 1,022,485; by the census of 1921, it was put at 897,405. The city of Santo Domingo, the capital, had 30,957 inhabitants. Agriculture and cattle-raising are the chief interests of the population. Sugar estates are to be found in the southern part of the country; tobacco, cacao, and coffee are grown in the other sections. Sugar production in 1927–28 totaled 412,380 short tons. The cacao yield in 1927 was 26,000,000 kilos. There is a great variety of minerals, the chief being gold and silver, but few are worked. In 1913 the total trade was valued at $19,741,000; in 1920 it reached the high figure of $105,257,117. In the succeeding years, it declined, falling to $45,199,375 in 1921 and $29,548,852 in 1922, but rose again to $58,962,000 in 1927. Trade in 1928 totaled $55,542,468, of which $26,787,940 represented imports and $28,754,528, exports. The year 1921 was the only one in the period to show an adverse trade balance for the Republic. The preponderating share of the country's foreign trade fell to the United States. Exports from Santo Domingo to the United States for 1920, 1921, and 1928 were respectively 87 per cent, 77 per cent, and 22.6 per cent of the total. The last figure was occasioned by the small purchases of Dominican sugar because of the tariff and prevailing low prices. In 1921 and 1928, American imports into Santo Domingo totaled 84 and 61.12 per cent of the whole. Sugar and cacao are the leading exports. There were in 1929 about 149 miles of railway of which 62 miles belong to the Government. Revenues and expenditures for 1913–14 were $5,035,250 and $4,890,216; for 1928, $12,565,400 and $12,172,829. The bonded debt of the country, on Dec. 31, 1928, stood at $19,820,000. Defense is in the hands of a native constabulary of 3000 officers and men. The American military occupation inaugurated in 1916 was terminated in 1924 upon the adoption of a new constitution and the inauguration of President Vasquez.

History. The much-needed internal peace which was to result from the American-Dominican fiscal treaty of 1907 came to a premature end with the assassination of President Ramon Caceres in 1911. Thereafter each year saw a new revolution and a new president. President Bordas, who had been elected in April, 1913, encountered a strong rebellion in the spring of 1914. When the situation had become a hopeless tangle in the late summer, matters were straightened out with the assistance of an American commission which had been sent to Santo Domingo for this special purpose. Bordas was induced to resign and Dr. Ramon Baez, the son of a former president, was elected provisional president on Aug. 27, 1914. In October of the same year ex-President Juan Isidro Jiminez was chosen constitutional president. A new revolution broke out under General Arias, a chronic revolutionst of Monte Christi, early in 1916. When Aras seemed on the point of seizing the government, the United States, which by this time had grown thoroughly impatient with the interminable civil disorders and their attendant destruction of life and property and harm to American and other foreign interests and had become alarmed by the danger of international complications, landed marines and took control in Santo Domigo.

President Jiminez, who had approved American intervention but had become dismayed at the turn of affairs, resigned on May 6, 1916, and left the country, while General Arias was summarily ousted by the American commander. The complete pacification of the interior by the American forces was rapid and without serious opposition from the native population. On July 25, the Dominican Congress chose as temporary president Dr. Francisco Herniquez Carvajal, a man of outstanding ability and character. In view of the failure of the 1907 treaty to ensure peace and the security of property, the United States decided to exact guarantees against the recurrence of disorders in the future and hence made its recognition of Henriquez contingent on the conclusion of a new American-Dominican treaty modeled after the treaty signed between Haiti and the United States in 1915. The principal features of the new treaty were to be provisions for the collection of customs under American supervision, the appointment of an American financial adviser, and the installation of a constabulary force officered by Americans. On the refusal of President Henriquez to accede to this request, on the ground that the proposed treaty constituted a flagrant infringement of the sovereignty of the Dominican Republic, the American authorities proceeded to compel compliance by withholding all Dominican revenues from the government. This brought about complete paralysis of the whole governmental machinery. When it became apparent that President Henriquez intended to stand for reëlection at the expiration of his temporary term, with good prospects of success, the existing deadlock threatened to continue for an indefinite period. To end an impossible situation the American commander issued a proclamation declaring the Dominican Republic under the military administration of the United States. Immediately thereupon the military government took full possession of the country, and what little opposition there was met with rapid suppression.

During the American occupation, Santo Domingo enjoyed a wholesome quiet after the many years of internal disturbances, and a notable improvement was made in social and economic conditions. Most important among the many reforms were the construction of many miles of good roads, the enactment of new tax and revenue laws, the settlement of claims outstanding against the Dominican government, the creation of an efficient police force, the building of new schools, and the enforcement of strict sanitary regulations. Notwithstanding these obvious benefits, the Dominican people maintained their passive resistance and the spirit of resentment which they had manifested when they rallied around President Henriquez in 1916. The practical exclusion of the Dominicans from participation in the government, the overbearing conduct of many of the American military officers, the arbitrariness of the provost courts, alleged acts of cruelty and brutalty on the part of American soldiers, all served to fan a spirit of violent resentment and opposition against the occupation. Off and on, loud protests were voiced by the Dominicans against American intervention and the very considerable loan which they were pressed to float.

Evacuation of the Dominican Republic by the American forces was foreshadowed by the proclamation issued by the military government on Dec. 28, 1920, stating that "the time has arrived when it (the military government) may, with a due sense of its responsibility to the people of the Dominican Republic, inaugurate the simple process of its rapid withdrawal from the responsibilities assumed in connection with Dominican affairs." At the same time it was announced that a commission of representative Dominicans with a technical adviser would be appointed to prepare the constitutional amendments and to revise the laws of the Republic and that these laws, after approval by the military government, would be submitted to a constituent assembly and to the national congress. On June 14 a similar proclamation was issued, outlining the conditions under which the withdrawal would be made. After a long delay due to the refusal of the Dominicans to accept the Amercan conditions, an American-Dominican accord was signed on June 30, 1922, which, aside from the establishment of a provisional government, stipulated that a treaty should be concluded between the United States and the new Dominican government, whereby the latter should recognize the validity of all acts of the American military government during the occupation, of the bond issues of 1918 and 1922, and of the convention of 1907, the latter to remain in effect for the time during which the 1918 and 1922 bond issues remained unpaid. Pending the establishment of a permanent government, Juan Bautista Vicini Burgos assumed office as provisional president on Oct. 21, 1922. Subsequently Gen. Horatio Vasquez, who was perhaps the outstanding figure in Dominican political life, was elected president, in accordance with a new constitution adopted June 13, 1924. On June 26, 1924, the Dominican Congress ratified the treaty with the United States which provided for the withdrawal of the American forces, and on July 12 the American troops were evacuated.

On the same date General Vasquez was inaugurated. At the end of September, 1924, an agreement for unconditional "most-favored-nation" treatment with respect to customs duties and other commercial charges was made between the United States and the Dominican Republic. In the same month the latter republic applied for membership in the League of Nations. The United States Senate, in January, 1925, ratified the treaties with Santo Domingo providing for the termination of the American occupation and the refunding of the Dominican debt of $25,000,000. Under the second treaty the President of the United States appointed a receiver of customs to serve until the retirement of all external refunding bonds.

Despite protests of the opposition party, a revised constitution of the republic, proclaimed June 16, 1927, extended the terms of President Vasquez, Vice President Velazquez, and the members of Congress from 1928 to 1930. In January, 1929, a treaty was signed fixing the boundary between the Dominican Republic and Haiti and on March 11 the Dominican Congress ratified an arbitration treaty negotiated with Haiti. At the invitation of President Vasquez a commission of American financial experts, headed by former Vice President Charles G. Dawes, arrived in Santo Domingo Apr. 2, 1929, for the purpose of working out a scientific budget system and recommending methods of improving the administrative organization of the republic. The mission departed April 23, leaving its report with President Vasquez. The report contained in codified form, ready for enactment, a budget law with provision for executive control of expenditures; an accounting law; a law regulating projected public improvements; a modified law of finance, and the necessary repealing laws. Certain changes in departmental organization were also recommended. The deficit at the beginning of 1929 was $1,631,277, which had accumulated since 1924 at the rate of $408,000 annually. General Dawes pointed out that appropriations under the 1929 budget would probably exceed the budget income for the year by approximately $4,127,000. The total indebtedness of the republic, both internal and external, was placed at $22,650,000. The opposition party, which was at first suspicious of the purposes of the Dawes Mission, later announced its unqualified indorsement of the plan.

Plans for the erection of a great lighthouse at Santo Domingo City as a memorial to Columbus were carried forward under the sponsorship of the Pan American Union during the latter part of the period 1914–29. In September, 1928, it was announced that 1091 architects from fifty-eight nations and territorial divisions had entered the competition for architectural plans.

SARAWAK. See STRAITS SETTLEMENTS.

SARGENT, CHARLES SPRAGUE (1841–1927). An American arboriculturist (see VOL. XX). As director of the Arnold Arboretum, Dr. Sargent had a world-wide reputation. He was regarded as the foremost dendrologist in America and introduced many plants to the North Temperate Zone. He received medals from the Garden Club of America (1920), from the American Genetic Association (1923), and the Loder Rhodedendron Cup from the British Horticultural Society. He contributed biographical notes to *Epes Sargent of Gloucester and His Descendants* (1923).

SARGENT, JOHN GARIBALDI (1860–). An American lawyer and cabinet officer, who was born at Ludlow, Vt., and graduated from Tufts College. Having been admitted to the Vermont bar, he served as Secretary of Civil and Military Affairs of that State (1900-02) and as Attorney General (1908–12). In 1925 President Coolidge appointed him Attorney General of the United States, and he continued in that office until March, 1929.

SARGENT, JOHN SINGER (1856–1925). An Anglo-American artist (see VOL. XX). His portrait of Henry James was one of the paintings attacked by the suffragettes in London in 1914. The third series of his mural decorations in the Boston Public Library, finished in 1916, was entitled "The Theme of the Madonna." These paintings were objected to by members of the religious denominations figuring in the allegory and the removal of some was asked. He made several paintings of scenes on the western front during the World War. His large picture, "Gassed," in the Royal Academy, attracted great attention. In November, 1921, his decorations in the rotunda of the Boston Museum of Fine Arts were unveiled.

SARMENT, JEAN (1897–). A French playwright and actor who was born at Nantes and educated at the lycée there. His characters were mild romantics presented with delight-fully charming humor. His first play, *La Couronne de carton* (1920), was crowned by the academy. It was followed—the dates are those of presentation in Paris—by *Le Pêcheur d'ombres* (1921); *Le Mariage d'Hamlet* (1922); *Je suis trop grand pour moi,* produced at the Comédie Française (1924); *Madelon* (1925); *Les plus beaux yeux du monde* (1926); *As-tu du cœur?* (1926); and *Léopold le bien aimé* (1927). M. Sarment acted in many of these, as well as in other plays, and in 1917 he played in New York. In 1922 he published *Le Cœur d'enfance,* a volume of poems.

SARRAIL, sȧ'rȧ'y', Maurice (1856–1929). A French general (see Vol. XX). At the beginning of the World War, he commanded the 6th Corps, and on Sept. 2, 1914, was appointed commander of the 3d Army. At Verdun, although authorized and even commanded to fall back, he held his army on the northwestern front, which helped to make Joffre's counterattack at the Marne possible. In December, 1915, he became commander-in-chief of all the Allied forces in the East, but was recalled to France in 1917 and was put on the reserve list as having reached the age limit. Soon after the end of the War, he published an account of the Saloniki operations, under the title, *Mon Commandement en Orient.* In 1924 he was appointed High Comissioner in Syria. He was recalled in October, 1925, after serious native outbreaks which were attributed to the severity of his administration. His attempt to quell an outbreak in Damascus by bombarding the Arab quarter of the city aroused a world-wide protest. (See Syria.) He died Mar. 23, 1929, and was buried at state expense in the Invalides.

SARRAUT, sȧ'rō, Albert (1872–). A colonial administrator and public official, who was born in Bordeaux and studied for a journalistic career. He entered the Chamber of Deputies as a Radical Socialist member in 1902, became Undersecretary for the Interior in 1906 and later for War, served as governor general of Indo-China (1911–14), and as Minister for Colonies (1920–24). During 1925–26 he was the French plenipotentiary in Angora. In the latter year he was elected Senator and appointed Minister of Interior, a post which he filled until November, 1928. He wrote *Le gouvernement direct en France* (1899) and *La mise en valeur de colonies* (1922).

SARTORIUS VON WALTERSHAUSEN, August, Baron (1852–). A German economist (see Vol. XX). He resigned his professorship at Strassburg in 1918. He published *Der Paragraph 11 des Frankfurter Friedens* (1915); *Weltwirtschaft und Weltkrieg* (1915); *Deutschland und die Weltwirtschaft nach dem Kriege* (1922); *Deutschlands Wirtschaftsgeschichte, 1815–1914* (1920); *Einfuhrung in das Stadium der Volkswirtschaft* (1923); *Die Weltwirtschaft und das staatlich geordnete Verkehrswesen* (1926); and *Weltwirtschaft und Weltanschauung* (1927).

SASKATCHEWAN. A Canadian province, with an area of 251,700 square miles, and a population in 1926 of 820,738, as compared with 757,510 in 1921, an increase of 63,228. The 1921 figure was a gain of 265,078 or 53.8 per cent over the figures for 1911. Of the population in 1921, 538,552 (71.1 per cent) lived in rural districts and 218,958 in urban. In 1921 males numbered 413,700 and females 343,810. The estimated population in 1929 was 866,700. There were considerable colonies of Germans, Austrians, Scandinavians, Russians, and Dutch. Populations of the larger towns in 1926 were: Regina, the capital, 37,329; Moose Jaw, 19,039; Saskatoon, 31,234; Prince Albert, 7873.

Industry. Because of the prairie nature of the country, agriculture is the leading occupation. By 1927 the acreage devoted to wheat had increased to 12,979,279 acres from the 5,720,000 acres in 1912. Saskatchewan is the leading wheat-producing Province. The acreage under oats, barley, rye, and potatoes also have doubled since 1912. As a result of the diversified farming practiced and the attention given to root crops, etc., the live-stock industry is thriving. In 1926 there were 497,572 milch cows (20,624 in 1914), 922,373 other cattle (474,436 in 1914), 133,000 sheep (126,027 in 1914), 599,601 swine (454,703 in 1914). The value of agricultural products for 1926 was $364,840,000, as follows: field crops, $313,318,000; dairy products, $18,873,000 (compare the 1910 products of $381.809); wool clip, $142,000; game and furs, $40,000; garden products, $2,452,000; poultry and products, $10,954,000. Under the spur of an enlightened self-interest, farmer organizations have applied themselves to coöperative grazing schemes and coöperative elevators. In 1927, 929 elevators handled a total of 84,997,400 bushels of all grains. Other industries yielded: fish catch (1926), $444,288; coal (1927), $1,668,000. In 1926, there were 674 industrial establishments, concerning themselves primarily with milling and building operations, capitalized at $33,943,060 and adding to products by manufacture, $17,980,062. Employees numbered 4904; salaries and wages paid, $6,397,545. The water-power resources were estimated at 542,000 horse power, but by 1928 only 35 horse power of this had been utilized.

Trade and Communications. Animal products and grains are the Province's leading exports. Exports for 1926–27 amounted to $9,849,274; imports, $20,700,339. In 1927 there were 7358 miles of railway in operation, as compared with 5654 miles in 1914.

Government. Revenues for 1926–27 totaled $13,050,217, as compared with $4,668,754 in 1913; expenditures for 1913 and 1926–27 were $4,656,800 and $12,962,217. In 1926 in the 4721 elementary and secondary schools, 206,560 pupils were enrolled (99,109 pupils in 1913). Total expenditures for education in 1913, $8,787,904; in 1926, $15,500,477. The provincial representation in the Dominion Senate is 6; in the House of Commons, 21. For 1925–26 receipts from the Dominion government (subsidy and school lands) amounted to $2,835,659. Women received the franchise in 1916 and were made elegible for election to the provincial legislature.

SASSOON, Siegfried (1886–). A British author and poet. During the World War, he served with the British forces in France and Palestine. He wrote *The Old Huntsman* (1917); *Counterattack* (1918); *Collected War Poems* (1919); *Satirical Poems* (1926); *The Heart's Journey,* poems (1928); and *Memoirs of a Fox Hunting Man* (1929), which won the Hawthornden Prize.

SATELLITES. See Astronomy.

SATIE, Erik (1866–1925). A French composer, born at Honfleur, France. Although he received musical instruction from the age of eight, and had good teachers, he neglected his opportunities. After leaving the Paris Conservatory, where he was regarded as hopeless, he played in various cabarets in Montmartre until about 1890. He then met Josephin Péladan, a writer and leader of a mystic cult, the Salon de la Rose-Croix, which he joined in 1892. The next two years he spent writing incidental music for the plays of Péladan and other members of the salon, and thus began to realize the inadequacy of his technical equipment. He entered the Schola Cantorum, and nothing was heard of him until 1911, when Ravel played some of his piano pieces. Satie began as an extreme impressionist and rapidly drifted into Futurism. He wrote mainly for piano, his works being as eccentric and extravagant as their titles (e.g., *Aperçues Désagréables, En Forme de Poire, Pieces Froides,* etc.). He also wrote the ballets, *Upsud, Quadrille, Le Piège de Méduse, Parade, Mercure,* and *Relâche;* two orchestral suites, *Le Songe d'une Nuit d'Été* and *En Habit de Cheval;* and a marionette opera, *Geneviève de Brabant* (Paris, 1926).

SATURN. See PHYSICS.

SAUD, IBN. See IBN SAUD.

SAUERBRUCH, zou'er-brŏŏk', FERDINAND (1875–). A German pioneer in thoracic surgery through his invention of the pneumatic operating cabinet which makes possible the opening of the thoracic cavity without collapse of the lung. Born in Barmen, Prussia, he was graduated in medicine at Leipzig and became an assistant to Mikulicz at the University of Breslau and later professor of surgery in both German and Swiss universities. He first published the description of his cabinet in book form in 1911 in *Technik der Thoraxchirurgie* (written in collaboration with E. D. Schumacher). In 1920 and 1925, he brought out a two-volume work, *Die Chirurgie der Brustorgane* which incorporated the earlier work. Another subject in which he has always been interested is practicable artificial limbs and in 1916 appeared *Die willkürliche bewegbare künstliche Hand.*

SAULT SAINTE MARIE, CANALS AT. In 1914 the United States St. Mary's Falls Canal had its facilities increased by the completion of a third lock, known as the Davis Lock, which was opened to commerce on October 21. This lock was 1350 feet in length between gates, with a usable length of 1300 feet, and had a width of 80 feet and a minimum depth of 24.5 feet over the sill. It was a part of a new separate canal on the American side with a width of 260 to 300 feet and by its increased depth made it unnecessary for the heaviest draft vessels to use the Canadian canal as was previously sometimes required, for there was only about 18½ feet at low water through the Poe or second American Lock. The new canal was crossed by a long bascule bridge carrying a railway track. Another feature of this canal was a fourth lock, of the same dimensions as the third. This fourth or Sabin Lock, named for the general manager of the canal, L. C. Sabin, was completed after various delays due to the War and opened to traffic on Sept. 18, 1919. It is operated by electricity and but 8 minutes are required to raise or lower the craft in the lock a distance of 20 feet. Two of the largest lake freighters can be accommodated tandem on these long locks. In 1916 a record was made of 25,407 vessels with a registered net tonnage of 69,824,463 passing through the American and Canadian canals with a total of 91,888,219 tons of freight. This record can be compared with the statistics for 1923 when 21,975 vessels passed through the canals with a net tonnage of 68,546,412 and 91,379,658 tons of freight. In 1928 the traffic through the canals consisted of 19,286 vessels with a total registered tonnage of 66,835,763, and freight aggregating 86,992,997 tons.

SAUVEUR, ALBERT (1863–). An American metallurgist (see VOL. XX). He was metallurgist attached to the American Aviation Commission in France during 1917–19 and was appointed metallurgical expert to the French Ministry of Munitions in 1917. He became Gordon McKay professor of metallurgy at Harvard in 1924 and the same year was one of the United States delegates to the Third Pan-American Scientific Congress at Lima, Peru, and Bessemer medalist of the British Iron and Steel Institute.

SAVINKOV, BORIS (1879–1925). A Russian political agitator, successively a Marxist, a Terrorist, a leader of the Social-Revolutionary Party, an assistant War Minister under Kerensky, a member of the Kornilov revolt against Kerensky, and an active opponent of the Soviet régime. In his work against the Bolsheviks, he secured financial aid from many countries, and carried on most of his work in Poland. In August, 1924, he went into Russia, was recognized, arrested, and sentenced to 10 years in prison. Under the pseudonym of Ropshin, he wrote three novels: *The Pale Horse* (1907), *What Never Happened* (1912), both translated into English in 1917; and *Das Schwarze Ross,* about the 1917 revolution and its results. These were interesting and finished novels, both in material and style, the latter having been compared with that of Tolstoy.

SAVOY, UPPER. See SWITZERLAND.

SAWYER, ROLAND DOUGLAS (1874–). An American clergyman, born at Kensington, N. H., and educated at Boston University. Besides his ministerial duties, he conducted a crusade against profanity during 1902–07, and organized the Anti-Profanity League. He was also active in Socialist politics, lectured for the Socialist Party, and was Socialist candidate for governor of Massachusetts in 1912. He was elected to the Massachusetts Legislature on the Democratic ticket in 1914 and was reëlected till 1928. He was a delegate to the Massachusetts Constitutional Convention of 1917–19. His writings include: *The Making of a Socialist* (1911); *Social Science of Jesus* (1912); *Walt Whitman, the Prophet Poet* (1913); *'Neath Swaying Pines* (1916); *Thoreau, New England Philosopher* (1917); *The Great Teachers of Wisdom and Virtue* (1920); *Cal. Coolidge, President* (1924).

SAXONY, săk'sŭn-ĭ. One of the constituent republics of the German Reich, with an area of 5786 square miles and a population (census of 1925) of 4,994,281. The internal situation in Saxony remained comparatively calm during the first years of the World War. In 1917, however, it assumed a disquieting aspect, and a strong movement for internal reform and an early peace began. It accumulated force during the following year and brought about the fall of the government in October, 1918. The career of the succeeding government, the Heinze ministry, was cut short by the November revolution, in the course of which King Friedrich

August abdicated and a republic was proclaimed. During the confusion of the early revolutionary period, the government was in the hands of People's Commissioners representing the extreme Socialists, but after the disturbances and upheavals of January, 1919, the reins of government were taken over by the Majority Socialists. Serious Communist risings occurred throughout Saxony and especially in the Vogtland. The Reichswehr had to be called in several times in 1919 and 1920 to reëstablish the authority of the Dresden government. At the time of the Kapp Putsch in 1920, the ministry, consisting, since October, 1919, of a coalition of Majority Socialists and Democrats, was replaced by a coalition of the two Socialist parties. A new constitution was adopted on Oct. 26, 1920, and in accordance with its provisions elections for the Diet were held during the following month, which cut the representation of the Majority Socialists by nearly one-half. In consequence of their increased representation, the bourgeois groups were able to maintain a vigorous parliamentary opposition against the Socialist government.

After a period of comparative calm in 1921 and 1922, "Red Saxony" came once more into prominence in the fall of 1923, at a time when the Reich was in a very critical situation and reaction and monarchism were rampant in the neighboring state of Bavaria. Ostensibly as a counter-movement against the peril of Bavarian Nationalism, the Socialists received avowed Communists into the cabinet and "Proletarian Hundreds" were organized to fight reaction. This action soon brought the Saxon Prime Minister, Dr. Zeigner, into conflict with the Reichswehr and the Minister of National Defense for the Reich. When the Saxon Minister of Finance, Dr. Böttcher, an active Communist, called on the "Proletarian Hundreds" to arm, the government of the Reich decided to take action. The commander of the Reichswehr in Saxony demanded from Dr. Zeigner the dismissal of the Communist ministers and the submission of Saxony to the authority of the Reich. Upon the refusal of the Saxon Premier to comply with these demands, the Reichswehr marched into Saxony on Oct. 22, 1923, and the whole Zeigner ministry was dismissed. The central government installed thereupon a moderate Socialist ministry under the leadership of Herr Heldt. He was reëlected on Jan. 11, 1927. See GERMANY, under *History*.

SAYLER, OLIVER MARTIN (1887–). An American dramatic critic, born in Huntington, Ind. He was graduated from Oberlin College, Ohio, in 1909, and during 1909–20 worked on the Indianapolis *News*. After 1915 he was correspondent for the Boston *Evening Transcript*. He studied the theatres of Europe and gave extended lectures on Russia and on the theatre. He is the author of *Russia, White or Red* (1919); *The Russian Theatre under the Revolution* (1920); *Our American Theatre* (1923); *The Russian Players in America* (1923); *Inside the Moscow Art Theatre* (1925). He has also edited several series of plays.

SAZANOV, SERGIUS DMITRIEVITCH (1866–1927). A Russian statesman who was educated at the Alexandrovsky Lycée, and entered diplomacy. In 1894 he was secretary to the Vatican Mission, and in 1906 Minister to the Vatican, but it was in Great Britain, when counselor of the Embassy (1904–05), and acting chargé, that he showed his ability in handling the Dogger Bank incident. In 1909 he returned to St. Petersburg to be under-secretary at the foreign office, and in 1910 he became Foreign Minister. He was an important factor in forming the Entente and in the negotiations immediately preceding the outbreak of the World War, and was one of the few reactionaries in Russia who urged fighting the War to a finish. At the outbreak of the War, the Poles had been promised home rule, and Sazanov wished to make good this promise, but as the Government would not hear of this, he was dismissed in 1915. Shortly before the revolution of March, 1917, he was appointed Ambassador to London, but conditions made it impossible for him to go. During the efforts to reconquer Russia from the Bolsheviks, he was Foreign Minister to Kolchak and diplomatic counselor in Ekaterinodar. When these efforts failed he spent a year in Prague, and then went to France. He was forced to live on the brink of poverty, which broke his health. He wrote his reminiscences which were translated into English as *Fateful Years, 1909–1916*, in 1928.

SCANDINAVIAN LITERATURE. Danish. Jóhann Sigurjónsson, who died in 1919, held the foremost rank among twentieth-century Danish-Icelandic dramatists. His plays, based on native history and legend, show a strong love for Icelandic nature and character, both of saga and of contemporary times. Henri Nathansen was generally considered the greatest Danish dramatist of the day. One of his favorite themes is the contrast between Jew and Gentile. Einar Christiansen writes somewhat in the manner of Ibsen. Like Otto Benzon, he often portrays the conflict between the old and the new.

Among the poets, Ludvig Holstein, although a lyricist, usually conceals his own personality. His poetry often expresses a love for nature, particularly spring. Johannes Jørgensen was considered by some the greatest living Danish poet. A Catholic convert, he gives expression in his poetry as well as in his prose to his soul experiences and religious sentiments. L. C. Nielsen was attempting to create a modern national poetry. He is the writer of a number of cantatas of great power and is the interpreter of the lonely, the wanderer, and the lover. In the poetry of Kai Hoffmann is seen a love for life and for everything living. Olaf Hansen's is largely a poetry of reminiscence. Other poets of note are Sophus Claussen and Thøger Larsen.

Danish fiction suffered a great loss in the death of Jakob Knudsen in 1917. Johannes V. Jensen was one of the foremost writers of Denmark. Influenced at times by Walt Whitman, and a strong believer in the soundness of Northern life and tradition, Jensen became interested in a Gothic renaissance. In his later works (*Bræen, Norne-Gæst, Kongens Fald*), he pictures Danish life, particularly from Viking times. Otto Rung is characterized by his clear and firm thinking, his original interpretation of human nature, his thrilling action, and his subtle psychology. A writer touching on social conditions is Henrik Pontoppidan. He does not preach; yet his sympathies are clearly with the under class. His series, *De Dødes Rige*, beginning with *Torben og Jytte* and ending with *Favsingholm*, portrays different phases of the struggle between the people and their oppressors, while *Mans Himmerig* shows a generally pessimistic outlook on life. Martin Andersen Nexø is another writer interested in social problems. Among his later works may be mentioned *Ditte Menneskebarn*, a series treating the history of a family and constructed on large lines, and *Pelle Eroberen*, the story of a poor boy who grows up to be a leader of the workingmen. More strongly felt are the tendencies toward preaching a social gospel in the works of Jeppe Aakjær, whose *Hvor der er gærende Kræfter* may be interpreted as warning the leisure class against a possible rebellion of the peasants. In *Jens Langkniv*, Aakjær tries to portray in a single village the general history of Denmark. His stories usually centre around a character, a cause, or a view of life.

Karl Gjellerup, who died in 1919, was originally a theologian and then went over to a rationalistic view of life, to end up with an ethical-religious philosophy. In his novels, Gjellerup's learning often seems oppressive and distracts from his story. His *Den gyldne Gren* depicts the conflict between heathendom and Christianity. Knud Hjortø finds his strength in his keen perceptions as a philologian and a psychologist. Of his later works may be mentioned the novels *Fru Herta* and *Tvelys*, and the collection of short stories, *Ud for Skrænten*. Of the Icelandic immigrants writing in Danish, the most important is Gunnar Gunnarsson, who shows vividly the disharmony, the gloom, and the passion of the soul-life of the Icelander, and also his lighter mood. Among his works are the series *Borgslægten, Varg i Veum, Edbrødre, Skibe paa Himlen*, and *Den uerfarne Reisende*.

Internationally recognized linguists are Otto Jespersen (English) and Kristoffer Nyrop (Romance). In the field of literary criticism should be mentioned Georg Brandes (died 1927), who in addition to Scandinavian has treated other literatures, ancient as well as modern, Vilhelm Andersen, and Valdemar Vedel.

Norwegian. Gunnar Heiberg was considered the greatest Norwegian dramatist of the period. His strength lies in the portrayal of strong sentiments and feelings. Another outstanding playwright was Hans E. Kinck (died 1926). The drama also received contributions from others whose chief work lies outside this field, such as Herman Vildenvey, Nils Kjær (died 1924), Vilhelm Krag, and Johan Bojer.

Norwegian poetry, even when written in Landsmaal, has retained many of the Danish characteristics and in general shows foreign influence. In spite, however, of its lack of a distinctly national character, it is very strong. In the period under review, foremost among lyric poets stood Olaf Bull, who expresses feelings for nature and love with exquisite tenderness, and Nils Collett Vogt, who is strongly subjective and whose *Hjemkomst* is his ripest and deepest poetry. Arnulf Øverland's verse is extremely personal. It expresses a feeling of revolt against things as they are and a grief over the nothingness of life. Other noted lyricists were Vilhelm Krag, the representative of neo-romanticism, and Knut Hamsun, whose main field, however, is the novel. Herman Vildenvey, who at first became popular because of his roguish humor, shows a deep seriousness and strong feeling in his later works, especially *Ildorkestret*. Among poets writing in Landsmaal were Olaf Aukrust, whose *Himmelvarden* is one of the best poems in Landsmaal literature, and Kristofer Uppdal, who comes nearest to writing a national poetry and whose verse in general is free from the Danish characteristics noted above.

Hans E. Kinck was regarded by some as the most important Norwegian author of the period. At heart a romanticist, he was yet interested in the world of reality and its problems. In the field of fiction, his *Sneskavlen brast*, a novel built on very broad lines and strong in social psychology, is an epoch-making work. Nils Collett Vogt, besides being a novelist, is a dramatist and a poet. Johan Bojer, whose *Den store hunger* made him known internationally, upholds idealism against materialism and generally shows the victory of optimism over pessimism. O. E. Rølvaag attracted attention on both sides of the Atlantic by his portrayal of Norwegian immigrant life on the American frontier. His best works are *I de dage, Riket grundlægges*, and *Peder Seier*, all of which have been translated into English. Another novelist known outside of Norway is Knut Hamsun, whose *Markens grøde*, expressing the dream of an ideal state in nature, seems a reaction against the War. The best-known woman writer of the period was Sigrid Undset, whose *Kristin Lavransdatter* gives in three volumes the story from childhood to death of a fourteenth-century girl. Sigrid Undset is particularly interested in the problems of her own sex. The same is true of Barbra Ring, author of *Før kuldenkommer, Under sejl, Søstre*, etc., who treats woman's side of married life and evinces a love for the soil and the agrarian class. Kristian Elster, in his works *Landeveien, Ilden, Guldet og de grønne skoger*, etc., protests against existing conditions and the prevailing philosophy of life. Among prominent novelists the outstanding are Gabriel Scott, Johan Fredrik Vinsnes, and Peter Egge, who is also a dramatist. Of Landsmaal writers we may note Oskar Braaten, who is particularly interested in life among the poorer classes; Kristoffer Uppdal, who even in his prose evinces strongly lyric tendencies; and Olaf Duun, who shows an intimate knowledge of peasant life.

Halvdan Koht is a scholarly writer on historical and literary subjects. Among literary critics of exceptional ability are Gerhard Gran (died 1925), Christen Collin, and Fredrik Paasche.

Swedish. The Swedish drama was not very strong during this period. The theatre drew largely on foreign and earlier Swedish playwrights. Among the best contemporary dramatists were Ernst Didring, Per Hallström, and Tor Hedberg, who excelled also in other fields of literature.

The greatest living Swedish poet is Verner von Heidenstam. He is an idealist, fond of portraying the conflict between good and evil, and interested in Swedish history and its heroes. Through his poetry breathes the spirit of patriotism, which is, however, largely an extension of his love for his birthplace. In addition to being a poet, Heidenstam wrote several novels, particularly on historical subjects; these antedated 1914. Bertil Malmberg's poetry, spontaneous and full of feeling, recalls the Gothic school and is often similar to Tegnér's. Among his works may be mentioned *En blödande jord, Orfika*. Bo Bergman's verse is exquisite in form, classical, clear and musical, and shows a strong lyric mood. Ragnar Jändel's verse expresses a seriousness and an idealistic long-ing and positive religious conviction. Swedish lyric poetry was strongly represented in Finland. In this connection, four men were outstanding. Preëminent among these was Bertel Gripenberg, a portrayer of strong feelings, hate as well as love. His verses are full of the spirit of fight. Among his later works is the collection *Under fanan,* which was written under the inspiration of the civil war in Finland. Jacob Tegengren is deeply sensitive to nature, particularly to its aspects in spring and summer. He is quiet and dreamy, the melancholy of his earlier years having given way to a more joyful tone. Among his later poems may be noted *Ny vår.* Arvid Mörne's poetry is often inspired by a love for his native place, its nature, and its people; but Mörne is also an agitator, fighting now for this cause, now for that; this often gives his poetry an argumentative coloring. He has also shown ability in the drama and novel. Hjalmar Procopé (died 1927), the last of the Swedish writers in Finland to be mentioned here, had no definite philosophy of life. His poetry is quiet and characterized by a mild and manly resignation.

The author who was considered by most critics the greatest living writer of Swedish fiction was Hjalmar Söderberg. The chief strain running through his works is pessimism. His irony and wit, as well as certain features of his technique, show French influence. Next in rank is Per Hallström, also a dramatist, whose works show a very strong power of imagination and keen psychological insight. Selma Lagerlöf, who received the Nobel Prize for Literature in 1909, is an extremely popular author, well known also outside of Sweden. Her work is characterized by a rich imagination, a love for her native Province of Värmland, a strong power of storytelling and a wholesome moral tone. Best known of her works is *Gösta Berlings saga.* Some of her later works are *Bannlyst, Mårbacka,* and the Löwensköld series (*Den Löwensköldska ringen, Charlotte Löwensköld,* and *Anna Svärd*). K. G. Ossiannilsson, who is also a poet, is interested in the problems of society, particularly in class struggles. Marika Stjernstedt is interested in her own sex, especially in the strong, independent woman placed in contrast with her weak and submissive sister. Some of her late books are *En officershistoria; Världen och stjäronorna,* which pictures the attainment of peace through struggle; and *Fröken Livin.* Although Sigfrid Siwertz began as a disciple of Schopenhauer, his later works have shown a more or less pronounced influence of Bergson. Of these may be mentioned *De stora barnen, Eldens återsken, Jonas och Draken.* Martin Koch is a writer with a social message. He shows strong sympathy for the lower classes, whose lives he likes to depict, as seen in *Guds vackra värld* and *Anteckningar på havet.* In religion, he favors an everyday practical faith rather than dogmatism and formalism. Elin Wägner generally has a thesis in her works, although in her later books she leans somewhat to the novel of character. Among these later works are *Helga Wisbeck, Den namnlösa,* which shows the influence of Strindberg and Dostoevski, and *De fem pärlorna.* Henning Berger, who died in 1924, treated the emigrant to America in several of his stories. His characters usually have something of the legendary and, in general, his novels are permeated by a note of earnestness and melancholy. Tor Hedberg is one of the strong writers, not only of fiction but also of drama, poetry, and criticism. Sven Lidman is interested in memories and traditions. Of his later works may be mentioned *Huset med de gamla fröknarna* and *Såsom genom eld.* Among humorists of popular fame are Albert Engström, whose humor and keen understanding of Swedish character made him a favorite with the people, and Hjalmar Bergman, whose *Markurells i Wadköping* carried him to the height of popularity.

Nathan Söderblom, the archbishop of Sweden, contributed to the subjects of religion, its origin, development, etc. Adolf Noreen, who died in 1925, had become internationally known for his linguistic investigations. Literary critics of note are Hendrik Schück, Karl Warburg, John Landquist, Fredrik Böök, and Martin Lamm.

SCAPA FLOW. A small body of water nearly enclosed by the Orkney Islands; about 14 miles long, varying from 3 to 8 miles in width. The principal channels leading out are through Hoy Sound into the Atlantic Ocean and through Holm Sound into the North Sea. Each is about 2 miles wide. The best anchorage is on the north coast of Hoy, but there are several others. Scapa is over 50 miles farther from the German coast than Rosyth, but the great ease of entrance and exit for a large fleet caused its use during the War as the operating base of the British Grand Fleet. It was in Scapa Flow that the surrendered German fleet was interned and where it was scuttled by its officers. See War in Europe, *Naval Operations.*

SCARBOROUGH, George Moore (1875–). An American playwright, born at Mt. Carmel, Tex., and educated at the University of Texas. From 1897 to 1905, he practiced law in Texas, then became a reporter for the New York *American,* and was with the Department of Justice from 1909 to 1914. His first play, *The Lure* (1913), attracted much attention. Among his other plays are *At Bay* (1913); *The Court of Last Resort* (1913); *What Is Love?* (1914); *The Heart of Wetona* (1916); *Moonlight and Honeysuckle* (1918); *The Son-Daughter* (1919); *Bluebonnet* (1920); *The Mad Dog* (1921); *Mrs. Hope's Husband* (1921); *The Grail* (1922).

SCARLET FEVER. In 1923 and 1924, more was learned of the intimate nature of this disease than within the previous 50 years. The labors of independently active researchers—Dick and Dick; Dochez, Sherman, and Blake; and Trask and Lynch—which were published in 1923 and 1924 in the *Journal of the American Medical Association,* all point to the same conclusions. Scarlet fever is due solely to a special strain of the hemolytic streptococcus, which flourishes only in the tissues of scarlet fever patients and possibly in so-called immune carriers. This organism is the cause alike of the disease and of its destructive complications. The disease is largely the result of an intoxication by the secretions arising from the bacterium, so that scarlet fever takes its place with those affections which can be reached by an antitoxin. From analogy, it should be possible to recognize those predisposed to the disease, to immunize against it, and to cure patients already infected, provided the antitoxin can be used seasonably. The conditions have been realized partly in the laboratory and in experimental work on volunteers.

Scarlet fever antitoxin, the skin test for susceptibility to the disease, and attempts at immunization have now been before the public of the civilized world for several years and many favorable reports have been published concerning the specific influence of the first named on the temperature and fever curve of the disease in patients with medium and severe types of it, but there are still numerous criticisms of both the theory and the results in practice. Thus, most of the reporters are skeptical as to the power of the serum over the secondary complications of the disease, although a minority believe that these may often be prevented by timely injections. That the hemolytic streptococcus is the essential cause of the disease is questioned in some quarters and this also is true of the specific action of the serum, for other sera prepared from other strains of streptococcus are said to have the same power over the disease, just as the specific serum is said to be able to control other streptococcus diseases—erysipelas, for example. In regard to the susceptibility test and immunization of the susceptible, this resource has for some reason been suspended by some of the health offices.

SCHACHT, (HORACE GREELEY) HJALMAR (1877–). A German financier, born at Tingleff, Holstein. After studying finance and political economy he entered the banking business and in 1908–15 served as a director of the Deutsche Bank. Shortly after the German invasion of Belgium he was sent to Brussels where during 1914–15 he supervised the collection of the Belgian war idemnity. In 1916 he became director of the Nationalbank für Deutschland and a partner in the Darmstädter und Nationalbank; in November, 1923, commissioner of currency for the German Reich; and in December, 1923, president of the Reichsbank. In the latter capacity he participated in the deliberations of the Dawes Committee, the launching of the Reparations Loan of 1924, and the meeting of the Reparations Commission in January, 1929, which appointed the Committee of Experts, known as the Young Committee, to formulate a substitute for the Dawes Plan. He wrote *Die Stabilisierung der Mark* (1927), a discussion which was translated into English the same year as *The Stabilization of the Mark.*

SCHÄFER, shā-fĕr, DIETRICH (1845–1929). A German author and historian (see VOL. XX). During the World War, he was president of the Independent Committee for German Peace and afterward he was leader of the German Nationalism Union of Youth. Like most of the historians of his country, after 1914 his works dealt principally with the War and the problems of Germany. They include: *Sein oder Nichtsein* (1914); *Deutschland und Frankreich* (1914); *Das Deutsche Volk und der Osten* (1915); *Staat und Volk* (1915); *Deutschland und England in See-und Weltgeltung* (1915); *Die Kultur und Ihre Aufgaben* (1917); *Die Vereinigten Staaten als Weltmacht* (1917); *Russland* (1918); *Wir Deutschen als Volk* (1918); *Wie wurden wir ein Volk? Wie können wir es bleiben?* (1919); *Osteuropa und die Deutschen* (1924); *Deutschland und Ausland* (1926); *Mein Leben* (1926).

SCHÄFER, shā′fĕr, WILHELM (1868–). A German poet, essayist, and short story writer, born in Ottrau, Hessen-Nassau. A member of the Prussian Academy of Art, he has written *Die Halsbandgeschichte* (1910); *Karl Stauffers Lebensgang* (1912); *Lebenstag eines Menschenfreundes* (1915); *Die dreizehn Bücher der deutschen Seele* (1922); *Hölderlins Einkehr* (1923); *Winckelmanns Ende* (1925); and *Huldreich Zwingli* (1927). *Anekdoten,* (1908), appeared in a new edition in 1929.

SCHAUFFLER, ROBERT HAVEN (1879–). An American author and lecturer. He was born at Brünn, Austria, of American parents and was brought as a child to the United States. He studied at Northwestern University and Princeton (A.B., 1902), and later at the University of Berlin. He was for one year music editor of the *Independent,* New York, and contributed to *Collier's Weekly,* the *Century, Outlook, Success,* the *Atlantic,* and the *Metropolitan Magazine.* In 1906 he was decorated by the Queen of Italy for winning the tennis championship of Italy (doubles). In the World War, he served as a first lieutenant with the 79th Division and was severely wounded in the Meuse-Argonne offensive. He is the author of *Where Speech Ends* (1906); *Romantic Germany* (1909); *The Musical Amateur* (1911); *Romantic America* (1913); *The Joyful Heart* (1914); *Fiddler's Luck* (1920); *Selected Poems* (1922); and *Peter Pantheism* (1925).

SCHEIDEMANN, PHILIPP (1865–). A German Socialist leader, born at Kassel. After attending the Burgerschule and the Realschule of his native town, he learned the printer's trade, and later became editor of a Socialist paper at Giessen and then of others at Nürnburg, Offenbach, and Kassel. In 1903 he was elected to the Reichstag, representing Solingen, and became a leader of the Social-Democratic Party. He supported the Government in its World War policy. In 1918 he was elected vice president of the Reichstag and was made Secretary of State without portfolio in October of that year. His party was said to have been willing that the monarchical form of government should be continued in Germany under a regency, but the Independent Socialists were determined on a republic; and their efforts were so successful that they were admitted in equal numbers in the provisional government. They denounced Scheidemann for his willingness to retain the services of reactionary officers and troops for the suppression of Communist disorders. When the National Constituent Assembly met at Weimar on Feb. 6, 1919, he was elected Vice President of the Republic and president of the Reichstag. After guiding the new Government through the troubles of the first half of 1919, he resigned on July 20, as he could not agree to the signing of the Treaty of Versailles. He took up again the leadership of the Majority Socialists in the National Assembly and afterward in the republican Reichstag. In 1920 he was elected chief burgomaster in his native town. He wrote *Der Zusammenbruch* (1921) and *Memoiren eines Sozialdemokraten* (1928).

SCHELDT RIVER CONTROVERSY. See NETHERLANDS.

SCHELER, shĕl′ĕr, MAX (1874–1928). A German philosopher and sociologist, who was born at Munich and died at Frankfort. Educated at the Universities of Munich, Berlin, Heidelberg, and Jena, he became a professor at Munich. Durng 1917–18 he was at Geneva and The Hague as representative of the German Foreign Office. In 1919 he resumed his professorial career at Cologne University, going to Frankfort in 1928. His works include *Die transzendentale und die psychologische Methode* (1901); *Zur Phänomenologie der Sympathiegefühle* (1913, 2d ed., 1923, as *Wesen und Formen der Sympathie*);

Die Genius des Krieges und der deutsche Krieg (1915); *Der Formalismus in der Ethik und die materiale Wertethik* (1916); *Vom Umsturg der Werte* (1915); *Vom Ewigen im Menschen* (1921); *Schriften zur Soziologie und Weltanschauungslehre* (1923–24); *Zur Soziologie des Wissens* (1924); *Die Wissensformer und die Gesellschaft* (1926); *Die Stellung des Menschen im Kosmos* (1928).

SCHELLING, shĕl′lĭng, Ernest (1876–). An American pianist and composer (see Vol. XX). During the World War, he was a captain with the American Expeditionary Forces. Since 1924 he has been conductor of the Saturday Morning Children's Concerts given by the New York Philharmonic Orchestra. The title of his variations for piano and orchestra is *Impressions from an Artist's Life.* He added to his list of compositions: *Violin Concerto*; *A Victory Ball,* an orchestral fantasy; *Divertimento,* for piano and string orchestra; songs.

SCHEPPEGRELL, William (1860–). An American laryngologist and one of the world's authorities on hay fever. Born in Hanover, Germany, he was educated in the State College of South Carolina and after taking a medical degree settled in New Orleans in 1890. He began to write on hay fever in 1909 and published many articles on the subject, some of them in the United States government *Bulletins* (U. S. Public Health Service). He was for some years president of the Hay Fever Prevention Society, and has made numerous additions to the armamentarium of his special work, notably in connection with the use of electricity. His major writings are *Electricity in the Diagnosis and Treatment of Diseases of the Nose, Throat and Ear* (1898) and *Hay Fever and Asthma* (1922).

SCHICK, Bela (?–). A Hungarian bacteriologist and pediatrist known for his discovery of the special reaction to diphtheria toxin of children who are susceptible to the disease, which is now in general use throughout the civilized world by health officers. He also discovered the existence of a peculiar toxic substance in menstruating women termed by him menotoxin. Schick was formerly an assistant to the well-known Vienna pediatrists, Escherich and von Pirquet. He has made numerous valuable contributions to periodical literature, but his major works are *Die Serumkrankheit,* von Pirquet and Schick (1905), and *Scharlach,* Escherich and Schick (1912).

SCHICKELE, René (1883–). A German writer, born in Oberehnheim, Alsace. He wrote the novels *Der Fremde* (1907); *Benkal der Frauentröster* (1914); and *Das Erbe am Rhein* (3 vols, 1925, 1927, 1929), and the plays *Hans in Schnakenloch* (1915); *Am Glockenturm* (1919); *Die neuen Kerle* (1920).

SCHICK TEST. See Diphtheria.

SCHILLER, Ferdinand Canning Scott (1864–). An English philosopher (see Vol. XX). He continued to serve as tutor in Corpus Christi College, Oxford, until 1926 and was a fellow of that college and of the British Academy. His later publications include *Problems of Belief* (1924); *Tantalus, or the Future of Man*; *Psychology and Logic in Psychology and the Sciences* (1924); *Cassandra; or the Future of the British Empire* (1926); and *Eugenics and Politics* (1926).

SCHINDLER, shĭn-dlĕr, Kurt (1882–). A German-American choral conductor, born in Berlin, Germany. He was trained in Berlin under K. Ansorge (piano), L. Bussler, and F. Gernheim (composition), and studied under L. Thuille in Munich. From 1902 to 1903, he was conductor at the opera in Stuttgart, later in Würzburg, and from 1905 to 1907, was assistant conductor at the Metropolitan Opera House. In 1908, he founded in New York the MacDowell Chorus, which in 1910 became the Schola Cantorum. This organization introduced many important novelties. He resigned in 1926. In 1927 he became artistic director of the Musical Forum, whose concerts aim to bring to the attention of the public little known or neglected gems of folk music. Schindler is considered a specialist on folk music, of which he published several collections. His original compositions consist of about 50 songs and a choral ballad, *The Miracle of St. Raymond.*

SCHINZ, Albert (1870–). An American university professor and author. He was born at Neuchâtel, Switzerland, and studied at the universities of Neuchâtel (A.B. 1888), Berlin, Tübingen (Ph.D., 1894), and Paris. Coming to the United States in 1897, he traveled and attended Clark University for one year, taught at the University of Minnesota, was professor of French literature at Bryn Mawr (1899–1913), held a similar chair at Smith College for 15 years, and since 1928 has been professor of modern French literature at the University of Pennsylvania. In 1928 he received an honorary L.H.D. degree from Smith College. He is a Knight of the French Legion of Honor. He is author of *Anti-Pragmatism* (1909); *Rousseau, a Forerunner of Pragmatism* (1909); *La Question du Contrat Social* (1913); *French Literature of the Great War* (1919); and *Jean-Jacques Rousseau, interprétation nouvelle* (1928).

SCHIPA, Tito (1889–). An Italian operatic tenor, born at Lecce. His original ambition was to become a composer, and with this object he studied composition under Alceste Gerunda. The extraordinary success of his début as a singer, in Vercelli (1911) decided him to devote his talent to the stage, and in a few years he had sung at many of the important opera houses in Italy and won international reputation through appearances in Paris and London. In 1919 he made his American début as the Duke in *Rigoletto,* with the Chicago Opera Company (December 4), and since then has been a prime favorite. He had also made extensive tours of the United States as a concert singer.

SCHLAF, Johannes (1862–). A German writer and joint founder of the naturalistic school, known for the spiritual quality of his works. He studied at Magdeburg, Halle, and Berlin, and after his collaboration with Arno Holz in the naturalistic sketches, *Papa Hamlet* and *Neue Geleise,* devoted himself mainly to theoretical and philosophical essays, particularly on Walt Whitman. He wrote the philosophical works: *Religion und Kosmos; Die geocentrische Tatsache* (1925); *Deutschland* (1926); *Die andere Dimension* (1926). He is also the author of the novels: *Das dritte Reich* (1900); *Aufsteig* (1910); *Die Wandlung* (1922); and several plays.

SCHLATTER, shlät′ĕr, Adolf von (1852–). A German theologian and author (see Vol. XX). He resigned his professorship at Tübingen in 1922. His recent publications include: *Die Christliche Ethik* (1914); *Die Korinthische Theologie* (1914); *Die Märtyrer in den Anfängen der Kirche* (1915); *Die Beiden*

Schwerter (1916); *Luthers Deutung der Römerbriefe* (1917); *Die Entstehung der Beiträge zur Förderung der Christlichen Theologie* (1920); *Die Geschichte des Christus* (1921); *Erlebtes* (1924).

SCHLESINGER, Arthur Meier (1888–). An American educator, born at Xenia, Ohio. He was graduated from the Ohio State University in 1900 and took postgraduate courses at Columbia. From 1911 to 1919, he was professor and assistant professor of history at Ohio State University; from 1919 to 1925, professor of history and head of the department of the State University of Iowa; and after 1925, professor of history at Harvard University. He was a member of many historical societies and wrote (with H. C. Hockett) *A Syllabus of United States History* (1915); *The Colonial Merchants and the American Revolution, 1763–1776* (1918); *Salmon Portland Chase* (1919); *New Viewpoints in American History* (1921); *Political and Social History of United States* (1925). Professor Schlesinger edited *Great Charters of Americanism* (1920), was also editor of the State of Iowa *Studies in Social Science,* and with Dixon Ryan Fox edited *A History of American Life* (1927–).

SCHLESWIG. This small duchy (area, 3385 square miles), wrested from Denmark by Prussia and Austria in the war of 1864 and annexed by Prussia in 1866, was one of the stakes of diplomacy at the Peace Conference of 1919. On Feb. 21, 1919, the Danish government placed the question of Schleswig before the Peace Conference. In the draft treaty submitted to the Germans in May, provision was made for the taking of a plebiscite in three zones, the third of which extended as far south as the Eider and the Schlei and was peopled largely by Germans whose social and cultural ties were clearly with the South. While the Germans naturally objected to the inclusion of this southern region in the plebiscite area, it was the weight of the arguments of the Danish Radical Party that succeeded in eliminating the third zone from the final treaty. Danes pointed out that the Germans in this district might be favorably disposed toward union with Denmark for economic reasons, viz., to escape heavy war taxes and the share of reparations, and that such a move would leave Denmark with a new irredentism. Articles 109–14 therefore mapped out two plebiscite zones: the northern running south of Tönder but north of Flensburg, and the southern taking in the area about Flensburg. Voting in the first zone on Feb. 10, 1920, gave a clear-cut majority for the Danes, 75,431 ballots being cast for Denmark and 25,329 for Germany. Tönder, in particular, being the centre of a Frisian population, gave a majority for Germany. Voting in the second zone took place on Mar. 14, 1920. Flensburg (population 63,000), the chief point of contention, was the scene of frequent clashes between the inhabitants and the French troops of occupation, and there were other disturbances. The final returns showed that 51,820 votes had been cast for Germany and only 12,793 for Denmark. Flensburg went German by three to one. In June, 1920, the Council of Ambassadors fixed the boundary between Denmark and Germany and details were settled in the next month by treaty between the two countries. Into North Schleswig (Danish Slesvig) the Danish currency was immediately introduced, and work was begun on the reconstruction of highways and railroads. Questions of the rehabilitation of war veterans, the protection of German minorities (of whom there were 25,000 in the province), and frontier arrangements were amicably settled by treaty with Germany in 1922. Denmark assumed North Schleswig's share of the German reparation debt and under the Peace Treaty was obliged to pay 65,000,000 gold marks ($15,500,000) to the reparation account for the properties of the Prussian state which had passed into her control. Danish Slesvig has an area of 1538 square miles and a population (census of 1921) of 163,622. By its acquisition, Denmark's area was increased by about 10 per cent and its population by 5 per cent. See Denmark.

SCHLUMBERGER, Jean (1877–). A French author who was one of the founders and directors of the *Nouvelle Revue Française,* which became the most important literary and critical monthly of Paris. He wrote the plays *On naît esclave,* with Tristan Bernard (1912); *Les Fils Louverné* (1914); and *La Mort de Sparte* (1921), both played at the Vieux Colombier theatre in Paris, and *L'Amour, le Prince, et la Vérité*; the novels, *L'Inquiète paternité* (1912); *Un Homme heureux* (1921): *Le Camarade infidèle*; and *Le Lion devenu vieux*; also *Épigrammes romaines*; *L'Enfant qui s'accuse*; *Césaire*; *Dialogues avec le corps endormi*; and *Les Yeux de dix-huit ans,* short stories (6 ed., 1928).

SCHMIDT, shmĭt, Otto Ernst (pseudonym, Otto Ernst) (1862–1926). A German author (see Vol. XX). He wrote novels, plays, and essays, of which the later ones include: *Nietzsche, der Falsche Prophet* (1914); *Gewittersegen* (1915); *Semper der Mann,* a novel which continues the story of his hero in *Semper der Jüngling; Das Glück ist immer da* (1916); *August Gutbier,* a satirical novel (1917); *Wer tötet Seine Mutter?* (1918); *Mann der Arbeit, Aufgewacht!* (1918); *Friede-Freude* (1920); *Gesammelte Werke* (1922–23); *Heidede* (1923).

SCHMITT, shmĭt, Florent (1870–). A French composer, born at Blâmont, France. He began his musical studies at the Conservatory in Nancy, and in 1889–96 was at the Paris Conservatory, a pupil of Dubois, Lavignac, Fauré and Massenet. In 1897 he won the second Prix de Rome and in 1900, the first prize. From 1906 to 1921, he lived in Paris and devoted his entire time to composition. In 1921 he became director of the Conservatory at Lyons. In 1925 he won the Prix Chartier for chamber music. Although one of the foremost of impressionist composers, he does not sacrifice definite formal structure to mere atmosphere. He wrote: an opera, *Antony et Cléopâtre* (Paris, 1920); three ballets, *La Tragédie de Salomé* (Paris, 1907), *Ourvaçi* (unproduced), and *La Petite Elfe Ferme l'Œil* (Paris, 1922); the symphonic poems, *Le Palais Hanté, Sélamik* (for military band), *Combat de Raksasas et Délivrance de Sita* (manuscript lost in the Paris flood of 1910), and *Rêves*; for orchestra, *En Été, Reflets d'Allemagne, Pupazzi,* and *Rapsodie Viennoise*; vocal with orchestra, *Sémiramis* (lyric scene), *Psalm 46, Chansons à Quatres Voix, Pendant la Tempête, Danse des Devadasis*; a considerable amount of chamber music; and fine works for piano (solo, four hands, and two pianos).

SCHNABEL, shnä'bel, Artur (1882–). An Austrian pianist, born at Lipnik, Carinthia. After receiving his first instruction from H. Schmitt, he studied with Leschetizky in Vienna

(1888–97). After that time, he made constant tours, chiefly of Austria and Germany. He visited the United States for the first time in 1921. In 1912, he made his home in Berlin, where he formed a trio, with A. Wittenberg (violin) and A. Hekking ('cello), and also appeared frequently as assisting artist with other chamber-music organizations. His joint recitals with Karl Flesch have for years been among the notable events of the Berlin musical season. In 1925 he was appointed professor of piano at the Staatshochschule für Musik in Berlin. As an eloquent interpreter of the classic and romantic masters, he is unsurpassed, while as a composer, beginning as a mild impressionist, he gradually drifted toward extreme futurism. In his latest piano pieces, written after the World War, he discards tonality, key-signatures, time-signatures and bar-lines.

SCHNEEVOIGT, Georg (1872–). A distinguished Finnish conductor, born at Wiborg. After graduation from the Conservatory at Helsingfors, he continued to study the 'cello with Karl Schröder in Sondershausen (1890–92) and J. Klengel in Leipzig (1894–95). During 1892–94 he was solo 'cellist of the Helsingfors Philharmonic Orchestra, and made successful tours of Finland. Beginning with 1896, he spent the next four years in extended tours of Scandinavia, Germany, England, Belgium, Holland and Switzerland. He began his career as conductor in 1901, directing the symphony concerts at the Exposition in Riga. In 1904 he succeeded Weingartner as conductor of the Kaim Orchestra in Munich, and after its dissolution in 1908, returned to Riga, where the following year he organized the Riga Symphony Orchestra, which he directed for three years. In 1912 he established his own symphony orchestra in Helsingfors, which was amalgamated two years later with the Philharmonic Orchestra, while Schneevoigt remained as conductor. During 1916–24 he lived in Stockholm as conductor of the Konsertförening, and during this period he appeared frequently as guest conductor in almost every country of Europe. During 1918–24 he also was the regular conductor of the summer concerts at Scheveningen. He made his first visit to the United States in 1924, when he appeared as guest with the Boston Symphony Orchestra. In 1924–25 he was general musical director in Düsseldorf. In 1927 he was elected conductor of the Philharmonic Orchestra in Los Angeles. His wife, Sigrid Sundgrén, whom he married in 1907, is a concert pianist, a pupil of the Helsingfors Conservatory.

SCHNEIDER, Albert (1863–1928). An American bacteriologist and pharmacologist, born at Granville, Ill. Having been graduated in medicine from the College of Physicians and Surgeons, Chicago, in 1887, he settled in California and in 1903 began to teach bacteriology, pharmacognosy and therapeutics in the university of that State, resigning in 1919 to assume the professorship of pharmacognosy in the College of Pharmacy at the University of Nebraska. While in California, he also took charge of the experimental station of the Spreckels Sugar Company (1906–07); was at the head of the department of pharmacognosy of the U. S. Department of Agriculture (1909–15), and was microanalyst of the State Food and Drug Laboratory (1915–19). From 1919 to 1921, he was professor of pharmacognosy at the University of Nebraska, and in 1922 became dean of the school of pharmacy at North Pacific College, Portland, Oreg. His chief publications are *Pharmaceutical Bacteriology* (1912); *Pharmacal Plants and Their Culture* (1912); *Microbiology and Microanalysis of Foods* (1920); *Microanalysis of Powdered Vegetable Drugs* (1921); *Laboratory Pharmacology and Toxicology* (1925).

SCHNEIDER, Edward Christian (1874–). An American physiologist born at Wapello, Iowa. He was educated at Tabor College (B.S., 1897) and at Yale (Ph.D., 1901). He was instructor in chemistry at Tabor (1897–99); professor of biology and physical chemistry (1901–03), and professor of biology (1903–19) at Colorado College; and professor of biology (1919–) at Wesleyan University. He was physiologist in the medical research laboratory at Mitchel Field Air Service.

SCHNEIDER, Herman (1872–). An American university president. He was born at Summit Hill, Pa., and graduated from Lehigh University. For three years he was engaged in structural iron work and later was on the engineering staff of the Oregon Short Line Railroad (1897–99). From 1899 to 1903, he was instructor in civil engineering at Lehigh University. Going to the University of Cincinnati in 1903 as assistant professor of civil engineering, he became full professor two years later, was dean of the College of Engineering from 1906 to 1919 and dean of the College of Engineering and Commerce from 1919 to 1929, when he was elected president of the university. He originated the coöperative system of technical education. In the World War, he was chief of the Industrial Service Section of the War Department, and member of the advisory board to the General Staff, U. S. Army, on education and special training. He is the author of *Education for Industrial Workers*, and *Arthur McQuaid, American.*

SCHNITZLER, shnĭts′lẽr, Arthur (1862–). An Austrian dramatist (see Vol. XX). During the World War and after it, many of his plays were translated into English and published in the United States, where they aroused much interest. *The Lonely Way*, translated in 1915, was highly considered. Other works made available to English readers were: *The Hour of Recognition, a Comedy of Words* (1916); *Casanova's Homecoming* (1922); *Gallant Cassian* (a puppet play, 1922); *The Shepherd's Pipe, and Other Plays* (1922); *The Vast Domain* (1922); *Living Hours* (1923). He also published *Komödie der Verführung* (1924); *Fräulein Else*, a novel (1924); *Der gang zum Weiher* (1926); *Traumnovelle*, a novel (1926); *Spiel im Morgengrauen*, a novel (1927); *Therese* (1928); published the same year in English translation; and *Rhapsody: A Dream Novel* (1928). *Schnitzler's Short Stories*, a collection, was published in New York in 1929.

SCHOFIELD, W(alter) Elmer (1867–). An American painter (see Vol. XX). He received the Temple Gold Medal of the Pennsylvania Academy of Fine Arts in 1914, the Altman Prize of $1000 from the National Academy of Design in 1920, and the Mrs. Keith Spalding Prize of $1000 in 1921. He enlisted in the British Army in 1915, became captain of artillery, and saw active service in France during the World War.

SCHOLZ, shōlts, Wilhelm von (1874–). A German lyrical poet, novelist, and playwright, born in Berlin. In 1927–28 he served as chairman of the department of poetry in the Prussian academy of learning. His plays include *Der Gast* (1900); *Der Jude von Konstanz* (1905); *Meroe* (1907); *Vertauschte Seelen* (1910); *Der Wellauf mit dem Schatten* (1921); and *Die Gläserne Frau* (1924). Other works are *Die Hauser* (1923); *Der Zufall, Eine Vorform des Schicksals* (1924); *Perpetua* (1926); *Das Jahr* (1927).

SCHOOLS. See Education in the United States.

SCHOOLS OF AGRICULTURE. See Agricultural Education.

SCHOPFER, Jean. See Anet, Claude.

SCHORR, shôr, Friedrich (1888–). An Austrian dramatic baritone, born in Nagyvarad, Hungary. When he was only three years old, his parents moved to Vienna, where he received his academic education and later studied law. This he abandoned, when friends convinced him of the exceptional beauty of his voice, and placed himself under the tuition of Professor Robinson, in Vienna, and after less than one year of training made a sensationally successful début as Wotan in *Die Walküre*, in Graz (1911). He was immediately engaged as a regular member and remained there five seasons. In 1916–18 he was at the Landestheater in Prague, and the next five years at the Cologne opera. Immediately after his engagement for the Deutsches Opernhaus in Berlin in 1923, he came with the entire company to the United States, where he made his American début at the initial performance as Hans Sachs in *Die Meistersinger* (Baltimore, Jan. 21, 1923). With the same company, he returned for a second tour in the fall of the same year. In 1925 he became a regular member of the Metropolitan Opera House and one of the prime favorites of the public. As an interpreter of Wagner, especially in the rôle of Wotan, he ranks with the very greatest.

SCHREINER, George Abel (1875–). An American author, born in Germany. He served in the Boer War on the side of the Boers, came to the United States in 1900, and was naturalized six years later. He was managing editor of the San Antonio (Tex.) *Light-Gazette* in 1912–13 and acted as war correspondent for the Associated Press in many countries. His writings include: *The Iron Ration* (1918); *La Détresse Allemande* (1918); *From Berlin to Bagdad* (1918); *The Craft Sinister* (1920); *Entente Diplomacy and the World*, with B. de Siebert (1921); *How America Decided the World War*, from the MS. of General von Falkenhayn (1922); *Cables and Wireless* (1924).

SCHREKER, Franz (1878–). An Austrian composer, born in Monaco. He studied composition under Robert Fuchs in Vienna. As a composer, he first attracted attention in 1902, when the Vienna Gesellschaft der Musikfreunde brought out his *Psalm CXVI*, which was soon followed by works for orchestra. In 1911 Schreker founded the Philharmonic Chorus and the next year he was appointed professor of composition at the Vienna Conservatory. He held both positions until 1920, when he was called to Berlin as director of the Akademische Hochschule für Musik. His greatest successes he won with his operas, which, according to his admirers, represent the perfect union of word and music. As a matter of fact, Schreker is his own librettist, but far from a poet. His principal subject is the sex problem, presented in commonplace, often trivial and vulgar, language, but always with considerable theatrical effect. This predominant erotic element determines the general character of his music, a strange mixture of romanticism, Italian verism, and many phases of the many manifestations of modernism. He has written the operas: *Der ferne Klang* (Frankfort, 1912); *Das Spielwerk und die Prinzessin* (Vienna, 1913; condensed into one act as *Das Spielwerk*, Munich, 1920); *Die Gezeichneten* (Frankfort, 1918); *Der Schatzgräber* (Frankfort, 1920); *Irrelohe* (Cologne, 1924); *Der singende Teufel* (Berlin, 1928). His other works include three pantomimes, orchestral and choral works, and songs.

SCHRÖDER, shrē′dẽr, Alwin (1855–1928). An American 'cellist (see Vol. XX). He severed his association with the Kneisel Quartet in 1907, and then lived a year in Frankfort as solo 'cellist of the Museum Orchestra and professor at Hoch's Conservatory. Returning to Boston in 1908, he was a member of the Hess-Schröder Quartet, and again solo 'cellist of the Boston Symphony Orchestra in 1910–12 and in 1918–20. In 1915 he became 'cellist of the Boston String Quartet and of the Margulies Trio in New York. Although a superb virtuoso, he seldom appeared as a soloist, his absorbing passion being chamber music. As an ensemble player, he had no superior and but few equals.

SCHUCHARDT, shōō′ärt, Hugo (1842–1927). A German philologist and university professor (see Vol. XX). His later works include *Aus dem Herzen eines Romanisten* (1915); *Berberische Hiatustilgung* (1916); *Zu der Romanischen Benennung der Milz* (1917); *Sprachverwandtschaft* (1917); *Die Romanischen Lehnwörter im Berberischen* (1918); *Sprachursprung* (1919–20); *Sprachenbrevier* (1922).

SCHÜCK, shụk, Johan Henrik Emil (1855–). A Swedish historian (see Vol. XX), chairman of the Board of the Nobel Foundation and a member of the Swedish Academy. His later works include *Engelbrekt* (1916); *Shakspere och hans tid* (2 vols., 1916); *Fran det forna Upsala* (1917); *En äfventyrare* (1918); *Messenius* (1920); *Den svenska förlagsbokhandelns historia* (1923); and *Från Campagnan och Sierran* (1926). He compiled vols. i, ii, and vi of the *Swedish National Literature, 1500–1920*, and edited *Ur Axel Reuterholms dagbok* (1921).

SCHÜCKING, shụk′ĭng, Walther (1875–). A German political leader and professor of law who was born in Münster and educated at the universities of Munich, Bonn, and Göttingen. He was professor of constitutional and international law at the University of Marburg (1903–21), at the Handelshochschule of Berlin (1921–27) and at the University of Kiel (1927–). He was a member of the German delegation to the Paris Peace Conference in 1919, of the Permanent Court of Arbitration at The Hague, of the board of the Academy and Institute of International Law at The Hague, chairman of the German group of the Inter-Parliamentary Union, and since 1919 a representative of the Democratic Party in the Reichsrat. Among his many works are *Neue Ziele der staatlichen Entwicklung* (1913); *Der Weltfriedensbund* (1917); *Der Dauerfrieden* (1917); *Die vörkerrechtliche Lehre des Weltkriegs* (1918); *Internationale Rechtsgarantien* (1918); *Das völkerrechtliche Institut der Vermittlung* (1923); *Garantiepakt und Rüstungsbeschränkung* (1924); *Das Genfer Protokoll* (1925). Many of his books have been translated.

SCHULZ, shụlts, Leo (1865–). A celebrated American 'cellist, born in Posen, Germany.

When only five years of age, he was exhibited in Germany as a prodigy, but later studied at the Königliche Hochschule in Berlin. In 1885 he was for one season solo 'cellist of the Berlin Philharmonic Orchestra, and during 1886–89 held a similar position with the famous Gewandotus Orchestra in Leipzig. In 1889–98, while in Boston, he was solo 'cellist of the Boston Symphony Orchestra and professor at the New England Conservatory. In 1890 he joined the New York Philharmonic Orchestra as principal 'cellist, and filled that post with distinction until his retirement in 1929, with the exception of the two seasons 1906–08, when he was with the New York Symphony Orchestra. He also taught some years at the National Conservatory, and in 1904–15 was 'cellist of the Margulies Trio. Throughout his career, he was frequently heard as a soloist with orchestra.

SCHUMACHER, shōō'mäg-ẽr, Hermann A(mandus) (1868–). A German economist and writer on the science of government (see Vol. XX). His works after 1914 include: *Der Panama Kanal und Seine Bedeutung* (1914); *Deutschlands Stellung in der Weltwirtschaft* (1915); *Antwerpen, seine Weltstellung und Seine Bedeutung für das Deutsche Wirtschaftsleben; Belgiens Stellung in der Weltwirtschaft* (1916); *Der Deutsche und Belgische Weltbewerb und Seine Regelung* (1916); *Deutschland und Englands Finanzielle Kraft* (1917); *Der Reis in der Weltwirtschaft* (1917); *Gegenwartsfragen des Sozialismus* (1920); *Die Wohnungsfrage als volkswirtschaftliches Problem* (1921); *Das Problem der Internationalen Reichsverschuldung* (1923); *Der Volkswirt* (1927).

SCHURIG, Arthur (1870–1929). A German writer and critic. He was born at Dresden and studied at the universities of Leipzig and Berlin. He is the author of: *Wolfgang Amadeus Mozart* (1913); *Das Leben eines Sonderlings,* a life of Beyle-Standhal (1921); *Konstanze Mozart* (1922); *Franzisco Pizarro* (1922); two volumes of essays, *Anti-Tagore* (1921), and *Katechismus der Lebenskunst* (1922); the novels, *Seltsame Liebesleute* (1913); and *Gottfried Buttervogel* (1923); *Tristan und Isolde in der bretonischen Urgestalt* (1923); *Vom Glücke Beethovens* (1926); *Der vollkommene Spiessbürger* (1927); *Die Legenden um Beethoven* (1927); and *Der goldene Ball* (1927). He also translated and edited works by Beyle, Flaubert, Julie de l'Espinasse, J. G. Prod'homme, Balzac, Taine, and others.

SCHURMAN, Jacob Gould (1854–). An American educator and diplomat (see Vol. XX). In 1915 he was first vice president of the New York State Constitutional Convention and in 1917–18 he served on the New York State Food Commission. In 1920 Dr. Schurman resigned the presidency of Cornell University. From 1921 to 1925, he served as United States Minister to China, and since June, 1925, has been Ambassador to Germany. In 1927 Heidelberg and Marburg universities conferred the honorary Ph.D. degree upon him. In the period after 1914, he was similarly honored by numerous other American, British, and German universities. He wrote *Why America Is in the War* (1917).

SCHUSTER, Sir Arthur (1851–). An English scientist and physicist (see Vol. XX). He was president of the British Association in 1915, secretary (1912–19), and foreign secretary (1920–24) of the Royal Society, and a member of the Cambridge University Commission (1923–24). He was knighted in 1920. His later publications include *The Progress of Physics* (1911), and *Britain's Heritage of Science,* with the late Sir A. E. Shipley (1917).

SCHWAB, shwäb, Charles M. (1862–). An American capitalist (see Vol. XX). In April, 1918, at the request of President Wilson, he became director general of the Emergency Fleet Corporation, created for the purpose of producing sufficient ships to transport American troops to France. His energies and qualities of leadership greatly stimulated the work, which he continued to direct until December, 1918. Throughout the World War, the Bethlehem Steel Corporation, of which he was the head, was one of the principal sources of munitions and other war supplies for the Allies. For his service in this connection, Mr. Schwab was made an officer of the French Legion of Honor. He became an officer and director of numerous industrial corporations and served as president and director of the American Iron and Steel Institute, director of the Pan-American Society of the United States, and a trustee of Cornell and Lehigh universities and Pennsylvania State College. He received honorary degrees from New York University (1918), Stevens Institute (1921), the University of Pennsylvania (1927), and others. In 1928 he was awarded the Bessemer Prize for services to the steel industry.

SCIALOJA, Vittorio (1856–). An Italian professor of law and public official, born in Turin. He became professor of law at the University of Camerino in 1879, at Siena in 1880, and at Rome in 1884. Elected a Senator in 1904, he served as Minister of Justice (1909–10), as Foreign Minister (1919–20), as member of the Italian delegation to the Paris Peace Conference, and as chief of the Italian delegations to the Locarno Conference and the sixth Assembly of the League of Nations. He also represented Italy on the League of Nations Council elected September, 1928, and was president of the Reale Academia del Lincei.

SCIENCE, American Association for the Advancement of. An organization founded in 1848 and incorporated in 1874. The membership increased from approximately 13,000 individuals in 1924 to over 17,300 in 1928; in the latter year, the membership also included 118 independent societies, of which 87 were affiliated with the association, 23 being local academies of science. The permanent endowment amounted to $133,245.95 in 1924, and $150,095.66 in 1928. Attendance at the annual meetings during that period varied from 1662 at Nashville, Tenn., in 1927, to about 5000 at the meeting in New York in 1928. At the larger gathering, 46 independent societies were represented and about 2200 papers and addresses were presented by about 1900 persons at the 250 sessions. A yearly prize of $1000 is awarded for the most notable contribution to scientific knowledge, that of 1928 going to Dr. Oliver Kamm for his paper, "Hormones from the Pituitary Gland." Besides the standing committee of 100 to promote general research, the association finances a commission to investigate the position of scientific study in educational institutions, and the general attitude toward such teaching. The weekly journal, *Science,* furnishes a forum for open discussion of the scientific problems of any of the 15 divisions of the association. Programmes for each annual meeting, and every four years a volume, *Summarized Proceedings* are also published. The president elected for 1929 was Robert A. Millikan, physicist, and director of the Norman Bridge Physical Laboratory of the California Institute of Technology, Pasadena. The permanent secretary is Dr. Burton E. Livingston, whose offices are in the Smithsonian Institution Building, Washington, D. C.

SCOTLAND. See Great Britain.

SCOTT, Austin Wakesman (1884–). An American lawyer and educator, born at New Brunswick, N. J. He was graduated from Rutgers College in 1903 and from the Harvard Law School in 1909. He was successively instructor, assistant professor, and professor of law at the Harvard Law School, occupying the latter position from 1914. In 1920 he was appointed to the Story professorship of law. He edited several books on legal subjects and was the author of *Fundamentals of Procedure in Actions at Law* (1922).

SCOTT, Cyril Meir (1879–). An English composer, born at Oxton, Cheshire. Having devoted himself chiefly to the study of the piano, he entered the Hoch Conservatory in Frankfort in 1896, and studied composition under I. Knorr. After 1900, he lived at Liverpool, making frequent pianistic tours. In 1920–21, he made a tour of the United States. As a composer, he is recognized as the foremost of the English impressionists. So completely did he absorb the spirit of Debussy's art that his best works might easily pass as productions of the French composer. His works comprise: a symphony; four overtures, *Christmas, Princesse Maleine, Aglavaine et Sélysette,* and *Pelléas et Mélisande;* two rhapsodies; *Aubade; Arabesque;* three *Dances;* a piano concerto; *La Belle Dame Sans Merci,* for soprano and baritone with orchestra; *Helen of Kirkconnel,* for baritone and orchestra; *Nativity Hymn,* for chorus and orchestra; a piano sextet, a piano quintet, three string quartets and a violin sonata; numerous pieces for piano, and songs. An opera, *The Alchemist,* was produced at Essen (1925), while two others, *The Saint of the Mountain* and *The Shrine,* are still unperformed. He is the author of *The Philosophy of Modernism* (1917), and *The Influence of Music on History and Morals* (1928). Consult A. E. Hull, *Cyril Scott: Composer, Poet and Philosopher* (London, 1918; 2d ed., 1921).

SCOTT, Sir Giles Gilbert (1880–). A British architect, educated at Beaumont College. He was architect for Liverpool Cathedral, the new nave of Downside Abbey, the restoration of Chester Cathedral, the new buildings of Clare College, Cambridge, and for numerous church buildings. He became a member of the Royal Academy in 1922 and was knighted in 1924.

SCOTT, Hugh Lenox (1853–). An American army officer (see Vol. XX). General Scott served as Chief of Staff, U. S. Army, from 1914 to 1917. After retirement by the operation of law in 1917, he was retained on active duty to May 12, 1919. In the World War, he was a member of the United States Commission to Russia (1917) and in the same year was appointed commander of the 78th Division. He served with a British Division in the front line at Arras and with a French Division at Chalons, and was present at the Battle for Passchendal Ridge (1917). He was awarded the Distinguished Service Medal in 1918. Since 1919 he has been a member of the Board of Indian Commissioners. He is also a member of the New Jersey State Highway Commission. In 1928 he wrote *Some Memories of a Soldier.*

SCOTT, James Brown (1866–). An American authority on international law (see Vol. XX). He was special adviser of the Department of State, and chairman of the Joint State and Neutrality Board (1914–17), and technical delegate to the Paris Peace Conference (1919). In 1928 he was a United States delegate to the Pan-American Conference at Havana. In 1915, he became president of the American Institute of International Law and, in 1910, trustee and secretary of the Carnegie Endowment for International Peace. His later books include *An International Court of Justice* (1916); *Peace Through Justice* (1917); *A Survey of International Relations between the United States and Germany, Aug. 1, 1914–Apr. 6, 1917* (1918); *James Madison's Notes on Debates in the Federal Convention of 1777 and Their Relation to a More Perfect Society of Nations* (1918); *Robert Bacon, Life and Letters* (1923); *Sovereign States and Suits* (1925); *Sixth International Conference of American States.*

SCOTT, Leroy (1875–). An American author, born at Fairmount, Ind., and educated at Indiana University. On graduation he engaged in newspaper work (1897–1900) and later was assistant editor of the *Woman's Home Companion* (1900–01). During 1902–03 he was assistant headworker of the University Settlement in New York City and afterward devoted his whole time to writing. His books include: *The Walking Delegate* (1905); *To Him That Hath* (1907); *Counsel for the Defense* (1912); *No. 13 Washington Square* (1914; dramatized, 1915); *Partners of the Night* (1916); *Mary Regan* (1918); *A Daughter of Two Worlds* (1919); *Children of the Whirlwind* (1921); *Cordelia the Magnificent* (1923); *The Heart of Katie O'Doone* (1925); *The Trail of Glory* (1926).

SCOTT, Walter Dill (1869–). An American university president and psychologist, born at Cooksville, Ill., and educated at Northwestern University and at McCormick Theological Seminary. He began his career as associate professor of psychology and education at Northwestern University in 1901 and became president of that institution in 1920. He was director of the Bureau of Salesmanship Research of the Carnegie Institute of Technology during 1916 and 1917 and has been president of the Scott Company, consultants and engineers in industrial personnel, since 1919. In 1917 he was appointed director of the committee on classification of personnel in the United States Army, a work for which he received the Distinguished Service Medal. In 1918 he was made colonel. In 1927 he was chairman of the American Council on Education. He wrote: *Die Psychologie der Triebe* (1900); *The Theory of Advertising* (1903); *The Psychology of Public Speaking* (1907); *The Psychology of Advertising* (1908); *Influencing Men in Business* (1911); *Increasing Human Efficiency* (1911); *The Psychology of Advertising in Theory and Practice* (1921); *Science and Common Sense in Working with Men* (1921); *Personnel Management* (1923).

SCOTT, William Robert (1868–). A British economist, educated at St. Columba's College, Rathfarnham, and Trinity College, Dublin. He was assistant to the professor in moral philosophy (1896–1901) and lecturer in political economy (1899–1915) at the University of St. Andrew, becoming Adam Smith professor of political economy at the University of Glasgow in the latter year. He was a member of the council of the British Academy (1919–25) and of government committees on coöperative credit (1919), farm economics (1925), and other subjects. He wrote *Francis Hutcheson* (1900); *Scottish Economic Literature to 1800* (1911); *The Constitution and Finance of English, Scottish and Irish Joint Stock Companies to 1720* (3 vols., 1910–12); *Economic Problems of Peace after War* (2 series, 1917 and 1918); and *Introduction to Everyday Life on a Highland Farm, 1769–1780.*

SCOTTI, skŏt′tē, ANTONIO (1866–). An Italian dramatic basso (see VOL. XX). In the spring of 1921, after the close of the regular season at the Metropolitan Opera House, he organized the Scotti Grand Opera Company, recruited largely from the Metropolitan artists, which made a very successful tour of the Eastern cities. This tour later became an annual event. On the occasion of the 25th anniversary of his connection with the Metropolitan Opera House, the management honored him with a gala performance of *Tosca* (Jan. 1, 1924).

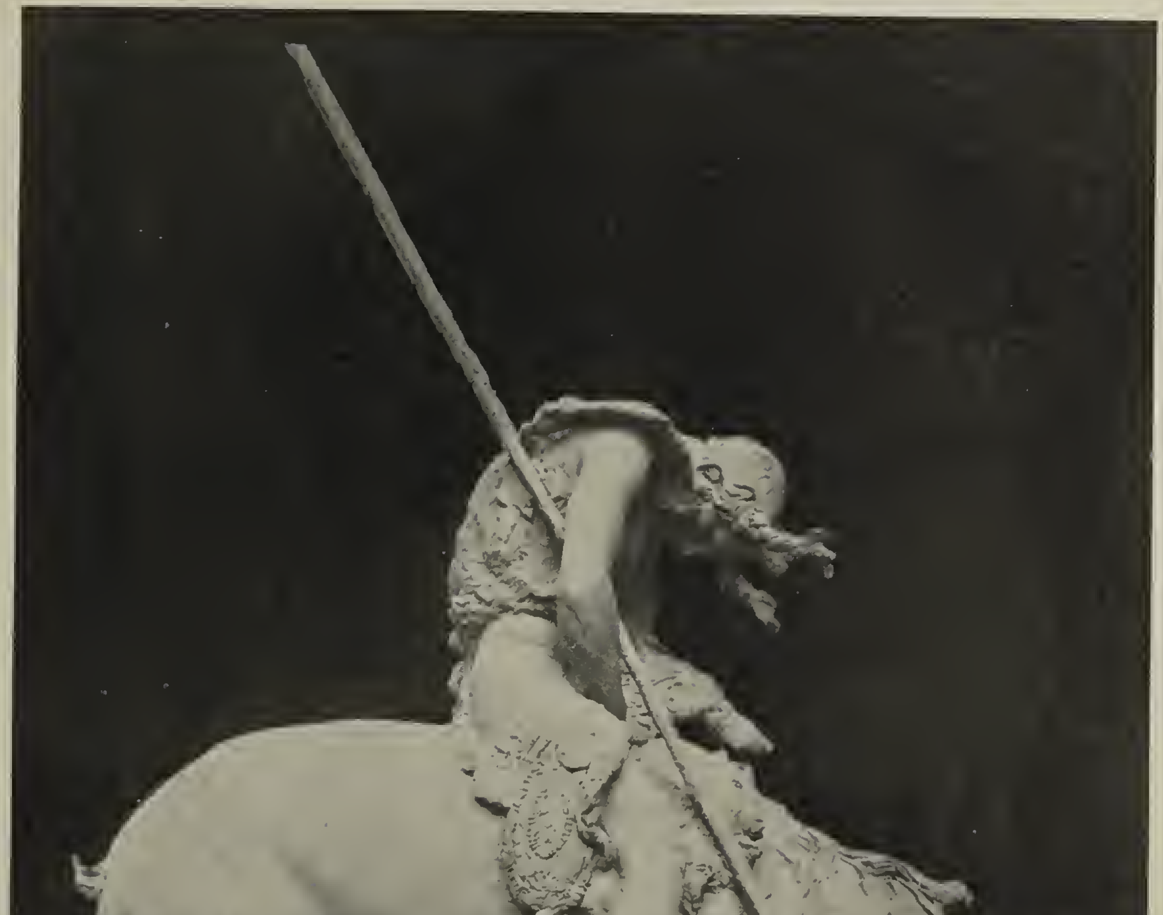
SCRANTON. A mining and manufacturing city of Pennsylvania. The population rose from 129,867 in 1910 to 137,783 in 1920 and to 144,700 in 1928, by estimate of the U. S. Bureau of the Census. Building construction has been active since 1920. In addition to an $800,000 Chamber of Commerce Building and a new Masonic Temple, numerous industrial plants and commercial buildings have been erected. In 1923 Weston Field, an eight-acre community playground, equipped with baseball fields, tennis courts, and a recreation building, was constructed. In 1929 the Everhart Museum of Natural History, containing the Hollister Collection of Indian Relics, was remodeled and enlarged. The public-school system of Scranton in 1928 consisted of 47 elementary schools, 1 junior high school, and 2 high schools, with a total enrollment of 32,174 pupils. The parochial schools numbered 12, with an enrollment of 6342 pupils. In addition, two private institutions were conducted under the auspices of the Roman Catholic Church: St. Thomas's College for boys and Marywood College for girls. Scranton has the largest lace mill in the United States and ranks second as a silk-manufacturing centre. Other manufactures include phonograph records, white lead, mine machinery, centrifugal pumps, bolts and nuts, fabricated steel, automobile trucks, graphic arts machinery, drawing instruments, beds, mattresses, curtains, electric lamps, stoves, knit goods, concrete, and building tile. In 1927, 11,115 persons were employed in the city's factories and received $12,310,614 in wages; the value of products manufactured was $55,704,206. Scranton has 5 national banks, 13 State banks, and 3 trust companies, whose deposits in 1928 amounted to $116,618,266. Bank clearings in the same year amounted to $329,092,840. The assessed valuation of property in 1928 was $126,754,730; the net debt was $7,142,912.

SCULPTURE. The immediate effect of the World War was a practical cessation of production; but the demand for memorials soon caused a revival after the close of hostilities. There was, however, no change in the tendencies of sculpture, which remained much the same.

France. On Nov. 17, 1917, Rodin, born 1840, the greatest of French sculptors, died. His art was the culmination of the naturalism of the nineteenth century, and it was chiefly he who developed the highly pictorial character of most contemporary art. His breaking up of the surfaces into bosses and hollows to attain the subtle modeling and effects of light and shadow, in which he so greatly excelled, and his rendering of instantaneous movement realized in sculpture a measure of representation thitherto confined to painting. The impressionism of his later period, neglecting more and more the nonsignificant parts and emphasizing only the characteristic and essential, paved the way for the sketchy character of most modern work and finally for the vagaries of post-impressionism. The dominating feature in the later development of French and, indeed, of European sculpture was undoubtedly the influence of Rodin, which may be compared with that of Michelangelo on Italian sculpture of the sixteenth century, when, as in the later time, it was easier for less gifted artists to copy the master's weaknesses rather than his strength. The peculiarities which in Rodin's work were balanced by marvelous modeling and profound depth of sentiment became mannerisms in the works of his less gifted followers. The influence was in part disastrous, aided as it was by other disintegrating tendencies in French art. Even the older men, Rodin's immediate contemporaries, lost their bearings. The public monuments of France just before the War were for the most part tawdry, in poor taste, and unmonumental. This was apparent in the later work of such able artists as Mercié, Fremiet, Barrias, and others, and to a less extent in those of Saint Marceaux and Falguière. The next generation followed generally in these footsteps. The later work of men like Denys Puech, François Larche, Verlet, Villeneuve, Charpentier, and others possessed the same false note.

Salvation came from a group of younger men, also under the influence of Rodin, who, following Bartholomé's advice, carved great simple figures in native limestone, as the mediæval masters had done. The three foremost of these were: Aristide Maillol (1861–), an artist of elemental power and primitive methods, whose aim is sculptural bulk; Émile Bourdelle (1861–) Rodin's direct successor, whose mighty portrait heads and dramatic groups and reliefs well emulate the work of his master and Henri Bouchard (1875–), a strong, versatile, well-balanced artist. Among sculptors practicing the more finished modeling along traditional lines and whose works are of real artistic worth were the clever François Sicard, Quilivic for Breton subjects, Constant Roux, Cordonnier, Jules Desbois, Gustave Michel, Jean Boucher, and later, Marcel Jacques, Maurice Faure, and Jeanne Hanin. The War brought the usual crop of designs for military memorials, mostly bad.

Mention may be made here of post-impressionism, the reaction against the unbridled naturalism and cleverness of much official French sculpture. For although its chief exponents were not native Frenchmen, yet they studied in Paris, and it was there that they found their principal support. Post-impressionism endeavors to represent the human figure in a purely abstract way, with little or no reference to natural appearance. The method consists in the elimination of almost all modeling except of the parts chosen



Courtesy of Brown–Robertson Co., Inc.

JAMES EARL FRAZER

"THE END OF THE TRAIL"

for characterization, which are exaggerated out of all semblance to nature. This is exemplified in the strange portraits, usually expressing a highly rarefied type of humanity, by Constantin Brancusi, a Rumanian. Other well-known representatives were Raymond Duchamps-Villon (1876–1918); Gautier-Brzeska (1891–1915), a young man killed in the trenches during the War, who belonged to the vorticists; and Aleksandr Archipenko, most important of the group, described below among the Russians. The little figures of Henri Matisse are as curious as his paintings. Umberto Boccioni, an Italian Futurist, tacked all kinds of actual objects such as glass, wood, cardboard, cloth, and electric lights, to the sculpture represented; following in this the custom of Futurist painting. Among younger sculptors of Cubistic tendencies are Jacques Lipchitz (1891–), who builds up his figures in layers, and Henri Laurens (1885–), at times archaistic but who endows even Cubistic figures with linear grace and charm. See PAINTING.

Germany. From the early years of the twentieth century, a veritable renaissance of sculpture took place in Germany and Austria. Nowhere else was the change as marked. The outworn realism and romanticism of the late nineteenth and early twentieth centuries were replaced by a new and more vital naturalism, of a strikingly simplified and essentially decorative character. The new sculpture was conceived as a part of the building or monument to which it belonged, subordinated to the *Massgefühl*, i.e., the feeling for the mass of the whole. It combines technical ability of a high order in modeling, carving, and casting with a mastery of the most varied materials of sculpture. It seeks to express character and its chief attribute is power, even to the point of brutality. This new German style found its most striking expression in a series of national monuments, such as the colossal statue of Bismarck at Hamburg, by Hugo Lederer, conceived in the style of the mediæval effigies of Roland, and the Völkerschaft Monument by Bruno Schmitz, commemorating the Battle of Leipzig, the largest military monument in the world. The sculptures of the latter, by Franz Metzner, are in a class by themselves, colossal, harmonious, and mysterious. The clever adaptation of sculpture to architectural effects is seen also in many recent buildings. In the Haus Rheingold, a Berlin restaurant, Metzner employed the human body as a purely decorative form with astounding effect. Other examples of subordination and simplification are the reliefs of the Bürgertheater in Vienna, by Luksch-Makowska, and especially the sculptures of the proscenium of the Marble House Theatre in Berlin, by G. S. Sieburg, in which simplification is pushed to the utmost limit.

The most influential and widely imitated figure in later German sculpture was Franz Metzner (1872–1918), whose art, often grotesque and enigmatic, shows a profound feeling for mass and is masterful in technique. The best qualities of this modern German sculpture—power, plasticity, and ability—are exemplified in such works of Hugo Lederer (1871–) as the Krupp memorial at Essen. Of powerful monumental quality is also the work of Benno Elkan (1877–), in his fine funerary sculpture, such as "The Stone of Lamentation" at Wickrath in the Rhine Province, his lifelike busts, and his medals. Anton Hanak (1875–) of Vienna is primarily a sculptor in marble, whose inspiration is Michelangelo and the Greeks. The stone and marble nudes of Hermann Haller, Hubert Kowarik, Hans Damman, and Karl Stemolak are Hellenic in simplification and of fine sculptural quality. A master marble cutter was Theodor Georgii (1883–), whose work is carved directly out of the stone. He was also a leader in animal sculpture, in which connection August Gaul (1868–), especially, and Fritz Behn (1878–) should be mentioned. Other important carvers of stone and marble among the younger men were Arthur Lange, Ernst Seger, Joseph Limburg, and Adolf Brütt.

The decorative talent of the contemporary German school was especially evinced in the treatment of most diverse materials, as in Joseph Wackerle's archaistic figures of travertine. Audacious and powerful experiments in tinted sculpture were made by Benno Elkan and others. Charming, if startlingly modern, effects were attained in porcelain by Theodor Eichler and Bernhard Hötger of Darmstadt. Woodcarving was practiced more extensively and enthusiastically in Germany than elsewhere, by Hermann Haller in Berlin, Richard Langer in Munich, and especially Franz Barwig in Vienna. Foremost, perhaps, of the modern Expressionist group is George Kolbe (1877–), whose art, however, is based upon nature. Early influenced by Rodin, but more by study with Tuaillon and of the antique in Rome, he achieves permanent, typical, as distinguished from momentary, individual effects.

The most recent development of German Expressionist sculpture was strongly influenced by Maillol. The chief representatives include Hermann Haller (1880–) and Ernestodi Fiori (1884–), both clever at posing, more pleasing than powerful; Wilhelm Lehmbruck (1881–1919), whose elongated, originally conceived nudes are the antipodes of Maillol's compressed figures; and Ernst Barlach (1870–), sculptor in wood, who found inspiration for his powerful primeval figures in the peasant art and types of southern Russia. The most radical of the group, at times Cubistic, is Rudolf Belling (1886–), whose powerful, tectonic figures and groups show mastery of movement and contrast of form. His strong, often distorted, portrait heads are highly characteristic.

Other European Countries. Among prominent British sculptors was Sir George Frampton (1860–1923), known especially for his polychrome sculptures. His monument to Edith Cavell, erected in St. Martin's Church, Trafalgar Square, London, in 1920, shows his conversion to Greek archaism, a very startling change. This is a sign of the diminishing vogue of the union of the arts and crafts movement with sculpture, so successfully practiced by Alfred Gilbert (1854–) and his followers. The outstanding feature of British sculpture of the day was the prevalence of the French influence, modified by the more ascetic requirements of British taste. Among the older men, Hamo Thornycroft (1850–1925) and Alfred Drury (1859–), the foremost representative of the French influence in England, continued an important activity. Of great imaginative power and originality is the work of Bertram MacKennal (1865–), an Australian trained in Paris, although his later memorials showed increased conformity to prevailing British tastes. His equestrian statue of

Edward VII in Trafalgar Square was unveiled in 1921. Gilbert Bayes (1871–) was known chiefly for the use of the horse as a motif and for his interesting accessories. Among other men whose work is noteworthy are S. Nicholas Babb, Albert Toft, Ernest Gillick, Benjamin Clemens, Richard Garbe, whose art is characterized by a certain brutal strength, Havard Thomas, and Derwent Wood. There are also the very modernistic productions of Jacob Epstein (1880–), who was born in New York and received his principal art education in Paris. His "Christ" in particular provoked much discussion.

In Belgium, the glorification of labor, so ably begun by Meunier, was notably continued by J. van Biesbroeck, of Ghent. The more conservative tendencies were represented in the work of Victor Rousseau (1865–), whose bronze group entitled "Gratitude," erected in Trafalgar Square in London, was presented by Belgium to Great Britain in 1920. The most startingly original of Belgian sculptors of the period was Georges Minne (1867–), likewise of Ghent, whose spare and highly stylized figures are of great power.

Scandinavian sculpture was very modern and showed the French influence, modified by native requirements. Among Swedish sculptors, the lifelike and rather unfinished works of Carl L. Eldh (1873–) are impressionistic in character. Carl Milles (1875–) shows great versatility of subject, ranging from prehistoric monsters to dancing girls; he is always monumental in his presentation. Noteworthy work also has come from the hand of the lively, imaginative Icelander, Einar Jonsson.

Russian sculpture was comopolitan in character, as the artists were trained and lived largely abroad, especially after the social revolution. The art of Prince Paul Troubetzkoy (1866–), born in Italy, self-taught, and much influenced by Tolstoy, is clever and impressionistic in character. Naoum Aronson, who resided in Paris, was a striking individualist, excelling especially in his interpretation of children. Modernism had numerous representatives, chief among them Archipenko (1887–). A Ukrainian by birth and early training, he was active chiefly in Paris, Berlin, and latterly in New York. By simplifying the parts of the human body into geometrical shapes and emphasizing its curves in taking various postures, he achieves sculptured bulk. His elongated female nudes show remarkable mastery of elegant and sinuous line. Quite unique is his sculpto-painting, uniting the two arts.

The Italians are the best stonecutters in the world, and their sculpture is characterized by a manual dexterity and florid ornament which proved itself a bane. Biondi (1885–1917) was known for his large groups carved more or less disconnectedly, and often revoltingly naturalistic, with the exception of his latest production, "Les Récluses Misérables," which, strange to say, was highly spiritualized and well composed. Vincenzo Gemito (1852–) modeled charming bronze genre subjects, usually representing Neapolitan urchins. Leonardo Bistolfi (1859–) of Turin created some work of true monumental character, like his fine "Offering" on the Victor Emmanuel monument at Rome. In 1915 a superb Garibaldi monument by Eugenio Baroni was unveiled near Genoa.

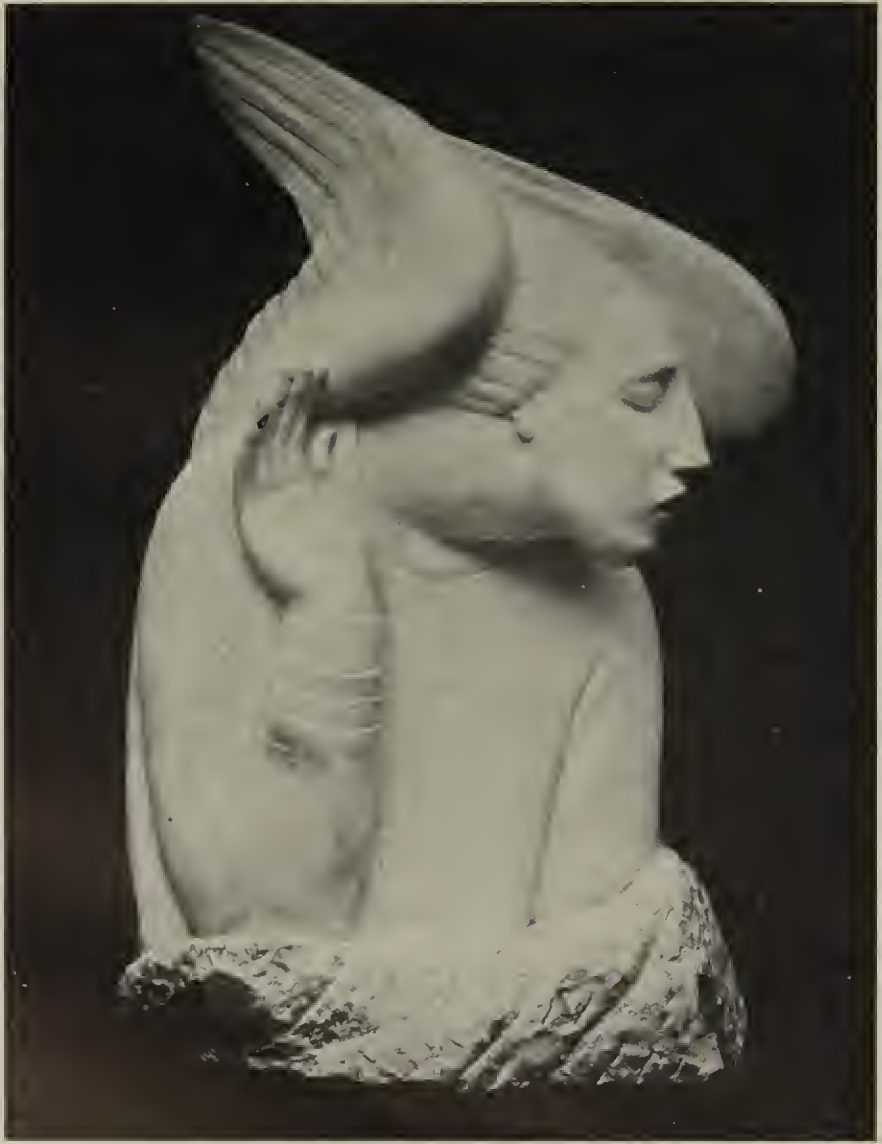
Spanish sculpture also suffered from parade of technique and too many accessories. The foremost sculptor at the close of the period was José Clara (1878–), whose art is always personal and interesting, sometimes even titanic. More or less directly connected with the development in Germany and Austria is the art of the non-German peoples who once formed a part of Austria-Hungary. Their art, like the Germans', emphasizes the mass and strives after power and characterization. Among the prominent figures were Nicholas Ligeti and Geza Maroti of Budapest and Jan Stursa of Prague, known especially for his subtly modeled figures of girls. Foremost of all was Ivan Meštrović (1883–), born in Dalmatia, and the national sculptor of Jugoslavia. He studied at Vienna under Franz Metzner, whose art his own most resembles, and was also for a time in Paris, where he was influenced by Rodin, who is said to have pronounced him "the most remarkable of living sculptors." His powerful and dramatic art shows a certain influence of the archaic Greek and, in religious subjects, of Byzantine traditions.

The United States. In no other country was there such an increase in the output of sculpture during the twentieth century as in the United States. So great was this that the volume of sculpture produced after 1900 more than equaled all that had been done before that time. One of the reasons for the increasing output was the wide use of architectural sculpture, especially on public buildings, and the willingness of important sculptors to devote themselves to such work; another was the great demand for public monuments throughout the country; a third was the demand for garden sculpture, especially for fountains in public parks and private grounds. Owing to the distance of America from the scene of conflict and to its late entrance into the War, there was no such cessation of artistic production during the War as took place in Europe.

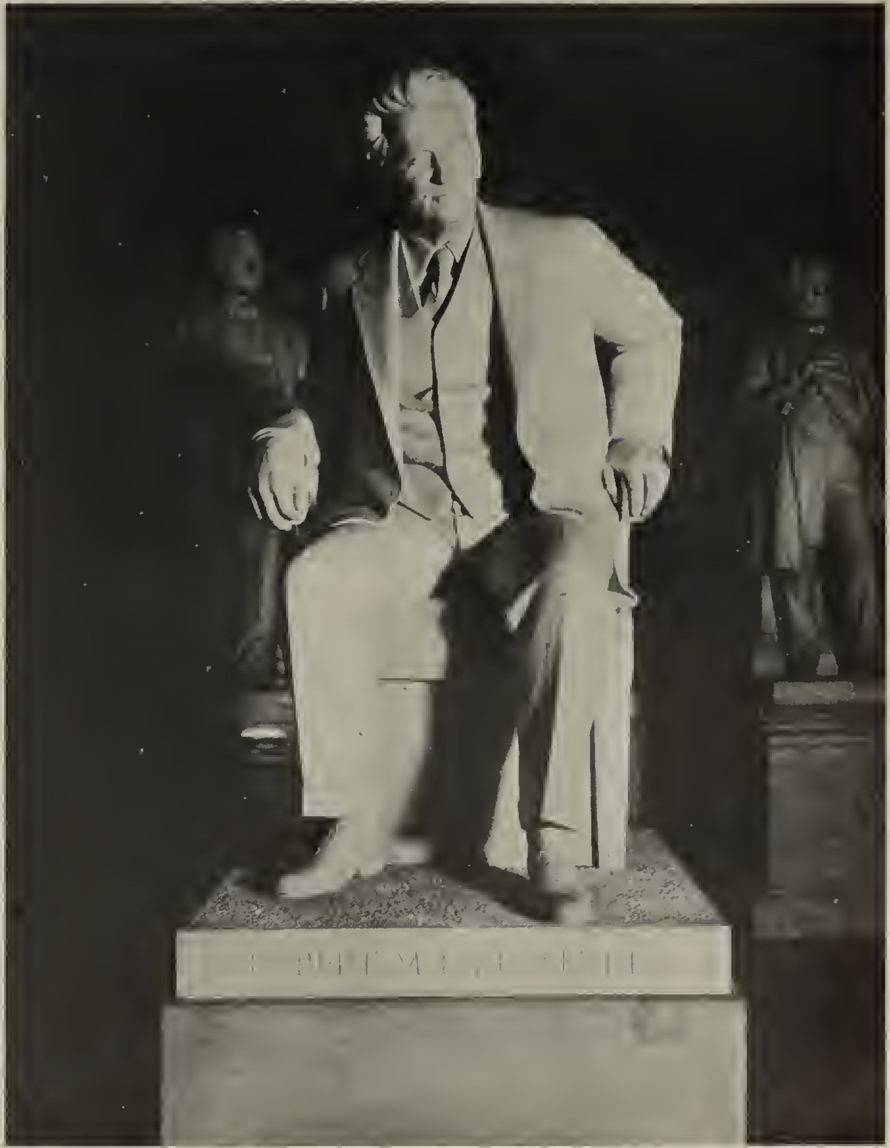
As compared with the development in Europe, American sculpture took a middle course, avoiding conservative and radical extremes, sometimes indeed a little restrained, but escaping the extravagances of post-impressionism. The chief centre of production continued to be New York and its vicinity, where nine-tenths of American artists live and labor They come, however, from the length and breadth of the land, the greater number from west of the Alleghanies, and some from the Far West.

During the period 1914–29, the United States lost several important sculptors. Foremost among them was Karl Bitter (1867–1915), killed in his prime by an accident. His latest works, such as the granite pediment of the Wisconsin State Capitol and the Lowry memorial of Indianapolis, show constant development of a decorative sense and mastery of material. A fitting termination for the activity of Henry M. Shrady (1871–1922) was the national U. S. Grant memorial at Washington, D. C., especially the colossal bronze equestrian statue of Grant which ranks among the best of the day. Bela L. Pratt (1864–1917), active as a teacher in Boston, is known for his youthful, girlish nudes; Solon A. Borglum (1868–1922), for cowboy and Indian subjects and many monuments. Among others were John J. Boyle (1852–1917), sculptor of red men; Edith Woodman Burroughs (1871–1918), famed for girlish figures and characteristic portrait busts; and Charles Cary

SCULPTURE



"ARCHANGEL GABRIEL"
BY IVAN MESTROVIC
Owned by the Brooklyn Museum



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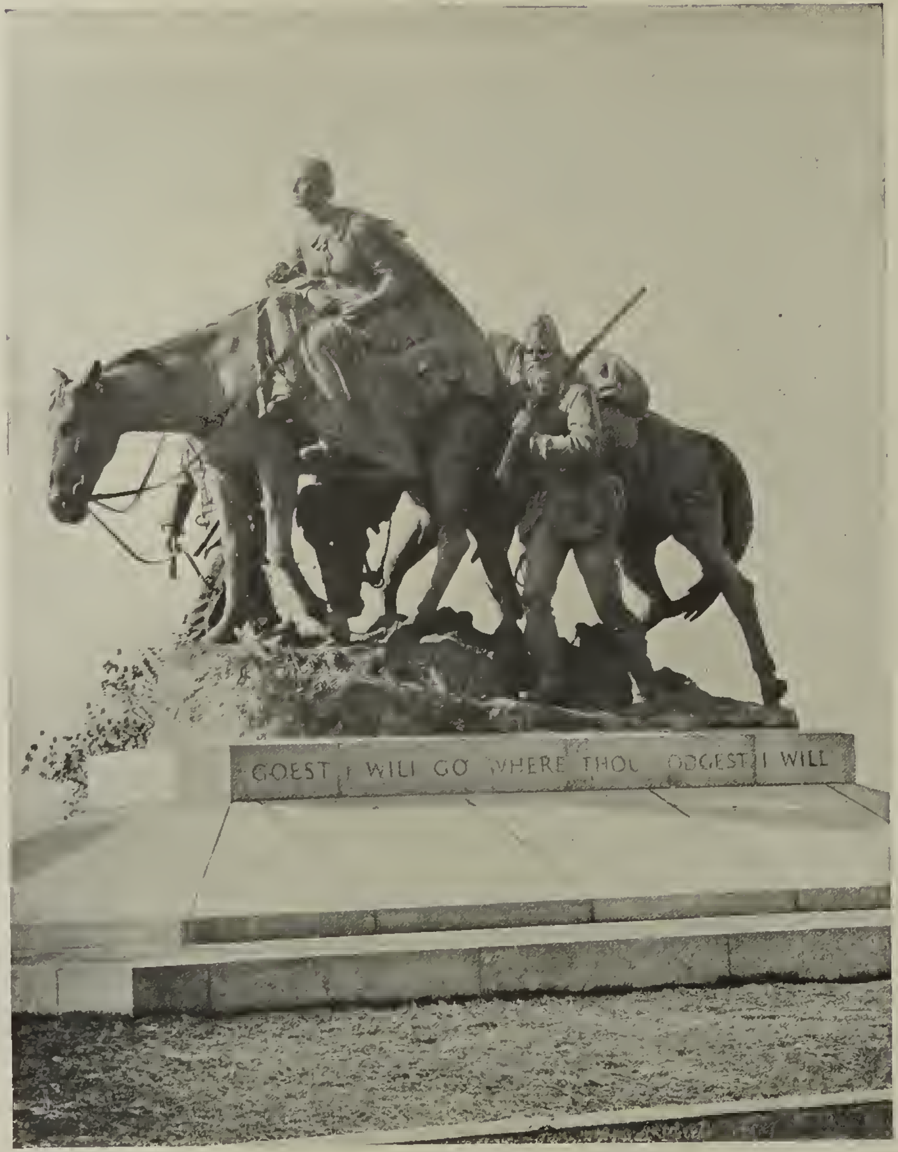
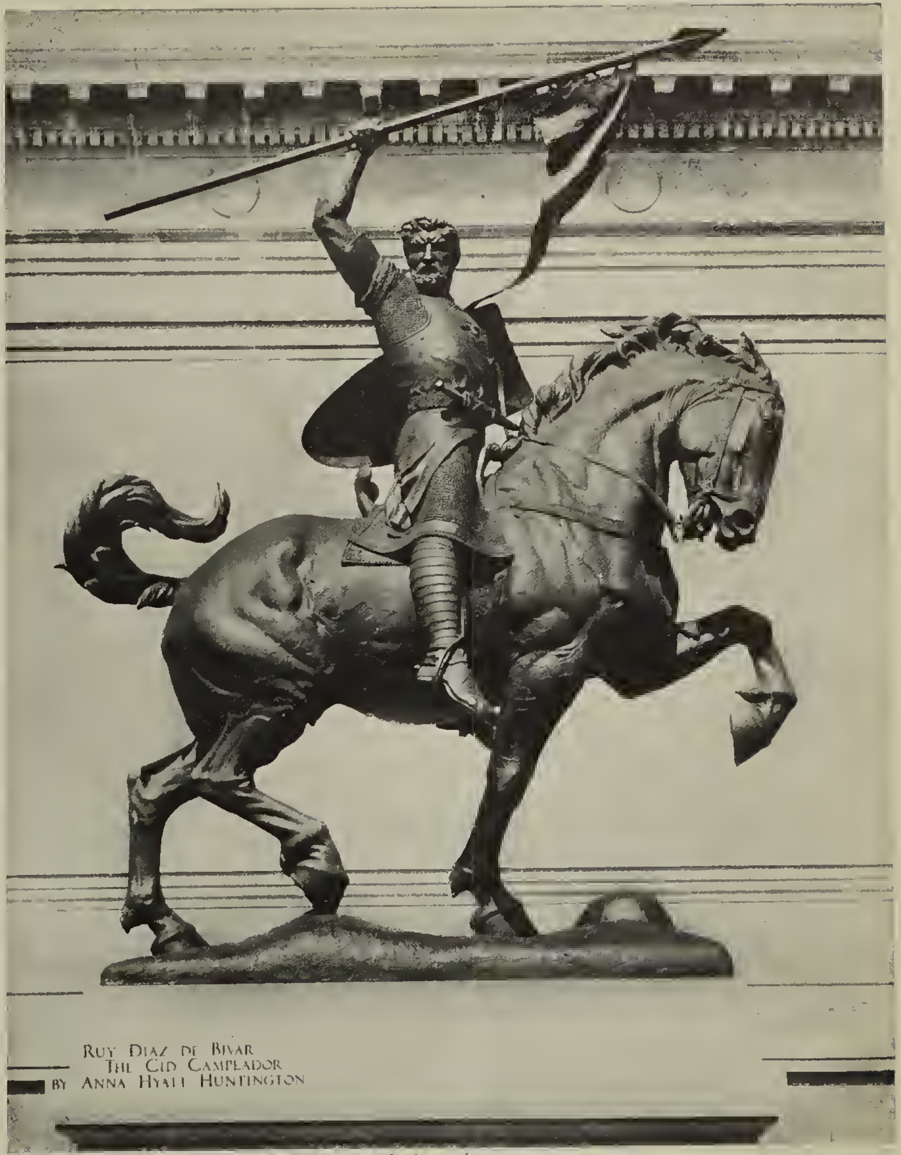
"ROBERT M. LA FOLLETTE"
BY JO DAVIDSON
In the United States Capitol


GOEST I WILL GO WHERE THOU GOEST I WILL

"PIONEER MOTHER"
BY A. PHINISTER PROCTOR
Pen Valley Park, Kansas City, Mo.


RUY DIAZ DE BIVAR
THE CID CAMPEADOR
BY ANNA HYATT HUNTINGTON

Courtesy of the Hispanic Society of America

"THE CID CAMPEADOR"
BY ANNA HYATT HUNTINGTON
AT the Hispanic Society of America, New York City

Rumsey (1879–1922), known especially for his horses.

Among the older men, the extensive production of Daniel Chester French (1850–), dean of American sculptors, combined with his customary good taste and pure form, reveal a distinct increase in power, as may be seen in the lovely nude "Memory" in the Metropolitan Museum of New York City, the colossal seated "Lincoln" for the national Lincoln memorial (1919), and the Dupont Fountain (1922), both in Washington, D. C. Besides his monumental sculpture, Herbert Adams (1858–) continued the production of sensitively tinted heads of young women. Charles H. Niehaus (1853–), "indefatigable builder of monuments," had a number of later works to his credit, like the Francis Scott Key monument at Baltimore (1922), and so had J. Massey Rind (1860–), besides a vast quantity of decorative sculpture.

The later works of Frederick MacMonnies (1863–) continued his novel and exotic ideas, as witness the Denver "Pioneer" fountain the Princeton battle monument and the much criticized "Civic Virtue" a fountain in New York. George Gray Barnard's (1863–) profound, symbolic work is worthily expressed in some of his recent statues, such as "Women" (Metropolitan Museum, New York City). His powerful realistic and magnificently characterized bronze Lincoln (Cincinnati, Ohio, and Manchester, England) caused more discussion than perhaps any other American statue. Paul Bartlett's (1865–1928) thoughtful and skillful technic is revealed in the grandiose pediment of the House of Representatives in Washington and his delicate architectural figures on the New York Public Library. Gutzon Borglum (1876–) was in 1924 engaged on a group of 42 heroic figures in bronze for Newark, N. J., and on a colossal relief, 700 by 100 feet, involving several hundred figures, to be carved in the face of Stone Mountain, near Atlanta, Ga. The latter is a memorial to the Confederate Army and the most colossal work of sculpture ever attempted. Owing to disagreement between Mr. Borglum and the donors, the entire commission was withdrawn and given to Augustus Lukeman.

Among other sculptors producing important public monuments were Hermon A. MacNeil (1866–); Albert Jaegers (1868–), who did the fine "Pioneer" monument at Germantown, Pa.; Edmond T. Quinn (1868–), whose work is tasteful and conscientious; Alexander S. Calder (1870–); Adolph A. Weinman (1870–); and Augustus Lukeman (1872–). The Piccirilli family is celebrated for skillful marble cutting. Among their important recent works are one of the pediments of the Wisconsin State capitol at Madison by Attilio Piccirilli (1866–) and a statute of Pierre Gautier de la Varenne, forming part of the decoration of the Parliament House at Winnipeg, Canada, which was entirely in charge of his brother, Furio (1868–). Charles Grafly 1862–), the well-known teacher in Philadelphia, in later years devoted himself to portraiture, in which he was unsurpassed in American sculpture. Lorado Taft (1860–), dean of Chicago sculptors, in later years devoted himself to the creation of fountains such as the "Fountain of Time" in Chicago (1922). Cyprus Dallin of Boston (1861–) continued his distinctive work, the representation of the American Indian.

Among animal sculptors, Phinister Proctor (1862–) recently subordinated animals to the human figure in a series of monuments. Edward C. Potter's (1857–1923) works included the much discussed lions at the Public Library in New York. Excellent indeed are the animal bronzes of F. C. R. Roth; Eli Harvey; Albert Laesle (1877–), who depicts in unique manner the humor of animal life; and Anna V. Hyatt (Mrs. Archer Huntington) (1876–), whose spirited equestrian "Joan of Arc" on Riverside Drive, New York City, is a stirring conception. The War offered fine opportunity for the medalists, chief of whom in the United States were John Flanagan (1865–), designer of the well-known Médaille de Verdun (1921), and Victor D. Brenner (1871–1924).

The sculpture of the men born after 1870 was full of promise for the future. Andrew O'Connor's (1874–) figures, such as the "Soldier" at Worcester, Mass., and the "Lincoln" at Springfield, Ill., are virile in conception and well modeled. The art of James Earle Fraser (1876–) is marked by skill and good taste, as in "The End of the Trail," shown in the plate, and his relief is wondrously delicate. Lee Lawrie (1877–), of German origin, an architectural sculptor, is well represented by the figures of the reredos of St. Thomas's Church in New York City. Mahonri Young (1877–), well known as a teacher, has specialized in characteristic statuettes of laborers. Rudolf Evans (1878–) became famous as a carver of beautiful nudes through "The Golden Hour," in the Luxembourg, Paris, and Metropolitan Museum, New York City. Robert Aitkin (1878–), a strong yet versatile artist, has executed monuments, garden figures, busts, coins, and medals which are widely known. Grace and charm are the marked characteristics of the carefully modeled work of Edward McCartan (1878–). The vivid portraits by Jo Davidson (1883–) of figures prominent during the War are powerful and artistic, as well as historic documents.

The American Academy at Rome had a marked influence on later American sculpture through the young men who enjoyed its four years' scholarships. The dominant note of their art is Greek archaism in all decorative and conventional features, but less in figure modeling. The execution is on the whole more finished than that of the group which studied chiefly in Paris. Sherry Fry (1874–) combined the archaic note with careful and interesting modeling. John Gregory (1879–) is known for charming garden figures. The art of Chester Beach (1881–) reflects rather the Rodinesque than the archaic motive. It is clear, individualized, and of rugged quality. Likewise, the art of Albin Polasek, an excellent portraitist, and since 1924 instructor in the Art Institute in Chicago, also is rather naturalistic than archaic. The chief representative of the latter-day classicism was Paul Manship (1885–), a master craftsman of archaic decoration, combined with skillful modeling of the nude. In Leo Friedlander's (1889–) work, the archaic is united with a certain brutal power reminiscent of the modern German school.

A striking feature of the development of American sculpture during the period was the large number of women sculptors, greater than in any other country and larger than that of women painting in the United States. Although practicing all branches of sculpture, they excel especially in representing women and children, garden sculpture, and small bronzes. Janet Scudder (1873–) is known for her fountain figures; Bessie Potter Vonnoh (1872–), for simple domestic scenes invested with great charm; Abastenia Eberle (1878–), for plastic sketches of the humble life of a great city. Evelyn Beatrice Longman (1874–) has created a series of busts, bronze doors, and memorials; Laura Gardin Fraser (1889–), nudes and minature reliefs; Anna V. Hyatt, animals; Malvina Hoffman (1887–), spirited figures and groups; Frances Grimes, graceful marble reliefs; Harriet W. Frishmuth (1880–), dramatic nudes; Gertrude Vanderbilt Whitney, a number of important public commissions.

Modernist tendencies found little echo in American sculpture. Their chief representative was Gaston Lachaise (1887–), a Frenchman, trained in the Beaux Arts, but who came early to the United States and developed his art in New York. He models and carves powerful female types of ample proportions, peacocks, sealions, dolphins, and the like, with fine simplification of line, correct relation of masses, and linear rhythm.

Bibliography. The best comprehensive view of the development of the period preceding 1921 is Lorado Taft's *Modern Tendencies in Sculpture* (Chicago, 1921). Other accounts are by C. R. Post, *A History of European and American Sculpture*, vol. ii (Cambridge, 1921); and Kineton Parkes, *Sculpture of To-Day* (London, 1921, 2d ed., 1928). For the United States, consult the supplementary chapter to Lorado Taft's *History of American Sculpture* (New York, 1923). See also Adeline Adams, *The Spirit of American Sculpture* (New York, 1923) and the current art magazines. The latest development will be found in Ozenfait, *L'art* (Paris, 1928); and Carl Einstein, *Die Kunst des 20. Jahrhunderts* (2d. ed., Berlin, 1928).

SCURVY. The ideal antiscorbutic diet seems still undetermined. Originally, the disease was attributed in part to the substitution of salted for fresh meat. Experiments on animals have shown that, although fresh meat contains antiscorbutic vitamin C, it is insufficient to prevent the development of scurvy if the diet is otherwise free from this vitamin C. There is evidence that to contain effective vitamin C, the meat must be raw and quite freshly killed. Arctic explorers escape scurvy at times by subsisting on freshly killed game; fresh fish is devoid of this vitamin, and this is also true of the fat of meat. Indians and Esquimaux appear to prefer fresh viscera to fresh muscle and always bargain for the former when dividing game with white men. It goes without saying that all preserved and tinned meat is unsuitable in an antiscorbutic dietary, and raw viscera are out of the question for white men. There is a considerable propaganda for the purpose of prevailing on the white man to settle permanently within the Arctic Circle, called forth by the century-old misrepresentation concerning this climate. Steffansson has shown that the weather there can be matched in every way with that of certain portions of the northern United States. The degree of cold, amount of snow, and other seasonal drawbacks are not materially worse in the Arctic and are often better. A greater drawback might be scurvy due to the absence of fresh game and other foods containing the vitamin C. To go through the winter free from scurvy, there would have to be a plentiful supply of potatoes, apples, canned tomatoes, and fresh milk; and dried and evaporated vegetables would not serve.

It has been commonly believed that "land scurvy" no longer occurs in the adults of civilized races unless under extraordinary conditions and even the hardships of the World War did not bring this affection into prominence among the deficiency diseases. Infantile scurvy, or Barlow's disease, is naturally quite a different affection and does not here concern us. Within the last few years, however, adult scurvy has occasionally been encountered in the Massachusetts General and Boston City hospitals and it is thought that such cases may often escape recognition. It was a mystery how such cases could develop on a background of national prosperity and an inquiry showed that the few patients with the disease were all single men with very low earning capacity who lived lives of hardship and privation without any kind of feminine supervision. Not one of the victims was of the "bum" or alcoholic type; but the crux of the matter was merely the lack of adjustment between low wages, the high cost of living, and ignorance of true economic values. See an article by Dr. Shattuck, in the *Journal of the American Medical Association* for June 9, 1928.

See FOOD AND NUTRITION.

SEALS. See FISHERIES.

SEAMEN'S ACT OF 1915. See SHIPPING.

SEAPLANE. See AËRONAUTICS; NAVIES, *United States*.

SEARES, FREDERICK HANLEY (1873–). An American astronomer, born at Cassopolis, Mich. He studied at the University of California and in Berlin and Paris. During 1901–09 he was professor of astronomy and director of the Laws Observatory in Missouri. In 1909 he was called to the charge of the computing division and of the publications of the Mt. Wilson Observatory of the Carnegie Institution and since 1925 he has been assistant director of that observatory. Among the special investigations by which he advanced the knowledge of astronomy are studies on the theory of orbits and perturbations, distribution of stars, and the general magnetic field. He is a member of the National Academy of Sciences.

SEATTLE. A seaport and manufacturing city of Washington. The population increased from 237,976, in 1910 to 315,685 in 1920 and to 383,200 in 1928, by estimate of the U. S. Bureau of the Census. The population of the metropolitan area in 1928, according to local estimate, was more than 500,000. Among recent outstanding buildings erected were the $1,000,000 Civic Auditorium, Arena, and Recreation Field and the Northern Life Insurance Tower, 27 stories in height, built at a cost of $1,775,000. The auditorium had a seating capacity of 7500 persons; the arena, a maxium capacity of 900 persons; and the recreation field, with facilities for all outdoor sporting events, contained permanent stands for 9000 persons. Other civic improvements included the leveling of some 28 blocks on Denny Hill, adjoining the uptown retail district, at a cost of $1,050,000; the installation of a new lighting system; the widening and repaving of Third Avenue; and the extension of Second Avenue through four city blocks occupied by old buildings to a traffic outlet beyond the two railroad stations at a cost of $1,250,000. In 1919 the city purchased the street railway system on a $15,000,000 public utility bond issue and by 1929 was operating 238 miles of municipally-owned lines. In 1924 it supplemented its municipal power plants by the development of the Skagit River power project. The principal feature was the construction of Diablo Dam at a cost of $2,263,000. In 1926 Lake Youngs was developed as a storage reservoir with a 4,000,000,000-gallon capacity, at a cost of $4,000,000. In 1929 a bond issue of $13,500,000 was authorized for the completion of the project, including the construction of a new power house at a cost of $2,500,000.

The Seattle Harbor has 193 miles of waterfront, 53 miles of which are on tidewater and 140 miles on fresh water. In 1928 there were 60 commercial piers with a berthing space of 72,484 feet. The combined areas of all the wharves was 142 acres with storage capacity for 5,226,700 bushels of grain, 40,000 tons of coal, and 1,015,781 barrels of fuel oil. The total water-borne commerce of the port in 1928 amounted to 35,909,706 tons valued at $1,104,300,890. It is served by 119 steamship routes. In 1927, 20,745 persons were employed by 1157 industrial establishments and received $30,032,120 in wages; the value of products manufactured was $170,325,692. The principal industries concerned airplanes, automobile bodies, chemicals, boat and ship building, building equipment, canned food products, fishing, flour and cereals, harness and saddlery, iron and steel articles, marine machinery, mining equipment, paints and varnishes, refrigerators, rope and cordage, shoes, gloves, and hats, stoves and furnaces. The clearings of Seattle's 29 banks in 1928 amounted to $2,542,920,897. The value of building permits increased from $27,270,500 in 1924 to $34,813,000 in 1928. The assessed valuation of property in 1928, according to local estimate, was $594,710,308; the net debt in 1927 was $74,714,000.

SECRETIONS, INTERNAL. Endocrinology has made prodigious advances in the period following 1914, as shown by the formation of a national society for the study of internal secretions, the appearance of a quarterly magazine devoted to the subject, and the publication of an encyclopædic work on the endocrines edited by Dr. Barker of Johns Hopkins. Naturally, the subject of organotherapy belongs under this heading, including insulin and the sensational work in so-called rejuvenation done by Steinach and his followers, Voronoff, and others. Dr. Barker, in summing up endocrinology in the *Journal of the American Medical Association* (July 8, 1922), prefers the term incretion, signifying internal secretion, to endocrine substance, hormone, etc. Of great immediate interest is the possible difference between active principles found in glands and whole gland substance. One of the great advances is the isolation of thyroxin, as the representative active principle of the thyroid gland, by Kendall at the Mayo Clinic. While certain incretions are active in determining the stature, length of long bones, general outlines of the face, and other static peculiarities, others are believed to determine the rate of metabolism and incidentally the temperament of the individual.

Gonads or Sexual Glands. The fact that castration of immature animals prevents the full development of secondary sex character led to the general belief that the sexual glands are the sole seat of sex. The various operations for procuring so-called rejuvenation are based on this conviction. Many isolated facts antagonize this belief, and it became increasingly evident that sex differences extend throughout the entire organism. In other words, a woman is not a woman because of her ovaries but has ovaries because she is a woman. It is also possible to show that sex is a matter of degree of development rather than a basic antagonism. The substratum of the individual is believed to be female, with an evolutionary tendency to maleness.

Grafting testicular substance into various types of animal will produce striking phenomena, as shown especially by the experiments of Steinach on rats. These researches were carried out for years on male and female, old and young, castrated and entire. It was noted that, in addition to change in sex characters, there was also an alteration in age characters. Thus, it was apparently possible not only to alter the sex of an animal but to alter its age; in other words, to rejuvenate it. In order to understand the bearing of such experiments, it is necessary to know much about ordinary breeding of strains of animals, including crossing and hybridism, and the natural history of intact and castrated animals of both sexes. It must be remembered that the animals lead artificial lives, are purposely bred for experiment and so on. Thus, Steinach's results were at one time disputed; breeders made the claim that his senile rats which became young again were only sick rats which improved in health because of the favorable conditions secured by the experiments. Steinach seemed to have disproved this charge.

Division or Ligation of the Duct. Steinach, who at first advocated actual implantation of material from the sexual glands to produce the similitude of rejuvenation, later discovered in the course of experiment that simple division or ligation of the spermatic duct produced such stimulation of the interstitial portion of the gland as to produce the same therapeutic result as actual implantation. Owing to the difficulty of obtaining testicular material, this discovery was hailed as of major importance, for any surgeon could perform the operation at any place or time. The results of section of the duct appeared to be very unequal, striking in certain cases and negative in others. These discrepant effects were variously explained.

The direct result of ligation or division of the duct is destructive, the sperm cells undergoing atrophy. This in turn is followed by an overgrowth of the connective tissue in which are imbedded the Leydig cells which supply the internal secretion of the male gonad. This state of affairs is not permanent, for the spermatic cells show some regeneration and at the same time the Leydig cells are reduced in number. The favorable results are more noticeable in premature senility, i.e., in men less old in years, than in men in the seventies and eighties. In the really old, the benefit, when present, is of the nature of a general tonic, while in the prematurely old there may be in addition improvement in defective sexual functions.

Implantation of Testicle. This operation did not originate with Steinach, for it was performed by Lespinasse and Lydston, both of Chicago, and independently of each other, on human beings and using human testicles. Others who followed them used the testicles of animals, including those of apes, rams, beeves, etc. This entire line of experiment is derived from the much older transplantation of ovaries, which has long been a recognized procedure, although largely limited to implantation of the woman's own ovaries after the operation of total removal of the uterus and appendages. The object of such transplantation has nothing in common with rejuvenation or reinvigoration but is solely to protect the woman from the trying symptoms which follow castration. In implanting the testicle, the same idea has been entertained in cases of accidental castration; such cases are few in comparison with the opportunities which daily present themselves of premature old age, functional loss of virility, and general breakdown of health. The simplest and easiest method consists of implanting a small slice of beef's or ram's testicle under the skin of the abdomen. The testicles of men and apes have been used in a few cases. Dr. Belfield summed up the subject of testicular implantation by stating that in the elderly the benefits, when apparent, are but shortlived. In young men who have had their gonads removed by accident or surgery or who have lost them as a result of destructive disease, the good results are more in evidence and the period of recovery longer, although it lasts only some months. The operation may of course be repeated indefinitely. It is by no means certain that this improvement is specific in character. The work of Voronoff largely corroborated that of Steinach, although his experiments were conducted on goats and rams. Steinach and his followers have reported many cases of gonad grafting in men and in women as well.

Résumé. Insulin is considered separately (see Insulin). In regard to thyroxin, the active principle of the thyroid gland isolated by Kendall, this substance has been successfully synthetized by Harrington of Great Britain and slight but unmistakable differences have been found in its physiological action, as compared with natural thyroxin, which will doubtless be formulated in full in time. Quite recently, Kamm, chief biochemist of Parke Davis & Co., has isolated two separate hormones from the pituitary gland—the so-called "pituitary twins"—which have physiological actions quite distinct from each other. In regard to the sexual hormones and the entire subject of gland grafting and so-called rejuvenation, the status of these operations seems to have been lowered. Large surgical clinics, such as those of the Mayo brothers at Rochester, Minn., report no work of this kind and, as a matter of fact, have always ignored the subject; while Garrison in the recently issued edition of his *History of Medicine* does not even mention it among recent advances. Of considerable passing interest is the report of a case of suprarenal grafting for Addison's disease which seems to have been of marked benefit (Reinhart, in *Münchener med. Wochenschrift*, June 14, 1928).

SECRIST, Horace (1881–). An American economist, born at Farmington, Utah. He studied at the University of Wisconsin, where he took his Ph.D. in 1911. In 1909 he became instructor of economics at the University of Wisconsin. In 1909 he was expert special agent of the United States Census Bureau, and during 1911–12, statistician of the Wisconsin Industrial Commission, becoming also, in 1914, United States Commissioner of Industrial Relations. During the World War, he was statistician to the United States Shipping Board and later the United States Railroad Labor Board. In 1912 he joined the faculty of Northwestern University, where in 1918 he became a professor and in the following year director of the Bureau of Business Research. In addition to many articles variously contributed, he is the author of *An Economical Analysis of the Constitutional Limitations on Public Indebtedness in the United States* (1914); *Readings and Problems on Statistical Methods* (1920); *Costs, Merchandising Practices, Advertising and Sales in the Retail Distribution of Clothing* (6 vols., 1921); *The Widening Retail Market* (1926); *Banking Norms and Trends Under the Federal Reserve System* (1927).

SEGONZAC, André Dunoyer de (1884–). A French painter, specializing in the nude and landscape, who became known as a powerful colorist, gifted in the picturization of movement in living forms. His etchings and illustrations are among the best in modernist art. He is a member of the Salon d'Automne.

SEGUR, sā'gur', Pierre M. M. H., Marquis de (1853–1916). A French historian, born in Paris, and educated at the College of Stanislas. He entered the public service in 1876 as auditor to the privy council, but after a short time relinquished that office to devote himself to the study of French history and literature. He became a member of the French Academy, which honored several of his books, in 1907. His writings consist of studies of the seventeenth and eighteenth centuries, several histories covering the reign of Louis XVI, and various articles and discourses, including: *Gens d' Autrefois* (1903); *Esquisses et Récits* (1908); *Silhouettes Historiques* (1911); and *Parmi les Cyprès et les Lauriers* (1912). His *Marie Antoinette* was translated into English in 1928.

SEIDEL, sī'del, Toscha (1900–). A Russian violinist born at Odessa. At the age of seven, he began to study the violin under Max Fiedemann. From 1909 to 1911, he was a pupil of Alexander Fiedemann at Stern's Conservatory in Berlin, where Auer heard him and offered to teach him free of charge. In 1915 he made a most successful début at Christiania, and for the next three years appeared extensively throughout Scandinavia in recitals and with orchestra, and occasionally in joint recitals with Auer himself. In 1918, he made his American début at New York, and since then has made extensive tours of the country, meeting everywhere with extraordinary success. He is one of the most brilliant of the younger generation of violinists.

SEILLIÈRE, Ernest Antoine Aimé Léon, Baron (1866–). A French philosophical writer. He was born in Paris and studied at the École Polytechnique there, but instead of pursuing the engineering profession, devoted himself to literature and social philosophy. Strongly influenced by Nietzsche and the doctrine of the will to power, Seillière developed what he called the philosophy of imperialism, that is to say, a philosophy of masculine activity, service and organization, as opposed to the effeminate romanticism of Rousseau. He traced all the modern evils, political, social, and æsthetic, to the influence of romanticism. Curiously enough, Seillière was a partisan of Bergson's intuitional philosophy, and even his own doctrine was characterized as an inverted romanticism. The long list of his works includes: *Ferdinand Lassalle* (1897); *Le Parti socialiste allemand* (1898); *La Philosophie de*

l'Impérialisme (4 vols., 1903–08); *Le Comte de Gobineau* (1903); *Appolon ou Dionysos* (1906); *Nietzsche* (1905); *L'Impérialisme démocratique* (1907); *Schopenhauer* (1909); *Barbey d'Aurévilly* (1910); *Gustave Flaubert* (1914); *Mme. Guyon et Fénelon* (1918); *Les Origines romanesques de la morale et de la politique romantique* (1918); *Georges Sand*; *Les étapes du mysticisme passionel* (1919); *Sainte-Beuve* (1920); *Jean-Jacques Rousseau* (1921); *Balzac* (1922); *Émile Zola* (1923); *Auguste Comte* (1924); *Le romantisme* (1925); *Christianisme et romantisme* (1925); *Du quiétisme au socialisme romantique* (1925); *Une académie à l'époque romantique* (1926); *Morales et religions nouvelles en Allemagne* (1927); and *Pour le centenaire du romantisme* (1927). Consult *Ernest Seillière: historien du mysticisme romantique*; by J. M. L. Boudeau (1925).

SEIPEL, Ignaz (1876–). An Austrian Chancellor, educated in the Theological Faculty of the University of Vienna, where, in 1908, he became a professor. A Roman Catholic prelate and the leading member of the Christian Socialist Party, composed of conservatives under Roman Catholic influence, he became Minister of Social Welfare in the last cabinet of the Austro-Hungarian Monarchy and was Chancellor of the Austrian Republic during 1922–24 and 1926–29. In the latter period he served also as Minister for Home Affairs and for Foreign Affairs. Criticism of his clerical connections by the Pan-German members of his coalition government and by members of his own party led to his resignation in May, 1929. As leader of the parliamentary group, he continued to exert a powerful influence upon the troubled course of Austrian politics. He is the author of *Nation und Staat* (1916); *La donna et la Questione Sociale* (1926), and *Seipel's Reden in Oesterreich und anderwärts* (1926). See Austrian Republic.

SEISMOLOGY. The word "earthquake" has in modern times acquired a twofold meaning—it still denotes a shaking of the solid earth which can be felt and may cause damage, and it is also used to denote any of those small tremors that cannot be felt but which can be detected by delicate seismometric instruments; seismology has come to be, to an ever-increasing extent, the study of the latter.

The unfelt disturbances first attracted attention because in some cases they obviously were connected with very distant quakes of destructive violence. It was soon found, however, that those which could be directly connected with distant quakes were far outnumbered by those that could not be so connected; it has been generally assumed that the latter are manifestations of violent quakes that occur under the sea or in uninhabited regions, although Oldham maintains that with few exceptions the two types of tremors are of different origins. The foci of the quakes that are felt usually lie at small depths in the earth's crust (perhaps less than 10 kilometers or 6.2137 miles), while the distant unfelt quakes seem frequently to originate at depths of 100 kilometers (62.137 miles) or more, and Oldham regards the shallow, destructive shocks (episeisms), when they happen to occur, as secondary effects of the deep-seated disturbances (bathyseisms). There still exists a good deal of disagreement among different investigators, however, as to the depths of the foci.

It is well established that tectonic quakes are due to movements and vibrations caused by the shock resulting from sudden slips, within the solid material of the earth's crust, along fractures consequent on a state of stress. The seismographic records of the elastic vibrations which spread out through the earth from the place of origin may be deciphered with the aid of the mathematical theory of wave-propagation in elastic media; the results, together with data obtained from laboratory experiments on rocks under conditions simulating those within the earth and from a knowledge of the mean density and tidal yielding of the earth, enable the internal structure of our planet to be determined.

The vibrations of a homogeneous elastic solid consist of two types of waves, viz., longitudinal or compressional, and transverse or distortional; near the surface, these waves and their reflections may combine to produce a wave propagated continuously along the surface in which the individual particles move in vertical elliptic paths lying in the direction of propagation, there being no horizontal motion across the latter direction. The seismograph records a sudden movement of the ground whenever one of these types of waves, or a surface reflection, first reaches it. The longitudinal waves are called primary or P waves; the transverse, secondary or S waves; and the surface waves are known as Rayleigh waves, after their discoverer; each type is propagated with a different speed. The actual motion of the earth's surface is greatly complicated, however, because of the marked heterogeneity of the crust and body of the earth. In a heterogeneous elastic solid, the behavior of Rayleigh waves is quite complex; and if the velocity of distortional waves is less near the surface than in the material below, surface waves (known as Love waves) may exist in which the displacements of the individual particles are purely horizontal and at right angles to the direction of propagation. The heterogeneity also introduces internal reflections and variations in velocity.

Records of quakes obtained near the epicentre show that seismic disturbances send out three pairs of compressional and distortional waves, characteristic of three distinct layers in the crust. A number of independent lines of evidence indicate the earth to be composed of a metallic core, surrounded by a thick "rock mantle" or layer of periodotitic (ultra-basic) rocks, such as compose meteorites, followed by an intermediate basaltic layer, then by a thinner shell of granitic (acidic) rocks, and finally by a surface film of sedimentary rocks and soil; the seismic waves travel with different speeds in the successive layers. C. G. Knott finds that the rate of transmission of both the P and S waves increases continuously with distance below the surface until the wave path attains a depth about 0.3 the earth's radius. The wave paths reaching lesser depths than this have a continuously curved form, convex toward the centre of the earth; below this, the rate of propagation is nearly constant, even decreasing at certain depths, so that some of the wave paths are concave toward the centre in part of their course. Below 0.6 of the radius, the distortional or S wave is killed and is not registered at distances greater than 120 degrees from the epicentre. The rate of propagation of the two forms of wave motion is about 6.2 and 4.0 kilometers (3.85 and 2.49 miles) per second, respectively, near the surface of the earth, and about 12.8 and 6.8 at depths over 1500 kilometers (932 miles). From a study of the waves generated by the Oppau explosion, which were undoubtedly truly representative of the uppermost layers of the earth's crust in south Germany, the Netherlands, and Alsace, Wrinch and Jeffreys have found the velocities of the P and S waves to have been respectively 5.4 and 3.15 kilometers (3.36 and 1.96 miles) per second, considerably less than in the case of ordinary earthquake waves. The Rayleigh waves, being characteristic of the lower basaltic and periodotitic layers, were absent, and in their place appeared the Love waves, transmitted largely through the continental granitic layer. Klotz found the mean velocity of the so-called "long" or L waves, which include Rayleigh and Love waves, and possibly other types of vibrations as well, to be 3.8 kilometers per second in the case of ordinary quakes; it may be shown that these waves must extend well into the lower layer of greater velocity, but that their amplitude must become inappreciable at a depth of 150 kilometers (93.2 miles); in order that the velocity be determined mainly by the lower layer, as it appears to be, it is necessary that the depth of the upper layer be a small fraction of the whole. Jeffreys concludes that the thickness of the granitic layer is of the order of 10 kilometers (6.2 miles) or a little more, while that of the intermediate layer is about 20 kilometers (12.4 miles); Knott's results apply to the basic rocks below the granitic layer. These results are consistent with laboratory measurements of the elastic constants of rocks. Mohorovičić, however, maintains that the combined thickness of the intermediate and the granitic layers is about 60 kilometers.

G. W. Walker, following up certain investigations begun by Galitzin on the angle of emergence of the wave paths, found that the focus, although sometimes quite close to the surface, is frequently at a depth of from 300 to 500 miles or more. These conclusions have been confirmed by H. H. Turner through a study of the times of arrival of seismic waves at the antipodes or anticentre. Turner's results for the relative depths of foci suggest that they collect around three chief values, and by identifying these with the three critical surfaces at the respective depths of 106, 232, and 492 kilometers (65.8, 144.1 and 305.7 miles) which were previously discovered by Galitzin from direct observations of the angles of emergence at Pulkovo, Turner obtained a value for the surface velocity of P waves agreeing with that observed in the case of the great Oppau explosion on Sept. 21, 1921. He found that 207 kilometers (128.6 miles) is the depth of the average focus corresponding to the standard seismological tables in use. The destructive quakes probably are those originating in the uppermost layer. On the other hand, Jeffreys, in a study of the waves from the Pamir quake of Feb. 18, 1911, concludes that the average depth of the foci cannot exceed 120 kilometers (74.5 miles). Jeffreys considers that most quakes, including all large ones, have focal depths in excess of 35 kilometers (21.7 miles), and that the greatest quakes occur at depths of about 100 kilometers (62 miles).

Under the direction of the Advisory Committee on Seismology of the Carnegie Institution, there has been concentrated on the study of the earth movements and seismic tremors of California probably the greatest assemblage of coöperating agencies ever put to work on a single scientific problem. The U. S. Geological Survey, in coöperation with the Seismological Society of America and various geologists, has mapped all known faults in the State, and the Society has published a map showing all these faults; the localities where quakes may be expected are thus indicated, and in these zones the proper locations, design, and construction of buildings and other structures may be made to minimize the danger from earthquakes. To aid in tracing the faults out to sea, the U. S. Hydrographic Office, by means of a new acoustic sounding device, has made a unique contour map of the ocean bottom off the southern California coast out to beyond the edge of the continental shelf. Anderson, of the Mt. Wilson Observatory, has devised a remarkably sensitive portable torsion-pendulum seismometer, which is extraordinarily simple, cheap, and easily set up; the entire instrument weighs only a few pounds; it can be adjusted to record quakes occurring at any distance, and great numbers of these instruments may be set up about the country and used to study in detail the propagation of seismic waves from local tremors through the heterogeneous crust. The regions of California surveyed prior to 1900 were resurveyed by the U. S. Coast and Geodetic Survey during 1922–25, in order to determine what earth movements had taken place in the interval during and following the San Francisco earthquake of 1906; after the completion in 1928 of a new readjustment of the triangulation net covering the western United States, it was found that many stations in the neighborhood of the San Andreas fault, near to and southward from San Francisco Bay, had moved by appreciable amounts: The trend of the displacements to the east of the fault is southeastward, while that of stations to the west of the fault is northward or northwestward; the largest movements have occurred close to the fault, while stations more than 20 miles from the fault have been affected only slightly if at all. The largest movement found is a relative shift of 14 feet between Ross Mountain and Point Reyes Lighthouse.

The great Russian seismological organization did a vast amount of valuable work under Galitzin, but with the death of its famous leader and the political revolution, it gradually went out of existence. Seismological work in Russia was recommenced at several stations in 1923. Galitzin improved the Milne seismograph almost out of recognition, producing the best such machine yet devised. The much less elaborate and less expensive instrument devised by J. J. Shaw is but little inferior to Galitzin's. Another new type of seismometer has been invented by Wenner, of the U. S. Bureau of Standards, in which the shock transmitted by the earth to the instrument is recorded, at any desired distance, through a galvanometer.

Horizontal pendulums, specially designed to record tilting of the surface of the earth, have been found by the Japanese to show (in addition to certain regular variations) irregular variations which, in some cases at least, occur just before earthquakes.

Necrology. The following eminent seismologists have died during the period since 1914: Prince Boris Galitzin, May 4, 1916; J. Perry, Aug. 5, 1920; G. W. Walker, Sept. 6, 1921; C. G. Knott, Oct. 26, 1922; Fusakichi Omori, Nov. 8, 1923; Otto Klotz, Dec. 28, 1923; Comte Fernand Montessus de Ballore, 1923; Emil Wiechert, Mar. 19, 1928; Giulio Grablovitz, Sept. 19, 1928.

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SELANGOR. See MALAY STATES, FEDERATED.

SELF-DETERMINATION. See RACIAL MINORITIES TREATIES.

SELLARS, ROY WOOD (1880–). An American college professor and author, born at Egmondville, Ont., and graduated at the University of Michigan in 1903. He began teaching at the University of Michigan in 1905 and became associate professor of philosophy there in 1918 and professor in 1923. He wrote: *Critical Realism* (1916); *The Next Step in Democracy* (1916); *The Essentials of Logic* (1917); *The Next Step in Religion* (1918); *Essays in Critical Realism* (1921); *Evolutionary Naturalism* (1921); *Principles and Problems of Philosophy* (1926); *Religion Coming of Age* (1928).

SENATE RESERVATIONS. See UNITED STATES, *History*.

SENESCENCE. See ZOÖLOGY.

SENSATION. Cutaneous Sensation. Head's theory of protopathic and epicritic sensibility was attacked from two quarters. H. Carr (*Psychological Review*, vol. xxiii) criticized the theory on grounds both of logic and of observation. E. G. Boring, repeating Head's experiment under improved conditions, reported his own observations of the return of cutaneous sensitivity after section of a sensory nerve (*Quarterly Journal of Experimental Psychology*, vol. x). He found that the results which Head's technique threw into high relief lost their special importance in the light of a more refined method, and that they took their place in a total body of fact which shows no such line of cleavage as that described by the British physiologist.

Boring himself outlined a theory of multiple innervation of the sensory "spots"; the nerve supply, he held, is so distributed that, under varying conditions, summation or inhibition of excitations may occur in varying degree. A hypothesis of this sort is, in Boring's opinion, adequate to the data of observation, and avoids the duplication of sensibilities which Head was led to assume.

One of the most important investigations of the cutaneous sense appearing in recent years is that of D. Katz (*Der Aufbau der Tastwelt, Zeitschrift für Psychologie und Physiologie des Sinnesorgane, Ergänzungsband 11*, 1925). After a brief critical survey of previous work, the author examines the various modes of appearance of touch experience, the efficiency of the sense of touch, the vibration sense, and other practical considerations. The vibration sense has taken on a popular interest because of the attempt to use it as a substitute for hearing in the deaf (see R. H. Gault, "On the Identification of Certain Spoken Words by their Tactual Qualities," *Journal of Applied Psychology*, 1926.) For a review of recent investigations of cutaneous sensation, see *Psychological Bulletin*, 1926.

SENSATION. Organic. E. G. Boring (*American Journal of Psychology*, vol. xxvi) reported experiments on the sensations aroused by the stimulation of the alimentary tract. He used thermal, mechanical, chemical, and electrical stimulation. In the esophagus, sensations corresponding to all stimuli except pepper and mustard were reported; in the stomach, all were sensed, but it was not certain whether the sensations of cold, warmth, and electrical shock arose in the stomach or in the surrounding tissues. Hydrochloric acid was found to induce the sensation of hunger. The greatest error of localization occurred in the direction of the median line through throat and stomach, reference being often made to head, to throat, or to a point below the sternum.

Boring also made a qualitative study of experiences referred to the alimentary and urinary tracts (*Psychological Review*, vol. xxii). He concluded that, under favorable conditions, most of the experiences are introspectively reducible to various patterns of pressure and pain. Nausea was the most difficult experience to analyze. Experiments reported by A. J. Carlson (*The Control of Hunger in Health and Disease*, 1916) confirmed many of Boring's observations. Carlson, however, maintained that hunger is experimentally distinguishable from appetite; appetite, he held, may appear in the absence of hunger, and can be aroused by weak chemical stimuli which inhibit the hunger contractions.

SENUSSITES. See PAN-ISLAMISM.

SEPTIC TANKS. See SEWERAGE AND SEWAGE TREATMENT.

SERAFIN, TULLIO (1880–). An Italian conductor, born at Cavarzere. After graduation from the Milan Conservatory he joined the orchestra at La Scala as viola player. His successful début as conductor, with *Aida* in Ferrara, resulted in his engagement for the Teatro Regio in Turin, where he remained till 1908, when he succeeded Toscanini as principal conductor at La Scala in Milan. In 1914–15 he was at the Carlo Felice in Genoa, in the summer of 1915 in Havana, and during the winter of 1915–16 at the Opera Real in Madrid. He then served in the Italian Army, and after his return was once more at the Teatro Regio in Turin until 1921, when he went to the San Carlo in Naples. In the fall of 1924, he became connected with the Metropolitan Opera House, New York. He made frequent appearances as guest-conductor in Paris, London, Rome, and Buenos Aires. He ranks with the foremost operatic conductors of the world.

SERBIA. Formerly a Balkan kingdom with an area of 36,937 square miles. In December, 1918, it was proclaimed a part of the new Unitary State of the Serbs, Croats, and Slovenes (Jugoslavia). See JUGOSLAVIA for matters pertaining to population, industry, trade, finance, etc. For its history during the War, see WORLD WAR; for post-war history, see JUGOSLAVIA.

SERBS, CROATS, AND SLOVENES, KINGDOM OF. See JUGOSLAVIA.

SERING, MAX (1857–). A German political economist and agrarian political leader, who was born at Barby and educated at the Universities of Strassburg and Leipzig. He has been professor of political economy at the University of Berlin since 1897. His works include *Das Friedensdiktat von Versailles und Deutschlands* *wirtschaftliche Lage* (1920); *Agrarkrisen unde Agrarzölle* (1925); *Die deutsche Wirtschaftskrisis* (1926); and *Germany under the Dawes Plan* (Eng. trans., 1928).

SETH, ANDREW. See PRINGLE-PATTISON, ANDREW SETH.

SETON, JULIA (1862–). An American lecturer and writer, born at Chicago. She was graduated from the Medical Department of the Denver-Gross College in 1898, and took postgraduate courses at Tufts Medical College. She practiced medicine in Denver and in Boston, and began metaphysical healing in the latter city in 1904. In 1906 she removed to New York City and there founded the New Thought Church and School. She lectured in the principal cities of the United States and in Europe, and wrote *Concentration—The Secret of Success* (1907); *Marriage* (1914); *The Race Problem* (1914); *Adrienne Le Baron,* a novel (1915); *Destiny,* a novel (1917); *The Outside and Inside of Life* and *The Self in Tune.*

SETON-WATSON, ROBERT WILLIAM (1879–). A British historian whose particular field of study was central Europe and the Balkans. He was educated at Winchester and New College, Oxford, afterward studying in Berlin, Paris, and Vienna. He was the founder and joint-editor of the *New Europe* (1916–20), and joint-editor of the *Slavonic Review.* He received honorary degrees at Prague and Zagreb universities, was an honorary member of the Rumanian Academy, and honorary lecturer in Eastern European History at King's College, London (1915–22). In the latter year, he was appointed Masaryk professor of central European history in the University of London. His works, the earlier of which were written under the pseudonym, Scotus Viator, were *Maximilian I* (1902); *The Future of Austria-Hungary* (1907); *The Southern Slav Question* (1911); *Absolutism in Croatia* (1912); *Rumania and the Great War* (1915); *The Balkans, Italy, and the Adriatic* (1915); *The Rise of Nationality in the Balkans* (1917); *Europe in the Melting Pot* (1919); *The New Slovakia* (1924); and *Sarajevo: A Study in the Origins of the Great War* (1926).

SEVCIK, sĕv'tsĭk, OTAKAR (1852–). A Bohemian violinist (see VOL. XX). In 1921 he taught a master class at the Ithaca Conservatory of Music, and in 1922–23 a similar class at the Chicago Musical College. Not less than 700 of his pupils became teachers or orchestral performers in the United States alone. During his stay in this country, he put the finishing touches to his life work, a complete method for the violin, from the first rudiments to the last degree of virtuosity. The first section, *School of Intonation* (15 parts and two supplements, with English, German and French text), was published at New York in 1922; the second section, *School of the Virtuoso* (12 parts), was published in 1926. The work is not only the most voluminous and comprehensive of its kind, but seems destined to live as a lasting monument to the genius of one of the world's greatest teachers.

SEVILLE, sĕv'ĭl *or* sē-vĭl', or *sp.* **SEVILLA,** sā-vēl'yä. A city of Spain. The population in 1927 was estimated to be 215,107. In 1926 access to the port of Seville was improved by the construction of the Alfonso XIII Canal and the deepening of the Guadalquiver River so that vessels of 13,000 tons displacement might reach the port. A new large modern dock system also was installed. In 1928 a terminal for the projected Buenos Aires-Seville air line was under construction, a distance of 44 kilometers (27.34 miles) northwest of the city. The facilities included an anchoring tower, two hangars, living quarters for the personnel, and factories to supply hydrogen, oxygen, and ethyl gas. The project was to be completed within three years at a total cost of 30,000,000 pesetas. In order to facilitate communication between the city and the airport, the municipality constructed a boulevard 50 meters (164 feet) wide. There has been developed an extensive suburban district.

The outstanding feature of Seville's development since the War was the Ibero-American Exposition which was held from March 15 to December 31, 1929. This exposition was first planned in 1910, and actual work on its construction was started in 1913. The War, however, postponed any further development of the plans until 1922, when the name of the exposition was changed from Hispano-American Exposition to Ibero-American Exposition, so that Portugal and Brazil might be included. The exhibits were confined to those from countries in the Iberian peninsula and those American nations discovered or settled by Spanish or Portuguese navigators and explorers. The exposition stressed particularly exhibits of fine arts, literature, and history. The site was a 2400-acre tract in Maria Luisa Park on the outskirts of Seville. The principal structure was the Plaza de España, built in a half circle with a central court 600 feet wide, and with 49 divisions in each of which there were exhibits of the 49 provinces of Spain. The buildings erected by Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Mexico, Peru, Santo Domingo, Venezuela, the United States, and Uruguay, in the best traditions of native architecture, were to serve as consulates after the exposition. The United States Congress appropriated $700,000 for participation in the exposition, and a permanent pavilion designed by American architects after the Spanish Mission style of southern California was erected. The commercial exhibits were displayed in buildings entirely apart from the pavilions of the nations and the art galleries and Royal Pavilion.

SÈVRES, TREATY OF. See DARDANELLES AND BOSPORUS STRAITS; CILICIA; DODECANESE; PEACE CONFERENCE AND TREATIES; SMYRNA; TURKEY.

SEWERAGE AND SEWAGE TREATMENT. Quick removal of soiled water used for domestic, office, and industrial purposes, together with its disposal without nuisance or menace to health, has received increasing attention in the twentieth century. Broadly, there was little change in collection materials and methods except in the growing use of concrete, plain or reinforced, for trunk and outlet sewers, generally precast in suitable lengths. Pumping plants, where required, were greatly improved and larger units employed where warranted by the volume of sewage; electric-driven pumps became more common, with automatic cut-in and cut-out control to suit changes in the volume of flow.

Final disposal of sewage reflected the increasing demand for a lessening of the pollution of the streams, lakes, or tidal waters into which all sewage must eventually go. The bulk of sewage, the world over, was still discharged into near-by or more remote waters with no treatment whatever or with but little, but with growing, attention to disposal into large volumes of diluting water, at points remote from sources of public water supply, shellfisheries, and bathing beaches, or from foreshores where cast-up wastes or sludge banks would be objectionable to sight or smell. Where nuisance or health menace could not be ensured at reasonable cost by choice of remote outlet points, recourse to treatment was indicated, but much postponement in its provision was still common.

The degree and kind of treatment were governed by a variety of local conditions—physical, financial, and civic—all of which demanded, but did not always receive, careful weighing and balancing. Degree of treatment ranged from coarse or fine screens, alone or combined with sedimentation, for the removal of solid matter, to some or all of these combined, with processes for the further reduction of decomposable, oxygen-demanding and possible nuisance-producing organic matters. Where public health would otherwise be endangered, more or less complete removal of bacteria was demanded, most commonly to reduce the burden on water-purification plants, these being the last and main line of defense against water-borne disease.

Aside from continued improvements in fine screens and other mechanical devices forming a part of sewage works, the most notable advances in sewage treatment since 1914 were the introduction of the activated-sludge process, a combination of forced aëration and sedimentation; the extension of separate sludge digestion for the solids removed; one- and two-story (Imhoff) tanks; and by the activated-sludge process, and the utilization of gases produced by sludge digestion, to raise the temperature of sewage or sludge to produce power for sewage-works use, or, more rarely, to produce gas for sale. In 1929 where more than screening was in use, Imhoff, or two-story, tanks led (sedimentation compartment above, sludge digestion below); next came these tanks followed by trickling or sprinkling filters, and in some cases by secondary settling tanks, and sometimes by chlorination of the effluent for bacteria reduction.

The activated-sludge process was slowly but steadily growing both in number and size of plants—particularly in the United States, Canada, England, and Germany—most of the plants outside the United States being relatively small. Baltimore, Philadelphia, Rochester, Cleveland, and the Chicago Sanitary District had large Imhoff tank installations; the Chicago West Side plant, nearing completion, being by far the largest in the world, with an ultimate capacity to serve a population of 1,850,000. The Chicago Sanitary District also had the largest activated-sludge plant in the world, put in use Oct. 3, 1928, to serve 830,000 people by 1930. Next in size came the activated-sludge plants of Milwaukee and Indianapolis. Late in 1928, designs were started for a large activated-sludge plant to serve about 1,000,000 people in the Boroughs of Manhattan and the Bronx, or a fifth of the population of New York City. Some idea of the work that is required to make plans for such a plant may be had from the fact that $605,500 was to be paid for the design of the plant alone, under contract with a consulting engineer.

The sewage from the cities of Paris and Berlin still went to sewage farms in 1929, but they had been overworked for years and some preliminary treatment had been provided and more was contemplated. Except in low-rainfall areas, sewage farming never gained a foothold in the United States, and in Europe it was little practiced in 1929. A notable example of sewage screening is afforded by Los Angeles, where the sewage of the city passes through an immense installation of fine screens before being discharged offshore into the Pacific Ocean.

Activated-Sludge Process. In this process, the sewage, either as it comes to the works or after preliminary treatment to remove some of the solids, is first passed through activation tanks, then through settling tanks. The process effects a heavy reduction of suspended solids, decomposable matter, and bacteria. Some of the sediment (sludge) in the settling tank is forced back into the activation, or aëration, tank and ultimately kept mixed with the sewage, either by means of compressed air or by mechanical stirring devices, such as revolving paddles. Where mechanical agitators are used, free air is drawn into the sewage from the atmosphere; otherwise, compressed air is admitted at the bottom of the activation tanks through porous plates or perforated pipe, generally the former. From the aërating tanks, the sewage and admixed sludge go to settling tanks; from these, some of the sludge is forced back to the aëration tank, while the excess activated sludge is removed for final disposal.

This sludge has a higher fertilizing value than that from other processes, but to make it commercially available, its moisture content must be reduced to 10 per cent. Because of the high first and operating costs of sludge presses and driers, few cities having activated-sludge plants had attempted to utilize excess activated sludge up to 1929, the chief examples being Milwaukee, Houston, and Pasadena. At Milwaukee, the operating revenue from the activated-sludge process in 1928 was put at $600,000 against $900,000 operating expense, making the net cost of sewage treatment $300,000, but with no allowance for capital charges. As a rule, excess activated sludge, up to 1929, was got rid of by dumping on land, after more or less dewatering in digestion tanks, in lagoons, or otherwise.

Chicago Drainage Canal and Lake Lowering Controversy. Decisions of the United States Supreme Court on Jan. 5, 1925, and Jan. 14, 1929, combined with the rapid growth of Chicago and the 59 other communities making up the Chicago Sanitary District, will speed up a programme already under way for the largest group of high-degree sewage-treatment plants under one governmental authority anywhere in the world. These decisions (see *Engineering News-Record*, Jan. 1 and 15, Mar. 2, 1925; Dec. 1, 1927; Jan. 24, and Mar. 7 and 14, 1929, for the decisions and related matters) established (1) that the district was dependent on the Secretary of War for authority to divert any water from Lake Michigan, was exceeding the amount granted, and must carry out such a programme of rectification as that officer might set up; and (2) that the Secretary of War, under congressional legislation bearing on navigation, had no authority to authorize diversion of water for sanitation alone, although in the case at bar a "negligible" (comparatively speaking) amount of water might be diverted to protect navigation from injury by sewage pollution.

The decision resulted from a suit brought by all the States bordering on the Great Lakes, except Illinois and Indiana. The terms of a court decree to put the decision into effect were referred to Charles Evans Hughes for report and recommendation, after hearing from experts. Apparently, the Sanitary District will be compelled to treat to the highest degree of the art the sewage of a population equivalent to 7,000,000 (sewage from human population plus organic wastes). The City of Chicago will also have to purify its water-supply to a high degree. The court held that diversion of water from Lake Michigan materially lowered the levels of the Great Lakes and caused serious injury to navigation.

The purpose of the drainage canal was to divert sewage from Lake Michigan for the protection of the Chicago water supply, at the same time affording a scientifically-devised means of sewage disposal by dilution. The rate of dilution, as recommended by three engineers, headed by an eminent sanitarian, would have been 4 cu. ft. of water per 1000 population, but this was reduced to 3⅓ cu. ft. in the legislative act creating the Sanitary District of Chicago, passed in 1889. The canal was put in use Jan. 1, 1900. When the engineers recommended the project of sewage disposal in 1887, there were almost no sewage-treatment plants in the United States and those were very small.

Sewerage-Service Rentals. Except that here and there sewers were built by private companies (see Municipal Ownership), almost unexceptional world-wide practice until well in the twentieth century was to make no annual charge for sewer and sewage disposal service. From about 1915, sewerage was put on a so-called utility basis in a number of States which passed enabling acts to that effect. The chief object of the plan is to provide funds more readily for a service that is growing in importance and extent. The charge is generally at least coördinated with that for metered water supply, and sometimes both services are billed together.

Rational Control of Water Pollution. Much attention was given to the classification of streams and other natural bodies of water with a view to putting regulations designed to prevent pollution on a more rational basis than formerly. A notable example of this is afforded by the report on the pollution of boundary waters between the United States and Canada, made in 1918 by the International Joint Commission created many years earlier by a treaty between Great Britain and the United States. The waters involved include the Great Lakes, the Rainy, St. Mary's, St. Clair, Detroit, and Niagara rivers and to some extent the St. Lawrence as well. The studies were conducted by eminent engineers, chemists, and bacteriologists in official and private life in the United States and Canada.

The report recognizes that the utilization of rivers and lakes to receive the sewage of cities is a legitimate and proper function so long as this can be done without menace to public health or the creation of nuisances by offense to sight and smell, and also that the amount of sewage which may properly be discharged into adjacent waters by any city should be determined by a careful study of all governing local conditions, including particularly whether or not public water supplies would be endangered by the sewage, and if so the permissible burden on water-treatment plants. This burden, the report states, should not exceed 500 bacteria of the colon type per cubic centimeter as an average for the year, determined by samples taken in a manner specified in some detail. The report proposed that before discharge into the Detroit and Niagara rivers, sewage should be treated to such a degree that the water receiving it would correspond to sewage diluted by a stream flow of 4 cu. ft. per second per capita of contributing population.

In Pennsylvania, the Sanitary Water Board, composed of representatives of State departments having to do with health, fisheries, and other aspects of the waters of the State, in 1923 divided the streams of the State into three general classes, according to degrees of pollution and uses to which the streams are put, and established general principles to control their pollution. The New Jersey Legislature of 1924 created a Sanitary and Economic Water Commission. In 1922 the Pennsylvania and New Jersey Departments of Health divided the interstate portion of the Delaware River into three zones and laid down conditions as to the degree of sewage treatment that each department would require, in passing on plans for sewage works in each zone.

In Great Britain, through what appears to be coöperative work carried on by the Ministries of Agriculture, Fisheries, and Health, the rivers were divided into three classes: (1) those sufficiently pure to support a considerable stock of fish; (2) those polluted but nevertheless still containing a great number of fish; (3) rivers grossly polluted and containing few if any fish. It was expected that further control of stream pollution through the joint efforts of these ministries would take this classification into account. For preliminary report of the Steinman Committee on River Pollution, see abstract in the London *Surveyor*, Jan. 11, 1924.

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SEX DETERMINATION. See Live Stock; Zoölogy.

SEX INSTINCT. See Psychology, Abnormal.

SEX STUDIES. See Secretions, Internal; Live Stock.

SEYFFERT, Leopold (Gould) (1888–). An American artist, born at California, Mo. He studied at the Pennsylvania Academy of Fine Arts and, after winning two foreign scholarships, continued his artistic education in Paris and Spain. In 1912 he gained the fellowship prize of the Pennsylvania Academy of Fine Arts, a gold medal of the Art Club of Philadelphia in 1913, a silver medal at San Francisco in 1915, the Hallgarten Prize in 1916, the Altman Prize of the National Academy of Design in 1917, the Beck Gold Medal in 1918, the Temple Gold Medal in 1921, and the Proctor Prize in the same year. From the Art Institute of Chicago he received the Palmer Gold Medal in 1923, the Logan Gold Medal in 1924, and the Hearst Prize in 1924. The Pennsylvania Academy of

Fine Arts awarded him the Stotesbury Medal in 1926. His work is represented in several of the most important art galleries in the country.

SEYMOUR, Charles (1885–). An American educator and historian, born at New Haven, Conn. He was graduated from Cambridge University in 1904 and from Yale in 1908, taking postgraduate courses at the latter and in Paris. In 1911 he was appointed instructor in history, in 1918 professor of history, and in 1927 provost at Yale. At the Peace Conference in Paris in 1919, he was chief of the Austro-Hungarian Division of the American Commission to Negotiate Peace, and was also delegate on other commissions dealing chiefly with the Balkans. Among his writings are *Electoral Reform in England and Wales* (1915); *The Diplomatic Background of the War* (1916); *How the World Votes,* with D. P. Frary (1918); *Woodrow Wilson and the World War* (1921). He edited, with Col. E. M. House, *What Really Happened at Paris* (1921). Professor Seymour arranged as a narrative *The Intimate Papers of Colonel House* (4 vols., 1926–28).

SHACKLETON, shăk''l-ton, Sir Ernest (Henry) (1874–1922). An English Arctic explorer (see Vol. XX). From 1914 to 1916, he was on an Arctic exploring trip. In 1919, at Archangel, his knowledge proved invaluable in providing comforts for the soldiers there. In 1921 he undertook his last Arctic voyage, which was to be a 30,000-mile journey in the South Atlantic and the Antarctic. He died off the whaling point, Grytviken, on South Georgia Island and was buried there. By a strange chance, Grytviken had been the jumping-off point of his 1914 expedition. See Polar Research.

SHAFFER, Philip Anderson (1881–). An American biological chemist. He was born at Martinsburg, W. Va., and graduated at West Virginia University. After graduate studies at Harvard (Ph.D., 1904), he became instructor in chemical pathology at the Cornell University Medical College in New York City (1904–10). Since 1910 he has been professor of biological chemistry at the Washington University Medical School, St. Louis, Mo. In the World War, he served as major of the Sanitary Corps, U. S. Army, assigned to the Chief Surgeon, A.E.F. He was president of the American Society of Biological Chemists in 1923–24, and in 1928 was elected to the National Academy of Sciences. He has conducted researches in diet, in treatment of typhoid fever and nutrition in that disease (with Warren Coleman), and also on metabolism in diabetes and on the preparation of insulin.

SHALIAPIN. Transliteration for Chaliapine, which see.

SHANDAKEN TUNNEL. See Tunnels.

SHANNON, Charles Hazelwood (1865–). An English painter (see Vol. XX). His later works include "The Embroidered Shawl" (1918) and the lithographs, "Ebb Tide" (1917), "The Tidal River" (1919), and "A Sharp Corner" (1919). He also painted portraits, including those of Princess Patricia of Connaught, Lillah McCarthy, and Hilda Moore ("The Lady in Black"). He became a member of the Royal Academy (1921), and an associate of the Société Nationale des Beaux Arts.

SHANNON, Effie (1867–). An American actress, born at Cambridge, Mass. She began to act at 10 years of age, as Eva in *Uncle Tom's Cabin,* and appeared as an ingenue in many popular plays. She played with Rose Coghlan in *Diplomacy,* with Herbert Kelcey in *The Moth and the Flame; His Lord and Master; The Thief,* etc. She took part in *The Years of Discretion* under the direction of David Belasco during 1913–14 and played in *Children of Earth* in 1915. She also appeared in *Under Orders; Mama's Affair; The Detour,* under Belasco's management, 1923–24, and under the management of George Tyler, 1926; and in *Merry Andrew,* by Lewis Beach (1929).

SHANNON, Frederick Franklin (1877–). An American clergyman and author, born in Morris County, Kan., and educated at Harvard University. He was ordained to the ministry of the Methodist Episcopal Church, South, in 1899, and after preaching in West Virginia and in Grace Church and the Reformed Church on the Heights in Brooklyn, N. Y., he became pastor of the Central Church in Chicago in January, 1920. His writings include: *The Soul's Atlas and Other Sermons* (1911); *The New Personality* (1915); *The Enchanted Universe* (1916); *The Breath in the Winds* (1918); *God's Faith in Man* (1919); *The Economic Education; The Land of Beginning Again; The New Greatness.*

SHANTUNG, shăn'to͝ong'. A Chinese maritime province with an area of 55,970 square miles and a population estimated at 30,803,245. The scene of Germany's pre-war development of Kiaochow Bay, this province attracted world attention in 1915 when Japan presented the notorious Twenty-One Demands to China, following the capture of the German leased territory during the World War. China's protest against clauses in the Versailles Peace Treaty giving Japan virtual sovereignty over the leased area and economic sovereignty over the entire province was carried to the League of Nations. It finally resulted in a Sino-Japanese agreement, signed at the Washington Conference, Feb. 4, 1922, under which the leased area of Kiaochow was returned to China, Japanese troops withdrawn from Shantung, and the Tsingtau-Tsinanfu Railway sold by Japan to China, thus reëstablishing full Chinese sovereignty. See China, under *History;* Japan, under *Foreign Policy;* World War; League of Nations; Washington Conference.

SHANTZ, Homer LeRoy (1876–). An American botanist, born in Kent County, Mich. He was graduated from Colorado College in 1901 and took postgraduate courses at the University of Nebraska. He was professor of botany and bacteriology at the University of Louisiana (1907), served as special agent in the United States Bureau of Plant Industry, and from 1910 to 1926 was plant physiologist in charge of various investigations. He was agricultural explorer for the Smithsonian Institution African Expedition in 1919–20, and carried on other explorations in Africa. From 1926 to 1928, he was professor of botany at the University of Illinois and since 1928 has been president of the University of Arizona.

SHAPLEY, Harlow (1885–). An American astronomer, born at Nashville, Mo. He studied at the University of Missouri, and received his Ph.D. from Princeton in 1913. In 1914, he became astronomer at Mt. Wilson Observatory of the Carnegie Institution, remaining there until 1921 when he accepted the directorship of the Harvard Observatory. His original investigations were devoted to studies in photometry and spectroscopy, as well as the orbital theory and computation on which he contributed important papers to the literature of astronomy. He was awarded the Draper Medal by the National Academy of Sciences in 1926. In 1928 he announced evidence that the stars are continually fed by vast showers of meteors. He is a member of the National Academy of Sciences and served as president of the American Association for the Advancement of Science.

SHARLOW, MYRNA DOCIA (1893–). An American dramatic soprano, born at Jamestown, N. D. Having studied piano and voice at the Beethoven Conservatory, she continued her vocal studies with F. E. Bristol (1911–13) and with E. Clément in Paris (1914). Her operatic repertory she acquired under Campanini, Moranzoni, Weingartner, and S. Wagner. She made her début with the Boston Opera Company as Stella in Offenbach's *Contes d'Hoffmann* (Nov. 25, 1912) and sang with that organization until 1914, and later with the San Carlo Opera Company of Naples, Italy. From 1915 to 1921, and again after 1923, she was a member of the Chicago Opera Association. In 1914 she appeared at Covent Garden. She is gifted not only with a glorious voice, but also is a splendid actress. Her favorite rôles are Tosca and Brünnhilde in *Siegfried.* In 1921 she married Edward B. Hitchcock.

SHARP, WILLIAM GRAVES (1859–1922). An American diplomat (see VOL. XX). He was a member of Congress from Ohio from 1909 to 1914, resigning in the latter year following his appointment as Ambassador to France, in which office he served until 1919. He was elected a Foundation member of the Société Astronomique de France, having been a lifelong student of astronomy. He was awarded the Grand Cross and Legion of Honor in recognition of his services as ambassador.

SHARPE, HENRY GRANVILLE (1858–). An American army officer, born at Kingston, N. Y., and graduated from the United States Military Academy in 1880. Most of his official employment was in the commissary department. He had charge of the relief of flood sufferers at Cairo, Ill., and Memphis, Tenn., in 1897, and was on duty in Porto Rico in 1898, in the Philippines from 1902 to 1904, and in France in 1919. He was promoted to be major general in 1918 and retired in 1920. He wrote: *The Art of Subsisting Armies in War; The Art of Supplying Armies in the Field as Exemplified during the Civil War; The Provisioning of the Modern Army in the Field; The Quartermaster Corps in the Year 1917 in the World War* (1921).

SHAW, GEORGE BERNARD (1856–). A British author and dramatist (see VOL. XX). He received the Nobel Prize for literature in 1925. In 1914 he wrote *Common Sense About the War,* which was so outspoken as to offend many, and throughout the World War he aroused considerable irritation by what was considered untimely defense of the Germans and faultfinding with the Allies. Other later books were: *How to Settle the Irish Question* (1917); *Peace Conference Hints* (1919); and the plays: *The Music-Cure* (1914); *O'Flaherty V.C., The Inca of Perusalem* (1915); *Augustus Does His Bit* (1916); *Heartbreak House* and *Annajanska* (1917); *Back to Methuselah,* a cycle of five plays (1921); *Jitta's Atonement,* a translation of *Frau Gitta's Sühne,* by Siegfried Trebitsch (1922); *Saint Joan of Arc* (1923), which was played in New York City in 1924; and *The Apple Cart* (1929). He also wrote *The Intelligent Woman's Guide to Socialism and Capitalism* (1928). Consult *The Quintessence of Bernard Shaw,* by Henry Charles Duffin (1920); *Bernard Shaw,* by Edward Shanks (1924); *Bernard Shaw Explained; a Critical Exposition of the Shavian Religion,* by George Whitehead (1925); and *A Guide to Bernard Shaw,* by Edward Wagenknecht (1929).

SHAW, JAMES BYRNIE (1866–). An American mathematician, born at Remington, Ind. He studied at Purdue University. During 1890–98, he was professor of mathematics at Illinois College, and later held a similar chair at Kenyon College. From 1903 to 1910, he was professor of mathematics at the James Milliken University, and in the latter year was called to the University of Illinois, where in 1918 he became professor. In addition to many mathematical papers he wrote *Synopsis of Linear Associative Algebra* (1907); *Lectures on the Philosophy of Mathematics* (1918); and *Vector Calculus* (1922).

SHAW, J(OHN) W(ILLIAM) (1863–). An American Roman Catholic Archbishop, born at Mobile, Ala. He was educated at the Academy of the Brothers of the Sacred Heart at Mobile, and at St. Finian's Seminary in Ireland. He studied also at the University of the Propaganda at Rome, and was ordained to the priesthood in 1888, becoming assistant in the cathedral at Mobile, and assistant and missionary in St. Peter's Church, Montgomery, Ala., and, in 1891, rector of the cathedral of Mobile and chancellor of the diocese. In 1910 he became Coadjutor Bishop of San Antonio, Texas, and in 1911 bishop. In 1918 he was consecrated Archbishop of New Orleans.

SHAW, RT. HON. TOM (1872–). An English labor leader, born at Colne, Lancaster. He began work in a cotton mill when but eight years old. He was self-educated, mastering French and German so thoroughly that he was one of the most skillful interpreters at the international labor conferences which he attended and for which he was frequently secretary. One of the ablest speakers in the English labor movement, and possessed of a thorough knowledge of industrial problems, he entered Parliament in 1918, and the next year was made a Commander of the Order of the British Empire. Ramsay MacDonald appointed him Minister of Labor in 1924, and in the same year he was made a member of the Privy Council. In the Labor cabinet formed in June, 1929, he was Secretary of State for war.

SHEAR, THEODORE LESLIE (1880–). An American archæologist. He was born at New London, N. H., and graduated at New York University (Ph.D., Johns Hopkins, 1904). He studied at the American School at Athens and the University of Bonn; was instructor in Greek and Latin, Barnard College, New York City (1906–10), and since 1911 has been associate in Greek at Columbia. In 1921 he began lecturing on art and archæology at Princeton. In the World War, he served as first lieutenant in the Air Service, U. S. Army. He conducted archæological excavations at Cnidus (1911), Sardis (1922), and Corinth (1925). In 1929 he was appointed by the American School of Classical Studies as director of the excavation of the Agora, or ancient market place, at Athens. He is the author of *Influence of Plato on St. Basil* (1907); *Sardis-Architectural Terracottas* (1925); and articles in archæological periodicals.

SHEEP. See Live Stock.

SHELFORD, Victor Ernest (1877–). An American zoölogist, born at Chemung, N. Y., and educated at the University of Chicago. He was assistant in zoölogy (1900–01) at West Virginia University; assistant (1904–07), associate (1907–09), and instructor (1909–14) in zoölogy at the University of Chicago; assistant, and associate professor (1914–27), and professor (from 1927) at the University of Illinois, and biologist in charge of the research laboratories of the Illinois Natural History Survey (from 1914). He has been active in developing research on ecology and has published *Animal Communities in Temperate America* (1913). He was also the compiler of *Naturalists' Guide to the Americas* (1925).

SHELL. See Projectile.

SHELL SHOCK. See Psychology.

SHEPPARD, Morris (1875–). A United States Senator (see Vol. XX). He was reëlected to the Senate from Texas in 1918 and in 1924 for the term expiring in 1931. He has been a member of the Senate committees on commerce, irrigation and reclamation, manufactures, and military affairs.

SHERMAN, Stuart Pratt (1881–1926). An American author, critic, and editor, who was born at Anita, Iowa. He was educated at Williams College and Harvard (Ph.D., 1906), and after a year as instructor of English at Northwestern University went to the University of Illinois in 1907 as associate in English. He became professor of English there in 1911, leaving this post in 1924 to become literary editor of the *New York Herald Tribune.* In 1926 he was drowned in an accident on Lake Michigan. He wrote *Matthew Arnold* (1917); *On Contemporary Literature* (1917); *Americans* (1922); *The Genius of America* (1923); *Men of Letters of the British Isles,* with Theodore Spicer-Simson (1924); *My Dear Cornelia* (1924); and *Points of View* (1924). He was an associate editor of the *Cambridge History of American Literature* (1917) and edited various other works. Consult *Life and Letters of Stuart P. Sherman,* by Jacob Zeitlan and Homer Woodbridge (1929).

SHERRILL, Charles Hitchcock (1867–). An American lawyer and diplomat, born in Washington. He was graduated from Yale in 1889 and from the law school of that university in 1891, practiced law in New York for several years and in 1909 was appointed Minister to Argentina. He served until 1911, when he was obliged to resign from the diplomatic service on account of ill health. In 1912 he resumed the practice of law. He was active in athletics and was the originator of several series of national and international sports. During the World War, he served as brigadier general and adjutant general of the State of New York. He is the author of *Stained Glass Tours in France* (1898); *Stained Glass Tours in Italy* (1913); *French Memories of Eighteenth Century America* (1915); *Modernizing the Monroe Doctrine* (1916); *Have We a Far-Eastern Problem?* (1920); *The Purple or the Red* (1924); *Stained Glass Tours in Germany* (1927).

SHERRINGTON, Sir Charles Scott (1861–). A British physiologist educated at Cambridge, where he received a degree in medicine in 1892. He was professor of physiology in the University of Liverpool from 1895 to 1913 and resigned to become Wayneflete professor of physiology at Oxford. He was formerly Brown professor of pathology in the University of London and Fullerian professor of physiology in the Royal Institution of Great Britain. In 1927 he lectured at Harvard and before the Canadian Medical Association at Toronto. He is best known for his researches into the repair of nervous tissue and his major works have been *The Integrative Action of the Nervous System* (1906) and *Mammalian Physiology* (1916). He was knighted in 1922 and received the Order of Merit in 1924. In 1925 he published a volume of verse, *The Assaying of Brabantius.*

SHIDEHARA, Baron Kijuro (1872–). A Japanese diplomat and Minister of Foreign Affairs, who was born in Nara-ken and graduated in law from the Imperial Tokyo University (1895). After entering the Department of Agriculture and Commerce, he transfered to the diplomatic service and served in consulates at Chemulpo, London, Antwerp, as secretary at the Tokyo office (1911), embassy counselor at Washington (1912), and Minister to The Hague (1914–15). In the latter year, he became Vice Minister of Foreign Affairs. From 1919 to 1922, he was Ambassador to Washington and from 1924 to 1927, Foreign Minister in the successive Kato cabinets. He again held the portfolio for Foreign Affairs in the Liberal cabinet formed by Premier Hamaguchi in July, 1929. As Foreign Minister, he attempted to settle Japan's international problems through a policy of understanding and coöperation. He was created a baron in 1920.

SHIP, Armored. See Vessel, Naval.

SHIP, Merchant. See Shipbuilding; Shipping.

SHIP, Naval. See Vessel, Naval.

SHIPBUILDING AND NAVAL ARCHITECTURE. The design and construction of naval vessels, as well as of merchant ships, fall under this head; but, for convenience of grouping, they are treated under Navies of the World and Vessel, Naval. After the extensive war losses and the diversion of merchant vessels to war purposes, the Allies' shortage in shipping stimulated shipbuilding to a very unusual extent—particularly in the United States, where the tonnage in the foreign trade was increased from about 1,100,000 gross tons in 1914, to 11,077,397 in 1921, and the total tonnage from 5,368,194 to 18,282,136. Construction in nearly all countries reached its peak in 1920 and then dropped sharply because of the return of ships to peaceful trade, the extensive building, and the slowness with which business, especially overseas commerce, picked up after the War. By 1923 a very large part of the seagoing tonnage was laid up; in the United States—exclusive of vessels on the Great Lakes and in the coasting trade—more than half the tonnage was idle.

After 1923 world trade steadily improved and the idle vessels began to be absorbed. New factors now became of importance. Many of the American ships which were built during the stimulation of construction, caused by an appreciation of war losses and war necessities, were found lacking in desirable qualities. Those with concrete or wooden hulls were definitely discarded. Standard and fabricated ships, especially the former, were less objectionable, but the propelling machinery in both classes was becoming antiquated and relatively inefficient.

In many of the most suitable of the war-built ships, steam machinery was replaced by Diesel motors, and others were likely to be so refitted in the future. The numbers and tonnages of vessels of more than 100 gross tons that were launched during the year ending Dec. 31, 1927, are shown in the accompanying table.

I

MERCHANT VESSELS OF MORE THAN 100 TONS GROSS LAUNCHED IN 1927

Country	Number	Tons, gross
U. S., Atlantic and Gulf	47	107,554
Pacific Coast	11	16,716
Great Lakes	8	54,948
U. S., total	66	179,218
Great Britain and Ireland	371	1,225,873
Canada, Coast	7	13,642
Great Lakes	5	10,131
Other British Dominions	17	6,477
Total Great Britain, etc.	400	1,256,123
Belgium	8	4,693
China	3	2,975
Danzig	8	30,910
Denmark	20	72,038
France	22	44,335
Germany	105	289,622
Italy	25	101,076
Japan	19	42,359
Netherlands	68	119,790
Norway	12	5,363
Russia	18	43,917
Spain	5	22,899
Sweden	18	67,361
Uruguay	5	3,000
World total	802	2,285,679

Table I includes no vessels of less than 100 tons nor those which are not included in Lloyd's Register. In Great Britain and Ireland, these omissions amount to about 17 per cent of the total tonnage built in the year ending June 30, 1928. In the United States, according to the report of the Department of Commerce, there were built, in the fiscal year 1927–28, 969 vessels of 257,180 tons; and on July 1, 1928, there were building or under contract 483 vessels of 264,410 tons, including 12 steel passenger steamers of 75,258 tons, 4 steel cargo steamers of 32,228 tons, 2 steel tankers of 13,116 tons, and 1 ferry steamer of 2767 tons. In all cases, the figures are for gross tons. The numbers and tonnages of merchant vessels under construction in the various countries of the world on June 30, 1928, are given in Table II. The figures are derived from *Lloyd's Register of Shipping.*

II

MERCHANT VESSELS OF MORE THAN 100 TONS GROSS THAT WERE UNDER CONSTRUCTION ON SEPT. 30, 1928

	Building		Ordered or commenced	
Country	No.	Tons	No.	Tons
Great Britain and Dominions	247	1,096,461	79	246,111
United States	29	64,572	20	37,000
Belgium	7	21,150	5	8,260
Brazil	1	770	...	......
China	4	3,513	2	2,210
Danzig	7	38,460	...	......
Denmark	13	64,923	4	17,162
France	20	138,362	3	25,800
Germany	77	423,375	13	66,210
Italy	41	132,739	3	5,465
Japan	17	99,257	4	9,800
Netherlands	50	191,290	11	29,950
Norway	10	15,340	5	7,170
Russia	33	108,428	3	8,500
Spain	7	12,270	2	5,560
Sweden	23	110,182	7	28,382
Uruguay	1	250	...	......
World total	587	2,521,342	161	497,580

About 1924 the development of large passenger vessels in the transatlantic and other trades began to renew its course which the War had interrupted. Until 1927 the largest of the post-war vessels that were produced were of moderate tonnage; but in that year the French liner, *Ile de France*, of 40,000 gross tons and 24 knots speed, was completed; and building competition was reëstablished. The Italian motor liner, *Augustus*, of 19 knots and 32,650 tons—the largest motor ship yet completed—entered service in 1928. The American passenger ship, *California*, the largest merchant vessel ever built in the United States, and the largest one in the world to be fitted with electric drive, also made her first voyage in 1928; a sister ship, the *Virginia*, was completed early in 1929; and the *Pennsylvania*, of similar type, but 4000 tons larger, was finished and entered service in October, 1929. Both the *California* and *Virginia* are of 20,325 gross register tons; the extreme length is 601.25 feet; beam, 80 feet; speed, 18 knots; displacement at normal load draft, 30,250 tons. They are fitted to carry 384 first-class passengers and 363 tourist passengers, and have a cargo capacity of 578,700 cubic feet, of which 100,000 is refrigerated space. They are employed in the New York-San Francisco trade via the Panama Canal. The *Pensylvania,* of the same line, was launched in October, 1929.

The new American Transatlantic line, which in February, 1929, purchased the *Leviathan* and 10 other large passenger ships from the Shipping Board (see SHIPPING: *United States Shipping*), is required by the terms of the sale to lay down two very large and fast liners for service with the *Leviathan* and has announced its intention to build five others of smaller size —three of 35,000 gross tons and two of 25,000 —in the next 10 years. For additional information concerning the recent operations of the Shipping Board, see SHIPPING: *United States Shipping.*

III

STEEL STEAMERS AND MOTOR SHIPS UNDER CONSTRUCTION IN PRINCIPAL SHIPBUILDING COUNTRIES, ON JUNE 30

[*In thousand gross tons*]

Country	Steamers		Motor ships		Total	
	1928	1929	1928	1929	1928	1929
Great Britain and Ireland	650	860	547	590	1,197	1,450
Germany	217	222	190	50	407	272
Japan	28	9	83	171	111	180
Netherlands	69	35	104	137	173	172
France	26	56	99	82	125	138
Russia	27	26	88	99	115	125
United States	29	88	16	25	45	113
Sweden	3	7	99	82	102	89
Italy	31	15	123	59	154	74
Denmark	4	5	94	63	98	68
Spain	24	....	11	45	35	45
Norway	5	20	4	16	9	36
Danzig	4	2	41	6	45	8
Other countries	22	49	1	6	23	55
Total	1,139	1,394	1,500	1,431	2,639	2,825

Two new German passenger steamers of 46,000 tons and 26.5 knots were launched in 1928 for the North German Lloyd Company. One of these was delayed in completion by a very serious fire, but the *Bremen* made her first voyage in July, 1929, and reduced the previous Cherbourg to New York record by eight hours and fifty-two minutes, covering the distance in 4 days, 17 hours, and 42 minutes. The average speed for the voyage was reported to be 27.83 knots; the longest day's run, 713 nautical miles; and the average speed for this day, 29.71 knots. The average daily speed increased steadily and indicated faster trips in the future.

The effects of the *Bremen's* successful passage were immediate and notable. The White Star

Company scrapped the beginnings of a 60,000 ton liner which had been laid down at Belfast. The construction of two large steamers for the Cunard Line straightway was deferred or delayed; while less advanced projects in both America and Europe were being subjected to further study and examination. The leading question is that of speed. It is highly desired, but it is expensive. A moderate cut in the record would have earned but a ripple of interest. But a nine-hour gain on the first voyage, with the certainty of greater speed when pressed, was too much for the equanimity of the other ship owners. As a matter of prestige all the great passenger lines were apparently considering the construction of one or more large and fast vessels to exceed in speed all possible efforts of the *Bremen*; but the desire to lead the way in the new race was curbed by new questions of size, speed, probable economics of operation and advertising, and the possible attitudes of competing lines.

Propelling Machinery. The four principal types of marine engines now in use are (a) the reciprocating steam engine, (b) the turbine (or rotary) steam engine, (c) the internal combustion engine, and (d) electric drive.

In a marine reciprocating engine, the steam develops its power while expanding in one or more cylinders, driving in each a piston that is connected to a crank on the propeller shaft. The majority of existing engines are of the triple-expansion type, i.e., the steam passes through three cylinders, effecting one stage of its total expansion in each. The first, or high-pressure cylinder, receives the steam from the boilers and the third, or low-pressure cylinder, is connected to the condenser. As the volume of the steam increases, the sizes of the cylinders increase and the steam, in its third stage of expansion, is frequently divided between two small low-pressure cylinders instead of using one large one. During its many decades of development, the reciprocating engine attained reliability of action, simplicity, endurance, and ease of repair; but it is less economical under many conditions than the newer types, produces objectionable vibrations in hull and engine structures, and is not so well adapted to very high powers and speeds.

The steam turbine is slowly but steadily displacing the reciprocating engine—less slowly in fast vessels. The Parsons reaction turbine, which is used in the majority of marine turbine installations, is briefly as follows: The rotor, or driving mechanism, consists of a shaft to which are secured one or more short cylinders, the smallest at the steam end and the largest at the exhaust. Each cylinder has circumferential grooves in which thin, slightly curved, blades are firmly set at a considerable angle with the direction of the axis. It is surrounded by a hollow cylinder which has on its inner surface similar rows of blades that extend inward between the rows of blades on the cylinders. The reaction of the pressure of the steam, as it passes through row after row of the blades, turns the rotor, which in early types was directly connected to the propeller shaft. As the pressure falls, the length of the blades is increased, the diameter of the casing being expanded to permit this. When the length of the blades reaches the permissible limit, a larger cylinder is introduced. The process of expansion then goes on and is usually carried into one or more additional turbines before the limit of expansion is reached. As the turbines always turn in one direction, going astern is effected by means of a separate "backing" turbine that revolves in the opposite direction to the main turbines. In the earlier turbine installations, such as are here described, the efficiency of propulsion was much reduced by too high a speed of the propeller and too low a speed of the turbine. By introducing reduction gearing between the turbine and propeller shafts this difficulty was obviated at the designed speed and reduced at other speeds.

The normal marine internal-combustion motor for propelling vessels is a modification of the Diesel heavy-oil engine. It differs materially from the gasoline engine. The fuel chiefly used is crude oil, from which the gasoline and kerosene have been removed, with a flash point of 510° F. or more. It is injected into a cooled combustion chamber where the heat of compression automatically ignites it. The different types are too numerous for description here. They are divided into 4-stroke-cycle and 2-stroke-cycle classes. Both classes have single-acting and double-acting types, while the 2-stroke has in addition the opposed-piston type of one or three cranks per cylinder. Practically all of these types are fitted either with air or airless injection.

The system of electric drive was designed to overcome some of the defects of steam turbines and heavy-oil motors. Powerful electric rotors are connected to the propeller shafts. The current for these is furnished by generating sets driven by steam-turbine engines or heavy-oil motors which are normally operated at their most efficient speeds. By varying the current supplied to the rotors, any desired speed may be given the ship without material loss of efficiency—at any sustained speed with practically no loss.

On Jan. 1, 1928, nearly 79 per cent of the world's steam and motor tonnage (excluding vessels of less than 100 gross tons) used reciprocating engines, less than 15 per cent were fitted with steam turbines, and only a little more than 6 per cent were motor ships (only 2 per cent in 1923). Of the vessels building at the end of 1928, however, about one-half were designed with internal-combustion engines of the heavy-oil type. The increasing demand for motor ships in many services in causing the removal of the reciprocating steam engines from many ships and the substitution of motor machinery. In 1927 the completion of the *California* in the United States and, in 1929, the Peninsular & Oriental Steam Navigation Company's liner, *Viceroy of India*, in Great Britain, marked the serious advent of electric drive into the field of merchant marine propulsion; and this was further emphasized by the selection of this sort of machinery for the new White Star ship.

Unlike Diesel motors, electric drive offers no obstacles to size or speed. The great U. S. Navy aircraft carriers, *Lexington* and *Saratoga*, of 33,000 tons and 35 knots, have a shaft horse power of 180,000—exceeding by far that of any other vessels, merchant or naval, while the speed is greater than that of any vessel in existence of more than 10,000 tons. These were the first large and fast ships fitted with electric drive; judging from their behavior on long trips, they could maintain across the Atlantic a speed exceeding that of any existing merchant vessel by six or seven knots. In case of control from the bridge, capability of reversal of the engines, and strength of backing power, electric drive greatly exceeds geared turbines, thereby making the ship considerably safer at sea and in crowded waters.

Whether the generating units should be driven by relatively small steam turbines or by Diesel motors is a problem which will require time and experience to solve. Geared turbines have the advantages, over turbo-electric drive, of less weight, less floor space, and somewhat greater fuel efficiency when operated continuously at the designed speed. Improved Diesel-electric installations may effect economy in these directions. Since the War, the use of geared turbines for large fast vessels of all kinds has steadily increased. Because of the great demand for the steam turbine and the Diesel motor, the use of reciprocating steam engines has slowly decreased, except for vessels of certain types and for certain trades. In some recent installations, reciprocating engines have been added to turbines to improve the backing and manœuvring powers, and to Diesel engines to give these advantages and to improve the fuel efficiency. Of the former class, there are many examples; of the latter, the Scott-Still engine is one of the latest types.

On account of the increasing steam pressure used in modern marine steam engines, the employment of water-tube boilers and superheating arrangements is constantly growing. All the new fast steamers are fitted with oil-burning boilers and a large number of the older boilers have been changed from coal to oil burning. The use of pulverized coal in place of fuel oil has been tried with excellent results. Pulverized coal in place of oil in internal-combustion engines has been under test in land machinery for many years. While the results attained are good, its value in marine propelling machinery as yet is undetermined.

United States Shipping Board. This board was created by the Shipping Act of 1916 (approved Sept. 7, 1916). The object of the act, as stated in its title, was "to establish a United States Shipping Board for the purpose of encouraging, developing, and creating a naval auxiliary and naval reserve and a merchant marine to meet the requirements of the commerce of the United States with its territories and possessions and with foreign countries; to regulate carriers by water engaged in the foreign and interstate commerce of the United States; and for other purposes." The board thus established consisted of five (increased to seven by subsequent legislation) commissioners. It was given wide powers; to build, purchase, lease, charter, or sell ships; to make rules and regulations in regard to shipping; to form corporations for the purchase, construction, equipment, lease, charter, or maintenance of merchant vessels of the United States; and to perform and control other matters. Under its power to form corporations, the Emergency Fleet Corporation was formed. By building and purchase, 2543 vessels of 14,706,217 dead weight tons were acquired. Of these, 2314 vessels of 13,636,967 tons were built; 103 of 368,305 tons were purchased; 105 of 675,441 tons were seized enemy vessels; and the remainder were transferred from other government departments. To effect construction of the new ships, contracts were made for the building and extension of shipyards, as well as for actual construction. After the close of the War, vessels in hand were completed, the latest in 1921.

In the meantime, great efforts were made to put the new ships to use. The Merchant Marine Act of 1920 directed the board to investigate and determine what steamship lines should be established for the general benefit of American trade. And the board was authorized to sell or charter such vessels as might be suitable to American citizens or companies who agreed to establish and maintain such lines; if no citizens or companies would make the purchases, charters, or contracts for the desired services, the board was authorized to establish the services under its own direction and maintain them until a favorable sale could be made or their financial inadvisability determined. The act also provided for a fund of $125,000,000 to be lent to American citizens or companies to assist in the construction of the best and most efficient type of vessels for use on desired lines. Steamship lines were subsequently established in all practicable directions; vessels were sold or leased to existing lines, and to lines newly formed, at favorable prices with contracts that insured maintenance of the service for a term of years. Later, established lines were sold or leased under similar contracts.

The situation was much improved by the terms of the Merchant Marine Act of 1928, but the full results have not had time to develop. This act raised the loan funds to $250,000,000 and provided for mail contracts on such routes as may be selected by the Postmaster General. The rates are Class 1, vessels capable of maintaining a sea speed of 24 knots in ordinary weather and of a gross registered tonnage of not less than 20,000, payment $12 per nautical mile; Class 2, 20 knots, 16,000 tons, $10; Class 3, 18 knots, 12,000 tons, $8; Class 4, 16 knots, 10,000 tons, $6; Class 5, 13 knots, 8000 tons, $4; Class 6, 10 knots, 4000 tons, $2.50; Class 7, 10 knots, 2500 tons, $1.50.

Another important section of the Act of 1928 provides for the replacement of old vessels controlled by the board and the building of additional passenger, cargo and passenger, and cargo ships of up-to-date type in sufficient numbers to give the United States an adequate merchant marine; and the board is authorized and directed

IV

STATUS OF VESSELS CONTROLLED BY THE UNITED STATES SHIPPING BOARD MERCHANT FLEET CORPORATION AS OF JUNE 30, 1928

	No.	Dead Weight Tons
Vessels in hands of operators or charterers:		
Cargo, operating in specified services, U. S. to foreign ports	219	1,928,236
Cargo, idle, with operating managers	20	177,200
Cargo, U. S. Army service	1	7,840
Passenger, operating in specified services	11	115,330
Tankers	1	10,000
Tankers, idle, with Operations Dept.	1	9,298
Tugs, steel, bare boat	4	....
Tugs (wood), tied up	1	....
Total	264	2,247,904
Vessels inactive, with Merchant Fleet Corporation or builders:		
Cargo, tied up	469	3,511,689
Cargo, spot with Oper. Dept.	9	80,889
Cargo, Dieselizing	3	35,319
Passenger, tied up	2	17,000
Refrigerators, tied up	13	92,220
Tankers (steel), tied up	7	60,766
Tankers (steel), spot with Oper. Dept.	1	9,298
Tankers (concrete), tied up	1	7,500
Tugs (wood), tied up	1	....
Total	506	3,814,681
Grand total of all vessels	770	6,062,585

to present to Congress, from time to time, recommendations as to what new vessels are required for permanent operation under the United States flag and the cost thereof, so that Congress may make provision for them.

The Shipping Board as organized in 1929 consists of seven bureaus—traffic, regulation, operations, construction, law, finance, and research. At the head of each bureau is one of the seven commissioners. The operation and maintenance of the fleet is carried on by a subsidiary organization formed for the purpose and known as the Merchant Fleet Corporation. It replaces the Emergency Fleet Corporation. Its affairs are administered by seven trustees who are the seven members of the Shipping Board, its president being the chairman of that board. The immediate administrative direction of its affairs is in the hands of its vice president and general manager. See Navies of the World and Vessels, Naval.

SHIPMAN, Samuel (1883–). An American dramatist, born in New York City, and educated at Columbia University. He has written many popular plays, among the best-known being *East is West*, in collaboration with John B. Hymer, and *Friendly Enemies*, with Aaron Hoffman. Others are *Love and Art*; *A Social Outcast*; *A Spiritual Vulture*; *The Spell*, with Clara Lipman; *It Depends on the Woman*; *Royal Maid*; *Some Warriors*; *Elevating a Husband*; *Children of To-day*; *Flames and Embers*; *Head of the House*; *Sweethearts*; *The Good-for-nothing*; *Exemption*, with Clayton Hamilton; *Cheaper to Marry*; *The Kreutzer Sonata*, with Percival Wilde; and *First is Last*, with John B. Hymer.

SHIPPING. The depressed financial condition of most European countries which followed the War continued for many years and at the beginning of 1929, full recovery had not yet been attained although ocean-going commerce considerably exceeded pre-war figures. The shipping industry, which severely felt the lack of trade in the years 1919–23, had about reached normal conditions in 1927 and the proportion of idle ships is no longer excessive except in the United States, where the conditions are exceptional and are hereinafter described under the sub-head *United States Shipping*. The amount of new construction everywhere indicates that the vessels laid up are of the older types for which the demand is decreasing. The great increase of American trade with Europe, South America, and the Orient, and the increased trade of all parts of the world with Europe has served to absorb all but five millions of the world's tonnage although the latter is sixteen millions greater than in 1914, while each new ton is of much greater efficiency than a ton of those days. The canals of Suez and Panama are wonderfully facilitating the development of trade; in 1927 that through the former had almost doubled since 1912, while traffic through the Panama Canal had increased from zero to 6456 vessels of 37,189,075 gross tons, almost exactly the same as through Suez, while the cargo carried was somewhat greater. See Panama Canal; Suez Canal.

I

TOTAL GROSS TONNAGE OF VESSELS OF 100 TONS OR MORE IN THE PRINCIPAL MERCHANT MARINES OF THE WORLD ON JULY 1, 1914, AND ON JULY 1, 1923

Country	1914	1923
Great Britain, etc.[a]	21,045,049	22,058,112
United States	5,368,194	16,945,363
Germany	5,459,296	2,590,073
Norway	2,504,722	2,551,912
France	2,319,438	3,737,244
Japan	1,708,386	3,604,147
Italy	1,668,296	3,033,742
Netherlands	1,496.455	2,625,741
Sweden	1,118,086	1,207,727
Austro-Hungary	1,055,719	....
Russia	1,053,818	....
Spain	898,823	1,260,206
Greece	836,868	755,441
Denmark	820,181	996,862
Belgium	352,124	616,670
Other Countries	1,384,097	3,182,993
Total for world	49,089,552	65,166,233

[a] Includes British Dominions.

II

NUMBER AND GROSS TONNAGE OF VESSELS OF 100 TONS OR MORE IN THE MERCHANT MARINES OF THE VARIOUS COUNTRIES OF THE WORLD ON JUNE 30, 1928

	Steam and Motor		Total, incl. Sail	
	No.	Tonnage	No.	Tonnage
United States	3,554	13,607,381	4,336	14,537,958
Great Britain	9,840	22,504,176	10,683	22,782,573
Argentina	252	264,898	292	287,614
Belgium	230	488,219	233	492,609
Brazil	344	542,092	388	559,468
Chile	116	159,568	130	170,864
China	212	315,729	218	317,279
Cuba	52	45,402	70	52,579
Danzig	33	127,568	33	127,568
Denmark	627	1,042,209	713	1,067,539
Estonia	62	42,476	107	52,630
Finland	239	213,991	354	280,581
France	1,482	3,255,832	1,682	3,344,465
Germany	2,053	3,738,067	2,080	3,777,251
Greece	515	1,187,508	515	1,187,508
Honduras	28	69,277	30	69,624
Italy	1,142	3,348,732	1,429	3,428,817
Japan	2,048	4,139,815	2,048	4,139.815
Latvia	81	113,861	98	116,754
Mexico	43	46,916	58	54,401
Netherlands	1,270	2,809,375	1,290	2,816,705
Norway	1,765	2,953,944	1,787	2,968,207
Panama	29	71,442	31	72,242
Peru	26	52,210	42	69,100
Philippines	99	95,444	99	95,444
Portugal	169	219,337	270	246,126
Rumania	34	71,503	34	71,503
Russia	349	373,836	354	376,819
Spain	789	1,137,813	884	1,164.272
Sweden	1,239	1,411,730	1,383	1,447.470
Turkey	179	159,836	179	159,836
Uruguay	.....	....	55	30,292
Venezuela	32	45,193	40	50,606
Jugoslavia	145	260,912	145	260,912
Others	269	180,424	294	189,140
Not stated	40	60,697	79	118,385
Total	29,387	65,157,413	32,463	66,984,956

In Europe, Great Britain is maintaining her position as the greatest shipowner and shipbuilder among the maritime nations of the world. Her shipping interests have always had the wholehearted support of Government and people —especially of the manufacturers, who have realized the importance of shipping as a stimulator and procurer of foreign trade, as well as a carrier of it. In 1917, as soon as the sinking in the unrestricted submarine campaign reached high monthly figures, every possible effort was made to replace the lost ships by new construction and this reached two million tons per annum in 1920. By 1923 the tonnage of 1914 was exceeded by a million tons and proved to be too great for the existing trade. Since that time, the building has been adjusted as closely as possible to the demands. Germany, which lost two-thirds of her tonnage by the War and war settlements, began to build strongly in 1919 and increased her annual construction until she overbuilt her market in 1922–23. With the revival of trade, her full building policy was resumed and by 1928 her merchant tonnage was, among European nations, second only to that of Great Britain. Italy, whose merchant tonnage first exceeded that of

France in 1928, is adding to her margin. The Netherlands, which are building heavily, may pass Norway, which has few vessels under construction; but Norway is a buyer, not a builder, and commonly acquires bargains in completed ships, so that her building programme does not show a definite indication of her future condition.

In the Far East, the Japanese merchant fleet exceeds in tonnage all others except those of Great Britain and the United States. At present rates of construction, however, Germany is likely to crowd her out of third place in less than three years. Japan built heavily in the years 1916–21, more than doubling her existing fleet, but laid down few ships after 1920. Since then, the building has been but little more than enough to replace old tonnage. Denmark, which was an early leader in the development of the motor ship, is still an active competitor in motor-ship construction—largely for other countries.

III

SEAGOING STEEL-AND-IRON STEAM AND MOTOR VESSELS OF 100 GROSS TONS AND OVER ON JUNE 30

[*In thousand gross tons*]

Country	1914	1927	1928	1929
Great Britain and Ireland	18,877	19,155	19,731	20,025
British Dominions	1,407	2,289	2,333	2,393
United States	1,837	10,860	10,854	10,745
Japan	1,642	3,901	4,015	4,068
Germany	5,098	3,311	3,731	4,048
France	1,918	3,348	3,248	3,295
Italy	1,428	3,373	3,325	3,198
Norway	1,923	2,750	2,907	3,174
Netherlands	1,471	2,643	2,806	2,930
Other countries	6,913	7,991	8,558	8,924
Total	42,514	59,612	61,508	62,800

IV

NUMBER AND GROSS TONNAGE ON JUNE 30, 1928, OF VESSELS OF 500 GROSS TONS OR MORE, IN THE LEADING MERCHANT MARINES OF THE WORLD, WHICH USE OIL FUEL UNDER STEAM BOILERS OR IN INTERNAL-COMBUSTION ENGINES (Statistics for countries which have less than 100,000 tons in either type are omitted except in the totals for the world.)

Country	As boiler fuel		In I.-C. engines	
	No.	Tons	No.	Tons
United States	1,835	8,915,397	135	402,747
Great Britain [a]	921	5,700,740	280	1,583,854
Denmark	18	67,805	51	249,183
France	81	542,613	5	11,207
Germany	66	450,176	91	418,512
Italy	82	513,703	57	285,521
Japan	91	560,640	33	125,953
Netherlands	172	808,684	47	245,089
Norway	102	514,358	155	686,494
Sweden	18	85,148	57	299,961
Total for world	3,558	18,741,884	1,009	4,572,171

[a] Includes British Dominions.

V

NUMBER AND GROSS TONNAGE OF MOTOR VESSELS AND OF OIL-BURNING STEAMERS OF MORE THAN 500 TONS IN THE MERCHANT MARINES OF THE WORLD ON JUNE 30 OF THE YEARS 1914–28

Year	Steamers		Motor ships	
	No.	Tonnage	No.	Tonnage
1914	441	1,527,728	60	194,019
1920	1,731	8,345,913	290	693,334
1921	2,474	12,415,181	374	959,471
1922	2,694	13,838,178	416	1,166,370
1923	2,917	15,229,946	431	1,248,158
1924	3,086	16,470,202	500	1,558,722
1925	3,214	17,215,342	608	2,157,273
1926	3,311	17,791,690	757	3,035,375
1927	3,373	17,980,414	881	3,674,426
1928	3,558	18,741,884	1,009	4,572,171

Tankers. On June 30, 1928, of the 1182 steam- or motor-propelled tankers (i.e., vessels carrying oil in bulk) of 6,578,351 gross tons in the merchant marines of the world, Great Britain had 414 of 2,492,301 tons; the United States, 385 of 2,315,889; Norway, 87 of 534,857; and Danzig, Netherlands, France, Germany, Italy, and Japan have 13 to 64 of 113,000 to 216,000 tons.

During and since the War, the very respectable showing of Russia in 1914 has well-nigh disappeared with no great likelihood of early recovery. The Soviet system, in its early form, was a complete bar to shipping prosperity and present conditions are far from favorable. Spain increased her merchant tonnage during and after the war, but since then has not built enough to replace wastage.

VI

SEAGOING STEEL-AND-IRON STEAM AND MOTOR VESSELS, JUNE 30, 1929

[*In thousand gross tons*]

Country	Steamers	Motor ships
Great Britain and Ireland	18,110	1,915
British Dominions	2,221	172
United States	10,268	477
Japan	3,866	202
Germany	3,466	582
France	3,231	64
Italy	2,736	462
Norway	2,232	942
Netherlands	2,543	387
Other countries	7,776	1,148
Total	56,449	6,351

United States Shipping. Much has been said of the activities of the United States Shipping Board in building ships and in finding work for them in SHIPBUILDING AND NAVAL ARCHITECTURE, under *United States Shipping Board;* but the colossal problem they were called upon to solve was not described. The construction work was completed in 1921. Previous to this, however, the Shipping Act of 1920 was passed. The act was a great advance for Congress which,

VII

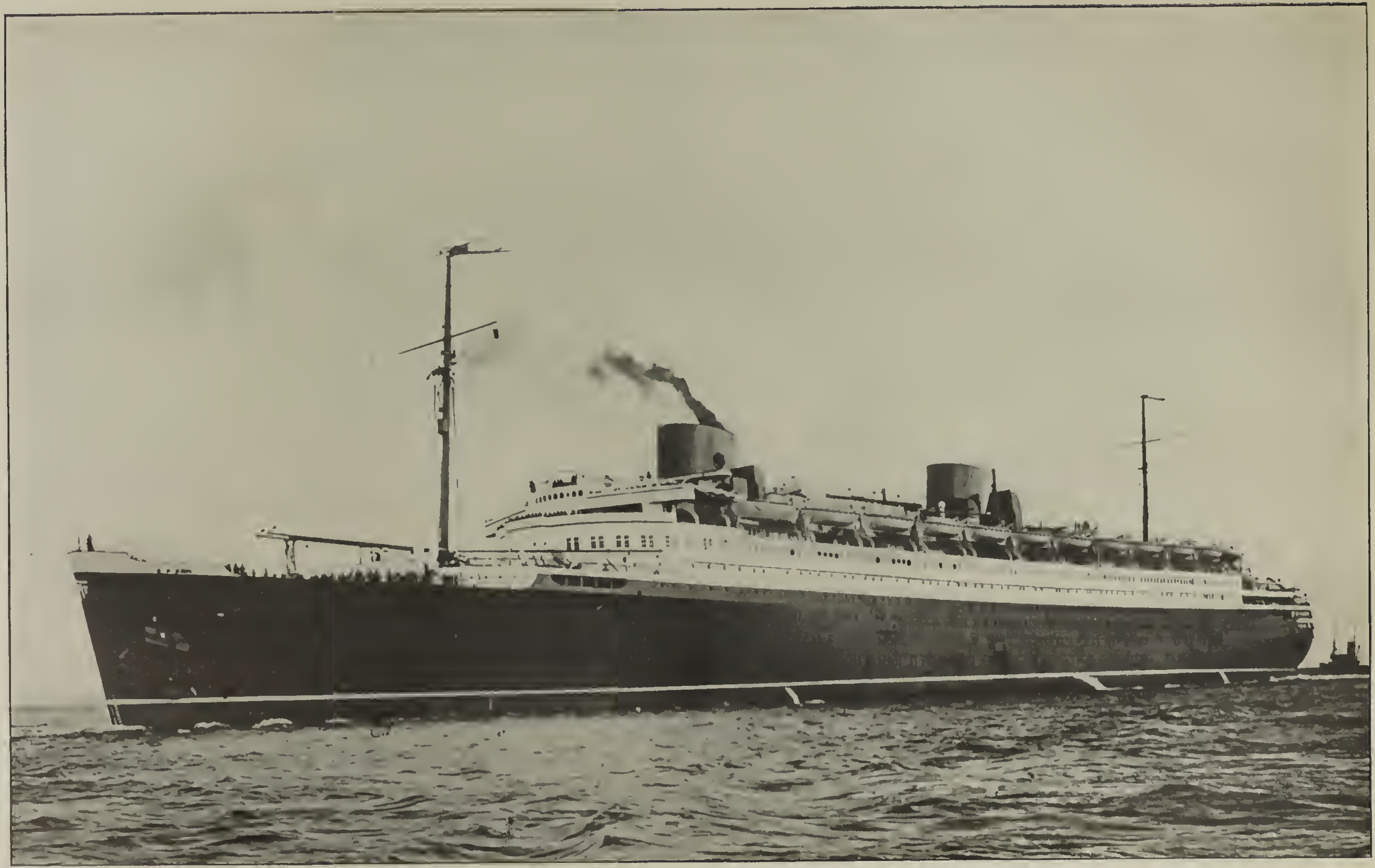
IDLE STEAM AND MOTOR SHIPPING OF PRINCIPAL MARITIME COUNTRIES, ON SPECIFIED DATES

[*In thousand gross tons*]

Country	1926 (July 1)	1927 (July 1)	1928 (July 1)	1929 (Jan. 1)	1929 (July 1)
Idle in home country:					
United States—					
Shipping Board	3,225	2,550	2,473	2,160	1,870
Shipping Board tankers	91	11	62	31	18
Privately owned	415	321	482	603	343
Government owned, other than United States Shipping Board	26	22	22	22	22
Total United States	3,757	2,904	3,039	2,816	2,253
Great Britain and Ireland	1,273	621	738	467	566
Italy	251	264	429	261	236
France	92	91	154	132	75
Greece	67	79	97	74	62 [a]
Japan	25	24	21	53	31
Spain	73	33	25	22	19
Belgium	28	....	15	4	14
Norway	89	24	60	20	10
Netherlands	64	3	48	....	7
Sweden	13	....	....	2	....
Denmark	75	....	....	....	....
Idle in foreign countries [b]	154	77	47	76	39
Grand total	5,961	4,120	4,673	3,927	3,312

[a] Figures as of Apr. 1, 1929.

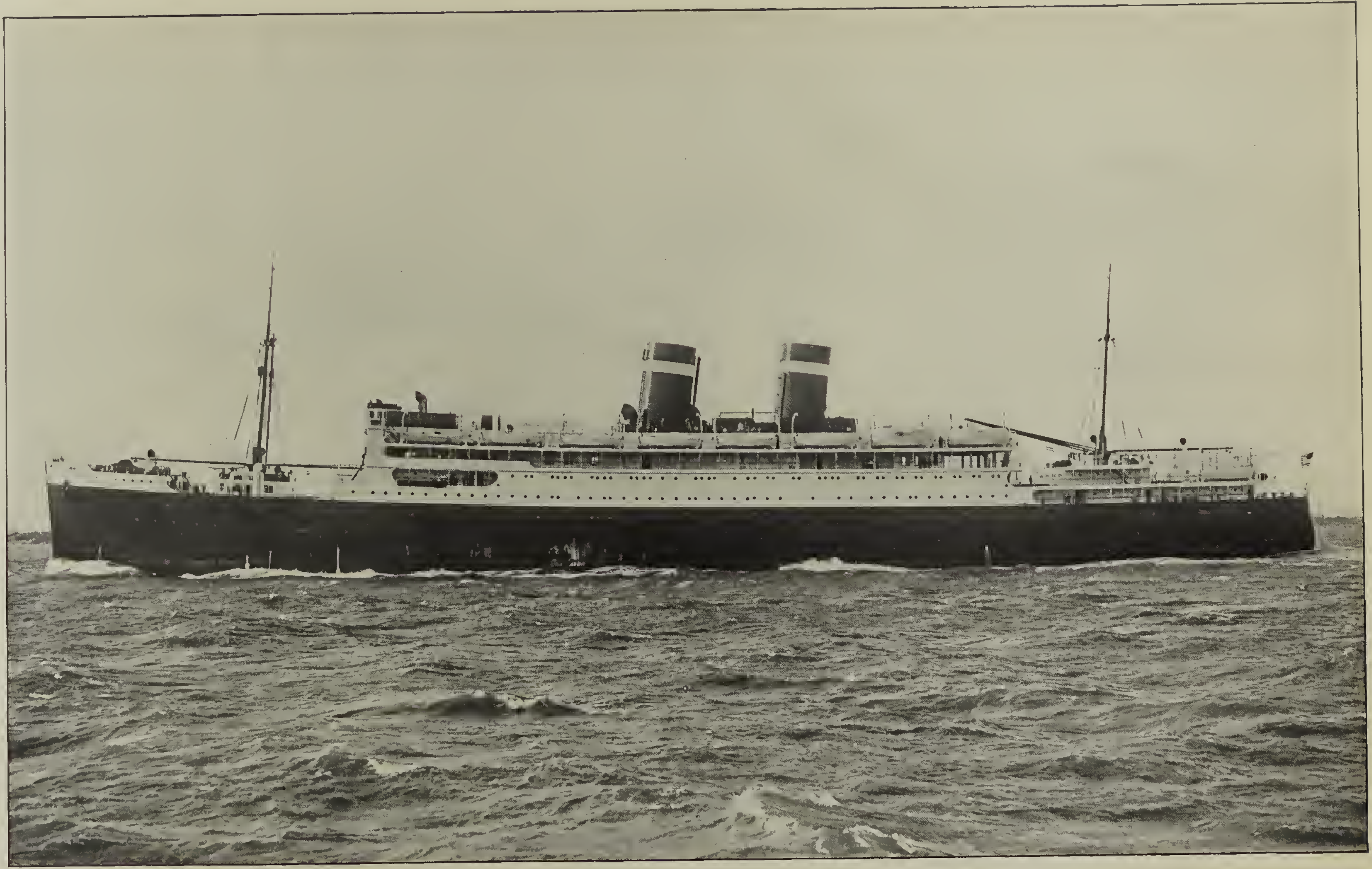
[b] Refers mainly to shipping of countries listed above.



NORTH GERMAN LLOYD TRANSATLANTIC LINER, "BREMEN"

BUILT AT STETTIN, GERMANY, IN 1929

The "Bremen" leaving New York, July 27, 1929, made a record crossing of 4 days, 14 hours, 30 minutes, Ambrose Lightship to Plymouth, 3082 miles, or an average of 27.97 knots.



PANAMA PACIFIC LINE TURBO-ELECTRIC STEAMSHIP, "PENNSYLVANIA"

BUILT IN 1929 BY NEWPORT NEWS SHIPBUILDING AND DRY DOCK CO. FOR NEW YORK-CALIFORNIA SERVICE previous to the War, had viewed with very mild interest the steadily declining tonnage in the foreign trade and made no serious efforts to check it. Transportation was transportation, no matter by whom performed, and if other merchant ships could perform it cheaper than those under the American flag, so much the better. All forms of assistance were grudged and few given. The idea of "subsidy" was taboo, although it was perfectly well known that building subsidies and generous operating and mail contracts were given by all the principal maritime nations of Europe. Great Britain disclaimed subsidies, but in one or two years at least, the only profit made by one of her largest steamer lines was the money received for mail contracts and for supplementary allowances for touching at additional ports that were located along the regular steamer course but not on the schedule of stopping points.

The Shipping Act of 1920 declared that "it is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater part of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States." It further declared it to be the policy of the United States to do whatever is necessary to develop and encourage the maintenance of such a merchant marine. It turned over to the Shipping Board all the newly built government-owned ships and all merchant ships otherwise acquired by the Government except those specifically assigned to other departments. It then gave the board authority to sell, charter, or lease vessels to private citizens or steamship companies for the establishment or extension of such lines or services as the board shoud deem desirable and under such terms as would insure the end in view. In case the board was unable to secure acceptable bids for the establishment of lines which it deemed necessary or desirable, it was authorized to establish and maintain the lines under its own direction and expense, keeping in view eventual sale to private interests. In performing this and other work prescribed by law and this act, the board was directed to keep always in view the purpose and object of the Government as given in the statement of United States policy.

VIII

NUMBERS (1870–1927 ONLY) AND GROSS TONNAGES OF ALL VESSELS OF THE MERCHANT MARINE OF THE UNITED STATES AND OF THOSE VESSELS ENGAGED IN THE FOREIGN TRADE FROM 1789 TO 1928. THE FIGURES ARE FOR DEC. 31 IN THE YEARS 1789 TO 1830; FOR SEPT. 30 IN 1840; FOR JUNE 30 SINCE THAT DATE

	In foreign trade		Total tonnage	
	No.	Tons	No.	Tons
1789	....	123,893	.....	201,562
1790	....	346,254	.....	478,377
1800	....	667,107	.....	972,427
1810	....	981,019	.....	1,424,783
1820	....	583,657	.....	1,280,167
1830	....	537,563	.....	1,191,776
1840	....	762,838	.....	2,180,764
1850	....	1,439,694	.....	3,535,454
1860	....	2,379,396	.....	5,353,868
1870	2,643	1,448,846	28,998	4,246,507
1880	2,204	1,314,402	24,712	4,068,034
1890	1,451	928,062	23,467	4,424,497
1900	1,288	816,795	23,333	5,164,839
1910	1,490	782,517	25,740	7,508,082
1915	2,755	1,862,714	26,701	8,389,429
1916	3,101	2,185,008	26,444	8,469,649
1917	3,453	2,440,776	26,397	8,871,037
1918	3,986	3,559,213	26,711	9,924,518
1919	5,006	6,665,376	27,513	12,907,300
1920	5,932	9,924,694	28,183	16,324,024
1921	5,951	11,077,398	28,012	18,282,136
1922	5,504	10,720,451	27,358	18,462,967
1923	5,140	9,069,342	27,017	18,284,734
1924	4,973	8,793,667	26,575	17,740,557
1925	4,695	8,151,426	26,367	17,405,902
1926	4,616	7,719,139	26,343	17,311,147
1927	4,434	7,309,146	25,778	16,887,501

IX

TOTAL WATER-BORNE COMMERCE (EXPORTS AND IMPORTS) OF THE UNITED STATES IN THE LAST YEAR OF EACH DECADE FROM 1830 TO 1910 AND IN EACH YEAR FROM 1913 TO 1927; ALSO THE PERCENTAGE OF THE TOTALS CARRIED IN UNITED STATES SHIPS

	Total value carried	Per cent in U. S. Ships
1830	$ 144,366,428	89.9
1840	239,327,465	82.9
1850	330,037,038	72.5
1860	762,288,550	66.5
1870	991,896,889	35.6
1880	1,482,612,011	17.4
1890	1,573,567,830	12.9
1900	2,089,528,616	9.3
1910	2,982,799.622	8.7
1913	3,773,060,925	10.1
1914	3,785,468,512	9.7
1915	3,992,625,475	14.3
1916	5,826,041,211	16.3
1917	7,819,495,133	18.6
1918	7,703,700,456	21.9
1919	8,960,098,394	27.8
1920	11,874,997,809	42.7
1921	8,910,434,710	39.8
1922	5,513,403,774	34.7
1923	6,626,784,799	33.2
1924	6,779,056,152	36.3
1925	7,560,975,603	34.1
1926	7,898,095,894	32.2
1927	7,864,943,095	34.1

X

NUMBERS AND GROSS TONNAGES OF VESSELS OF THE UNITED STATES MERCHANT MARINE, UNDER PRIVATE OWNERSHIP AND UNDER THE CONTROL OF THE UNITED STATES SHIPPING BOARD, ON JULY 1 OF EVERY YEAR FROM JULY 1, 1917, TO JULY 1, 1928; ALSO ON NOV. 1, 1928

	Private owners		Shipping Board	
July 1,	No.	Tons	No.	Tons
1917	1,552	3,564,160	19	76,160
1918	1,649	3,813,325	235	939,058
1919	1,676	3,927,651	982	3,827,203
1920	1,774	4,375,613	1,630	6,903,128
1921	1,925	5,240,630	1,798	7,993,771
1922	1,933	5.664,323	1,711	7,686,973
1923	2,035	6.242,547	1,498	6,861,241
1924	1,983	6.244,555	1,339	6,290,323
1925	1,925	6,216,552	1,218	5,839,659
1926	1,996	6,732,724	1,056	5,162,334
1927	1,957	6,836,355	879	4,539,706
1928	1,934	7,054,297	761	4,110,061
Nov. 1, 1928	1,949	7,266,125	727	3,915,206

On July 1, 1921, 893 wooden ships of 1,045.424 tons were operated by private owners; on Nov. 1, 1928, they had 557 wooden ships of 686,916 tons, having scrapped, lost, or sold to foreign citizens 336 wooden ships of 358,508 tons, and had built or bought from the Shipping Board or other sources 360 steel ships of 2,711,411 tons of nearly four times the average size of the discarded ones. The improvement in the quality of the tonnage of 1928 is thus apparent. During the years 1921–26, the Shipping Board discarded 279 wooden steamers of 746,487 tons, which were all it had—another gain in quality. Improvement also has been made in other directions in the quality of the merchant vessels. During the years 1921–28, the number of passenger steamers decreased from 238 to 206, but the total tonnage increased by 224,465 tons (see Table XI). Of the reduction in freight vessels, nearly all of those discarded were wooden vessels or steel vessels of inferior quality. Of the coal-burning steamers, the wooden ones were mostly sold to foreigners or scrapped. Some of the better steel ones were changed to oil burners or fitted with motor machinery. Of the sailing vessels of over 500 tons in Table X, 94 of 166,854 tons are of steel. In the years 1921 to 1928 (both inclusive), the total losses of vessels of over 100 gross tons consisted of 156 vessels of 362,441 tons. These ships were mostly small, averaging 2300 tons. The tonnage loss was 12 per cent of the world's total loss in the same period while the total American tonnage was 21 per cent of the world's total.

XI

NUMBERS AND GROSS TONNAGES OF VESSELS OF THE VARIOUS TYPES IN THE UNITED STATES MERCHANT MARINE ON JULY 1, 1921, AND NOV. 1, 1928

Type of vessel	July 1, 1921 No.	July 1, 1921 Tons	Nov. 1, 1928 No.	Nov. 1, 1928 Tons
Ships of over 1000 tons:				
Passenger	238	1,121,079	206	1,345,544
Freight	2,145	8,619,525	1,443	6,645,282
Oil tanker	351	2,124,279	376	2,331,010
Refrigerator	118	100,688	14	75,170
Steamers:				
Oil-burning	1,595	8,239,896	1,609	8,621,279
Coal-burning	1,102	3,744,025	337	1,373,749
Motor ships	55	131,650	93	401,985
Wooden ships, of over 1000 tons:				
Shipping Board	279	746,487	....	....
Sailing ships of over 1000 tons:				
private ownership	422	699,954	292	514,621
Ships of over 500 tons:				
Wooden ships of over 500 tons, private ownership	893	1,045,424	557	686,916
Sailing vessels of over 500 tons, private ownership	....	....	536	709,115

The outline was thus established. War freight rates and the lack of shipping abroad had built up a large foreign trade in American ships. This reached a maximum in 1920, when 51 per cent of the foreign trade of the United States was carried in American bottoms. Foreign competition and the dropping of freight rates caused a steady decline. Two million tons were transferred to the coasting trade in two years. The ships of foreign nations were suited to their trade routes and their owners were conversant with every feature of the business. There were now too many ships for the slowly reviving trade; many foreign vessels and lines were temporarily run at a loss in the effort to regain their trade. The American ships, due to high wages, and the cost of repairs and other items of maintenance, were more expensive to operate; also, many of them were unsuited to the particular service in which engaged. Again the foreign ships won, but the great efforts of the board slowed down the steady loss to American tonnage until 1927, when a condition indicating some stability was reached; but the American ships were growing older and too few new ships were being built. The board foresaw the inevitable result and urged on Congress the necessity for further aid. The result was the passage of the Shipping Act of 1928 (see SHIPBUILDING, ETC., *Shipping Board*) extending the construction loan fund to $250,000,000 establishing rates for mail contracts, and authorizing the construction by the board of such new ships as might be required for the proper development of the merchant service. It was hoped that the aid given by this act would enable the Shipping Board to give the country an adequate marine. This hope was rendered brighter by a realization of the great work done and doing by the Department of Commerce abroad and at home in stimulating trade with the United States.

XII

NUMBERS AND GROSS TONNAGE OF UNITED STATES MERCHANT VESSELS OF 500 OR MORE TONS ENROLLED IN THE COASTING TRADE OR REGISTERED IN THE FOREIGN TRADE, ON JUNE 30 OF EACH YEAR FROM 1921 TO 1928 AND ON OCT. 31, 1928

	Foreign		Coasting	
June 30	No.	Tons	No.	Tons
1921	2,559	10,620,717	1,164	2,613,684
1922	2,328	10,174,607	1,316	3,176,689
1923	1,958	8,441,892	1,575	4,661,896
1924	1,885	8,215,150	1,437	4,119,728
1925	1,702	7,516,728	1,441	4,539,483
1926	1,552	7,128,697	1,500	4,766,361
1927	1,305	6,291,457	1,531	5,084,604
1928	1,201	6,161,871	1,494	5,002,487
Oct. 31 1928	1,205	6,251,208	1,472	4,831,586

NOTE. The vessels in the foreign trade given in this table do not include those of less than 500 gross tons; those in Table VIII include all documented vessels.

In 1929 arrangements of great importance were effected by the Shipping Board or planned by it. The first of these was the sale, in February, 1929, of the six large passenger liners *Leviathan* (59,956 gross tons), *Washington* (23,788), *President Roosevelt* (13,869), *President Harding* (13,869), *America* (21,329), and *Republic* (17,910); and five smaller liners, each of 7430 gross tons—the *American Banker*, *American Farmer*, *American Merchant*, *American Shipper*, and *American Trader*. The sale was made to interests represented by Paul W. Chapman, Chicago banker, for the sum of $16,082,000. The conditions of the sale include a contract to build two large liners of very high speed to run with the *Leviathan* in the Transatlantic service. These interests also propose to build, in the following 10 years, three liners of about 35,000 and two of 25,000 tons.

The contract for the large liners and the other shipbuilding proposals were predicated upon the receipt of mail contracts and the routes covered. As these mail contracts were held up by the Postmaster General, the execution of the plans was deferred. Similar delays were caused by the Postoffice Department in other routes. As that department desired to refer the law back to Congress for better definition of its provisions, it was thought that there might be a delay of several years before the law was fully carried out. Among the many difficulties to be met by the struggling American marine, this was considered unfortunate and serious, and was thought by many to be wholly unnecessary.

The second project which was developed by the Shipping Board was to make further efforts to sell 253 idle freighters on its hands. These are vessels of 5000 to 10,000 gross tons and include all of the better classes of the board's cargo ships that are not needed for existing services and as reserve ships. Most of them are oil burners. They were to be advertised for sale on more favorable terms than have been offered heretofore, and it is believed that sales will be effected as rapidly as places can be found for their use. The third board project was the reorganization and consolidation of its remaining freight lines with a view to reducing the costs of operation and rendering the lines more attractive to purchasers. If both the freight projects are carried out, the board will be nearly cleared of vessels and the Government will no longer operate ships in the merchant service. The board will then be concerned with the other duties imposed on it by the shipping acts.

Much information in regard to the shipping of the world is contained in the accompanying tables.

SHIPSTEAD, Henrik (1881–). A United States Senator from Minnesota, born at Burbank, Kandiyohi Co., Minn. He was educated at the State Normal School at St. Cloud, Minn., and at the dental school of Northwestern University, Chicago. He practiced dentistry at Glenwood, Minn., for several years, acted as mayor of the town one year, and was elected to the State Legislature of Minnesota in 1917. In 1920 he moved to Minneapolis, and was elected to the United States Senate by the Farmer-Labor Party on Nov. 7, 1922, and reëlected in 1928.

SHOES. See Leather; Boots and Shoes.

SHOOTING. Rifle tournaments and trap shooting have long had their appeal to certain sports lovers and international tests are held frequently in the United States and Europe. In 1928 the most comprehensive tourney of the kind ever held took place in Holland, the Swiss team triumphing, with Sweden second and the United States third. The .22-calibre matches were won by the United States, with Great Britain finishing second. The individual title went to Olle Eriksson of Sweden. A recent development in shooting competition is found in the many intercollegiate and interscholastic tournaments held in the United States. Many of these contests are conducted by wire with satisfactory results.

SHORRIDGE, Samuel Morgan (1861–). A United States Senator. He was born at Mt. Pleasant, Iowa, and had high-school training at San José, Calif. He was admitted to the California bar in 1884 and has since practiced at San Francisco. He became widely known on the Pacific coast as a public speaker. In 1884, 1900, and 1908, he was a Republican presidential elector. He was elected United States Senator from California in 1920 and reëlected in 1926. In the Senate, he has been chairman of the committee on privileges and elections and also has had membership in the committees on finance, irrigation and reclamation, naval affairs, and public buildings and grounds. He was chairman of the subcommittee which conducted an inquiry into naval propaganda in September and October, 1929.

SHOTWELL, James Thomson (1874–). An American historian and university professor (see Vol. XXI). In the World War, Professor Shotwell was chairman of the National Board for Historical Service and a member of the committee engaged in preparations for the Peace Conference. At the conference, he was chief of the Division of History and a member of the International Labor Legislation Commission. He was also American member of the organizing committee of the International Labor Conference in 1919. Since 1924 he has been trustee and director of the Division of Economics and History, Carnegie Endowment for International Peace. In 1929 he was awarded a gold medal of the National Institute of Social Sciences "as one having a world-wide reputation for faithful and effective work in support of the cause of peace among the nations of the world." In 1923 he was lecturer to the Nobel Institute at Christiania (Oslo), Norway. He has written *Labor Provisions in the Peace Treaty* (1919); *An Introduction to the History of History* (1921); and *War as an Instrument of National Policy and Its Renunciation in the Pact of Paris* (1929).

SHOWERMAN, Grant (1870–). An American philologist. Born in Wisconsin, he studied at the State University there. He was in Rome as fellow of the Archæological Institute of the American School of Classical Studies (1898–1900) and on his return to the United States in the latter year became professor of classics at the University of Wisconsin. Since 1923 he has been director of the summer school of the American Academy in Rome. He is the author of *With the Professor* (1910); *The Indian Stream Republic and Luther Parker* (1915); *A Country Chronicle* (1916); *A Country Child* (1917); *Horace and His Influence* (1922); *Eternal Rome* (1924); *Century Readings in Ancient Classical Literature* (1925). He translated Ovid's *Heroides et Amores* for Loeb's Classical Library (1914).

SHULL, A(aron) Franklin (1881–). An American zoölogist born in Miami County, Ohio, and educated at the University of Michigan and at Columbia. He was assistant in zoölogy (1905–08) at the University of Michigan; instructor (1911–12), assistant professor (1912–14), associate professor (1914–21), and professor (since 1921) of zoölogy at the University of Michigan. He did important work on sex determination in rotifers and in insects, and was joint author (with Ruthven and La Rue) of *Principles of Animal Biology* (1920).

SIAM, sī-ām'. An independent kingdom of southeast Asia; area 200,149 square miles; population in 1921, 9,221,000, as compared with 8,266,408 in 1910; estimated in 1926–27, 9,939,000. Bangkok, the capital, had 931,171 inhabitants in 1924. Chinese coolie immigration arriving at Bangkok in 1927–28 numbered 140,102; those emigrating numbered 63,765.

Industry and Trade. The life of the population centres, for the most part, in the rice fields. In 1927–28, of the 7,389,000 acres under cultivation, 7,319,000 were given up to rice, the yield being 4,527,872 tons. Cotton, tobacco, maize, and pepper receive limited attention. The economic well-being of the country is dependent on forces beyond its control. Drought often plays havoc with the rice crops, while rice demands from Japan and competition from Indo-China and Burma, for instance, affect either favorably or adversely the Siamese market. Thus, exports of rice (in metric tons) reached 1,193,230 in 1913–14; 281,960 in 1920–21 (because of drought); 1,270,535 in 1921–22; 1,275,198 in 1922–23; and 1,433,000 in 1926–27. Of the mineral resources of tin, tungsten, coal, iron, zinc, manganese, antimony, the first receives the greatest attention. Production of tin was: 1918–19, 8834 tons; 1919–20, 8542; 1920–21, 6201; 1927–28, 10,844. In 1913–14 imports were valued at $32,593,000 and exports, at $42,742,000; in 1927–28, $88,500,000 and $121,570,000. Trade continues to be carried on largely with Hongkong, Singapore, China, India, the United Kingdom.

Railway building has been considerable; mileage increased from 976 in 1915 to 1701 in 1927. Through service from Bangkok to Penang was inaugurated in 1922, and a similar service to Chiengmai was planned. Wireless stations have been erected at Bangkok and Senggora.

Government and History. There has been no change in the structural form of government and the King remains the absolute ruler. The revenues increased from $27,527,882 in 1913–14 to $48,900,600 in 1927–28; expenditures from $23,391,510 in 1913–14 to $48,659,300 in 1927–28. The national debt at the end of 1914 stood at $30,410,960; in March, 1928, it was $57,754,509. In May, 1928, a new currency, known as the baht, with the same value as the tical, was introduced. In 1929 the baht was valued at $0.44. Under King Rama VI, progress was continuous, particularly in the fields of sanitation, law, municipal functions, etc. On July 22, 1917, Siam declared war on the Central Powers and sent an ambulance detachment to the western front late in 1918. As an Associated Power, Siam had delegates at the Peace Conference and became a member of the League of Nations. Thus, politically, but as well economically, with the passing of Germany, the British influence became paramount in the country after the War. Rama VI died on Nov. 26, 1925, and was succeeded by his brother Prajadhipok, who has launched a policy of economic and commercial development along thoroughly modern lines.

SIBELIUS, sē-bä'lĭ-us, Jean Julius Christian (1865–). A Finnish composer (see Vol. XI). To his major compositions, he added three symphonies (*E flat Major*, *Symphony VI*, and *Symphony VII* in C major), music to the tragedy, *Kaolema* (containing the "Valse Triste"), and numerous other pieces which have added to his great popularity.

SIBERIA. The term Siberia is applied to a vast area in northern Asia roughly one and one-half times the size of the United States and divided into a number of geographic, economic, and administrative units forming part of the Union of Soviet Socialist Republics. Soviet official sources in 1929 estimated the total area at 15,764,504 square kilometers (6,086,681 square miles). The population in that year was approximately 23,700,000. This territory, comprising all of Asiatic Russia except four small provinces and autonomous Socialist Soviet Republics in the extreme southwestern part, is divided administratively as follows:

	Area (sq. km.)	Population
Far Eastern Area	2,846,323	1,805,837
Yakutsk Aut. S. S. R.	3,769,000	236,728
Buriat-Mongol Aut. S. S. R.	419,000	484,363
Siberian Area	4,028,615	8,667,874
Kazak Aut. S. S. R.	2,924,938	6,530,528
Kirghiz Aut. S. S. R.	246,000	997,441
Ural Area (Asiatic section)	1,530,628	5,000,000 [a]
	15,764,504	23,722,771

[a] Approximate figure.

Although the impression is generally prevalent that the mineral, forest, and fur resources constitute the main wealth of Siberia, it is nevertheless a fact that 90 per cent of the population live in rural districts and the most important productive activities are agriculture and the industries allied with it. The lack of capital has prevented the development of the mineral, forest, and fur resources in the past and probably will continue to do so for a long time to come. The Trans-Siberian Railway serves as the principal mode of communication for the entire region. It is the longest railway in the world, extending from Sverdlovsk, capital of the Ural Area, to Vladivostok on the eastern coast, a distance of 7186 kilometers (4491 miles).

In 1927 the acreage of crops in Siberia was estimated at 7 per cent above that in pre-war times, and of that acreage wheat occupied over 50 per cent, as against 35 per cent in 1923. Live stock was increasing in numbers, with horses nearly as numerous as before the World War, cattle 20 per cent more numerous, and sheep and goats twice as numerous. The gross value of the industrial output had increased by 100,000,000 gold rubles in two years. The trade turnover was nearing the 1,000,000,000-ruble mark, whereas in 1925, it aggregated only half as much. In its plans for the development of Siberia, the Soviet government was giving first place to the basic industries, such as coal and gold mining and metallurgical work, and second place to the more profitable of other industries, such as woodworking, paper, glass, and pottery making and the production of agricultural implements.

Far Eastern Area. (For the rise and fall of the Far Eastern Republic, see below under *History*). This territory, occupying the eastern coast of Asia from Manchuria northward and including most of the island of Sakhalin, is chiefly important for its untapped resources of minerals, forests, fish, and furs. Although 85 per cent of the area remains unexplored, it produces over 40 per cent of the mining and manufacturing output of Siberia. Over 700 deposits of coal, oil, and precious metals have been located, but of these, less than 50 are being worked. In 1926 there were 250 mining and metallurgical enterprises, employing about 20,000 workers. Woodworking, flour milling, and fisheries are the other chief industries. In 1926 the fish catch was 160,000 metric tons, consisting largely of salmon. See Sakhalin.

Yakutsk Republic. Hunting and gold mining are the principal occupations in this desolate, sparsely settled land bordering on the west of the Far Eastern Area and stretching from the Amur River to the Arctic Ocean. The principal transportation system is the Lena River and its tributaries, frozen several months every year. A freighter from Vladivostok reached the mouth of the Lena in the Arctic Ocean in 1927, opening up the possibility of the profitable mining of bulkier and less valuable minerals. An airplane line between Irkutsk and Yakutsk, the capital, has been inaugurated.

Buriat-Mongol Republic. A comparatively small territory to the south of the Yakutsk Republic, populated mainly by cattle-breeding nomads. Cattle in the territory increased from 586,200 in 1924 to 801,400 in 1926. In 1928 the Far Eastern Area, the Yakutsk Republic, and the Buriat-Mongol Republic together had 2,743,000 cattle, 1,058,600 horses, and 2,446,800 sheep, about one-half of the latter in the Buriat-Mongol Republic. There are also a few leather and glass factories in the latter region.

Siberian Area. The largest and most developed part of Siberia. It adjoins the Yakutsk Republic on the east, the Ural Area and Kazak Republic on the west and southwest, and extends north and south from the Arctic Ocean to Mongolia. The principal cities are (population in 1926 in parentheses): Omsk (161,475), Novo-Sibirsk, the capital (120,700), Irkutsk (98,979), Tomsk (92,485), Barnaul (73,798), and Krasnoyarsk (72,162). In 1928 about 2,000,000 acres were under cultivation in the region, or 13 per cent more than in 1913, and in the six months ending Dec. 31, 1928, it produced 1,096,000 metric tons of grain, or 17 per cent of the total for the entire country. Cattle increased from 5,974,000 head in 1926 to 6,661,600 in 1928, butter purchases by state and coöperative marketing agencies in the region totaled 35,764 tons in 1928, and it accounted for 15.7 per cent of the country's fur production in 1927. The product of the larger factories and mines is valued at about $100,000,000 annually, one-fifth of which is credited to mines. It has large and undeveloped coal, iron, and nonferrous metal-ore deposits. Lumbering is in the infant stage, with 138,451,000 hectares suitable for exploitation.

Kazak Republic. This large territory, stretching south and west from the Siberian Area to the Caspian Sea and eastward to Mongolia, has tremendous agricultural potentialities. Its development is expected to be stimulated by the completion of the Turkestan-Siberian Railway now under construction.

Kirghiz Republic. Stock raising is the principal occupation of the semi-nomads inhabiting this comparatively small territory wedged in between the Kazak Republic and western Mongolia.

Ural Area. This area, straddling the Ural mountains and including the remaining Asiatic territory west of the Siberian Area and a small part of European Russia, is similar in its geography and economic development to the Siberian Area. It has great iron-ore reserves, those of the Magnet Mountain alone totaling 225,000,000 metric tons. In 1929 the discovery in the Kuznetsk Basin region of this area of a large deposit of coal rich in volatile matter, from which all kinds of oil products may be recovered, was reported by Soviet officials. The Kuznetsk Basin has other large deposits of high-grade coal, iron, manganese, gold, copper, and other minerals and metals and promises to become a thriving metallurgical centre.

History. Immediately after the Russo-Japanese War of 1904–05, a rapprochement took place between Russia and Japan. In a series of four secret treaties, most of which were not made public until the time of the Washington Conference (1921–1922), the two Powers allocated each other their respective zones of interest in the Far East and agreed on friendly coöperation in Far Eastern affairs. The fourth and last of these treaties, which was first published by authority of Trotsky in 1917, was concluded on July 3, 1916, and provided for what amounted to an alliance between Russia and Japan. It was contemporary with an open agreement by which the two Powers bound themselves to coöperate in the regions which hitherto had been the bone of contention between them. Thus, the former enemies had taken definite steps for the prevention of future conflict over eastern Siberia and for a joint imperialistic policy in China to the prejudice of the interests of all other Powers; but hardly had this policy matured when the Russian Revolution annulled the four secret treaties and provided Japan with a pretext and an opportunity to pursue a course of her own in the Far East.

A new chapter in the history of Siberia opened when the decision was reached in the summer of 1918 for Allied intervention in Siberia. The conclusion of peace between Soviet Russia and the Central Powers closed Russia proper to the Allies and thus there remained to them Vladivostok, the back door, as the only possible entrance to render aid to those Russian elements which were still eager to continue the War. The Allies were also anxious to prevent the large military stores in Vladivostok and along the Siberian Railroad from falling into the hands of the enemy. An additional reason for the despatch of the Expeditionary Force was the desire to aid the Czechoslovak Legion which had been slowly and laboriously fighting its way to the Pacific in order to proceed to France, and which had come in conflict in Siberia with the Bolshevists and the armed German and Austrian prisoners. These were the reasons advanced by the United States in an official announcement of Aug. 3, 1918, for its participation in the venture. Doubtless imperialist motives, and particularly the desire to crush Bolshevism, activated more than one of the participants, as well. In the case of Japan, for example, it soon became evident that she aimed at the exclusion of Bolshevism and Russia from the Far East, and at the extension of her own political and economic power to eastern Siberia.

Meanwhile, a rather confused situation had arisen in the interior of Siberia. Early attempts on the part of the Bolshevists to spread their power to Siberia were only partially successful and were blocked during 1918 by the Czechoslovaks and the anti-Bolshevik organizations of various descriptions which sprang up during the course of the year. The confusion was further increased by the independent action of the Japanese, who landed troops at Vladivostok in the spring of 1918. During the summer, the Allied Expeditionary Force arrived and at the same time the Japanese advanced along the Siberian Railway. Thus, there were active over the vast extent of the Siberian territory an incoherent combination of forces and movements each one of which was, with the exception of the common opposition to the Soviet government, actuated by different motives. At the end of 1918, Admiral Kolchak succeeded in uniting the many counter-revolutionary groups into a rather loose organization which established its headquarters at Omsk in western Siberia.

After the elimination of the moderate Socialists and the liberal elements through a *coup d'état* of Nov. 18, 1918, the Omsk government adopted openly a policy of monarchist reaction. The reactionary and military character and the administrative inefficiency of the Kolchak government and particularly the predatory raids of such ruthless anti-Bolshevik condottieri as the Cossack Attamans, Semenov, Ungern-Sternberg, and Kalmikoff, who recognized only nominally the authority of Kolchak, served to discredit the entire anti-Bolshevik movement with the mass of the Siberian people. The initial support which the counter-revolutionists received from the native population was further weakened by the fact that they were backed by foreign troops operating on Russian soil and especially by the Japanese, whose selfish aims became more and more evident. The number of Japanese troops in Siberia was temporarily reduced as a result of the protest of the American government on Nov. 2, 1918.

The United States, on the other hand, which was the only foreign government that in a measure held the confidence of the Siberian people, refused to enlarge its action into military support of the west Siberian government, in spite of urgent recommendations of the chief American representatives in Siberia in favor of such procedure. Also the Japanese, who had no interests west of Lake Baikal, refused to make such a move and preferred to tighten their hold on eastern Siberia. The military position of Kolchak became in consequence more and more precarious and was further aggravated by the action of General Semenov, who sat astride the Trans-Siberian Railway at Chita and held up at will Kolchak's supply trains. At the same time, the policy of reaction at Omsk went its course and succeeded in alienating completely the sympathies of the Siberian population. After initial military successes during 1919, the Kolchak All-Russian Movement succumbed to the Bolshevists at the end of the year, a victim of its own folly and of the indifference of the Allies who ostensibly had moved into Siberia to assist the Russians in the formation of a representative government.

This débâcle was followed in February, 1920, by the withdrawal of the American Expeditionary Force and the abandonment by the United States of a Siberian policy which had been a sterile adventure from the start. The last American troops were withdrawn on Apr. 1, 1920. The Japanese, however, remained and consolidated their powerful position. They issued a statement on Mar. 31, 1920, to the effect that "the presence of the Japanese forces in the Russian Far East does not imply any political designs against Russia and . . . as soon as the political situation in the Russian Far East has become normal to the extent that there will be no danger to Korea and Manchuria, and life and property of all our nationals protected and normal railway communications restored, that then, after the evacuation of the Czechoslovak forces has been completed, our troops will be withdrawn from Siberia as early as possible." This statement was followed in April of the same year by an attack of the Japanese troops on the local Russian forces and by the Japanese occupation of the entire Maritime Province. A weak anti-Bolshevik government led for a time in this region a precarious and ignominious existence as a tool of the Japanese.

After the fall of the All-Russian government, the Bolshevists, advancing from the line of the Trans-Siberian Railroad, gradually established their authority in the greater part of the country. At Irkutsk, the Western Siberian Revolutionary Committee sprang up, which assumed control and governed under direction from Moscow. Local opposition in eastern Siberia to the committee gave birth to the Far Eastern Republic which gradually took over control in practically the entire region east of Lake Baikal. The Republic was nominally an independent state and recognized as such by Soviet Russia on May 14, 1920, with its capital at Chita. In reality, it maintained close connection with Russia. The Far Eastern Republic was not organized along Soviet lines, but on the basis of radical democracy. While private property was abolished, the constitution of the new state contained a bill of rights and the Legislature was elected by the universal franchise of the people. In short, the fundamental principle of the Soviet doctrine, namely, the dictatorship of the proletariat, was not applied; but it was obvious from the beginning that the Far Eastern Republic was merely a transitional organization and was created to serve as a "buffer" state between Soviet Russia and Japan. This became very evident from its strongly anti-Japanese policy and from its vigorous action against the counter-revolutionary elements, which were still operating within its territory or on its frontiers. In October, 1920, its forces expelled Semenov from Chita.

In consequense of the successes of the Far Eastern Republic, the Japanese opened negotiations with representatives of this state and the Soviet government during 1920, which resulted in the definition of the frontiers between the territory of the Chita government and the Japanese zone. Meanwhile, new complications arose, because of the Japanese occupation of the northern half of the Island of Sakhalin and of parts of Kamchatka, ostensibly in reprisal for the massacre of 350 Japanese at Nikolaevsk in March, 1920. Then, in the spring of 1921, Japan gave support to an anti-Bolshevist White government in Vladivostok under the Merkulov brothers. This government eventually fell after a short Bolshevist campaign late in 1922, when Japanese troops had been withdrawn.

In the early part of 1921, the Chita government called on Japan to withdraw from the remainder of the Siberian territory and pointed to the Japanese pledges in this respect. When this action produced no results, more vigorous notes were directed to the Japanese government, while at the same time representations were made to the United States in which attention was drawn to the fact that the presence of Japanese troops in Siberia was a direct result of the invitation on the part of the United States to the Japanese government for intervention in Siberia and the claim was advanced that therefore the American government was morally responsible for the existing situation. This protest came simultaneously with a strong note from the Washington government to Japan. The United States had grown apprehensive as to the intentions of the Japanese in Siberia and gave warning that Japan's policy might lead to her isolation in Far Eastern affairs. Japan, however, evaded a direct settlement of the issue by inviting the Far Eastern Republic to a conference. Negotiations were begun in September, 1921, at the conference of Dairen, which dragged out till April, 1922, without results.

Meanwhile, the Far Eastern Republic was unofficially represented at the Conference of Washington. There, the Siberian question came up, but was shelved after lengthy discussions. This conference, however, had the indirect result of convincing the Japanese that a policy of closer adherence to international coöperation would be more productive than a policy dictated by national egotism. This consideration, together with reasons of domestic policy, induced the Japanese government, in the summer of 1922, following a proposal of the Far Eastern Republic for renewed negotiations, to express its willingness to evacuate the Siberian mainland by the end of October of the same year. A new conference took place in September, 1922, at Changchun in Manchuria, at which Soviet Russia was officially represented through Joffe, her envoy to China.

After some minor agreements, the conference broke up because Japan was as yet unwilling to deal directly with the Soviets. In conformity with its pledge, the Tokyo government withdrew its troops from the mainland in October. Finally, under the terms of a treaty negotiated with Russia on Jan. 20, 1925, Japan withdrew her troops from Sakhalin early in that year. This treaty also granted Japan some concessions in the area she was evacuating.

From the very start, the connection between the Far Eastern Republic and the Soviet government had been close and this intimate relationship grew in proportion to the consolidation of the position of the Chita government, to the freeing of Siberian soil from foreign troops and from counter-revolutionists, and to the crystallization of a Soviet Far Eastern policy, especially with regard to China. In December, 1920, a treaty had been signed between the Far Eastern Republic and Soviet Russia whereby Kamchatka was ceded to Moscow. At the same time, communism came more and more to the fore in the inner political life of the Far Eastern Republic and tended to submerge the original democratic principles. The Communists gradually obtained a majority in the National Assembly at Chita and the Far Eastern Republic became for all practical purposes a part of the great Soviet organization. With the evacuation of the Maritime Province by Japan, all of the former Asiatic domains of the Czar were in the hands of revolutionary Russia. The Far Eastern Republic, having fulfilled its purpose, was liquidated on Nov. 13, 1922, when the Chita National Assembly voted to turn over all power to a revolutionary committee which operated as part of the Government of the Russian Socialist Federated Soviet Republics. The undisputed authority of the Moscow government now stretched, in the vast, thinly populated, and undeveloped territory of Siberia, from the Ural Mountains to the Pacific Ocean. The history of Siberia became thereafter wholly part of the history of Soviet Russia. See Russia.

SICARD, sē′kȧr′, François Léon (1862–). A French sculptor and member of the Académie des Beaux-Arts, who was born at Tours and studied under Cavallier and Barrias. He won first prize at the Rome exhibition in 1891 and in 1905 was awarded the medal of honor for his statue of George Sand. His works include "The Good Samaritan"; "Agar" and "Edipo" in the Luxembourg Museum; statues of Cardinal Meignan and Joan of Arc, and the figures for the municipal building at Tours.

SIDIS, Boris. See Psychology, Abnormal.

SIEGFRIED, André (1875–). A French writer and professor at the École des Sciences Politiques, who was born in Havre and educated at the Lycée Condorcet, the Faculties of Letters and Law, and the École des Sciences Politiques. In August, 1929, he was a speaker at the Williamstown Institute of Politics in the United States. He was best known in America for *America Comes of Age* (*Les États-Unis d'aujourd'hui*, 1927), a study of present-day civilization in the United States, which, as well as *La Démocratie en Nouvelle-Zélande* (1904, trans. 1914) and *Tableau politique de la France de l'Ouest sous la III^e République* (1913), received literary prizes. Other works were *Le Canada* (1906); *Deux mois en Amerique du Nord à la veille de la guerre* (1916); a translation of G. F. Campbell's *De Verdun aux Vosges* (1916); and *L'Angleterre d'aujourd'hui* (*Post-war Britain*, 1924).

SIERRA LEONE, sė̂-ĕr′rȧ lė̂-ŏ′nė̂. A British colony and protectorate on the west coast of Africa between French Guinea and Liberia. Area of colony, about 4000 square miles; population in 1921, 85,163, of whom 1161 were Europeans. In 1911 the population was 75,572, of whom 702 were Europeans. Freetown, the chief city, had 44,142 inhabitants in 1921, as compared with 34,090 in 1911. The protectorate has an area of 27,000 square miles and a population (1921) of 1,456,148. The colony and protectorate continue to depend upon the export of palm kernels and cola nuts, which form 87 per cent of the domestic exports. Other exports are palm oil, piassava, and rice. Exports in 1913 totaled £1,731,252; in 1920, £2,949,380; in 1927, £1,767,259. Imports, consisting of manufactured goods, food, drink, tobacco, and coal, totaled £1,750,303 in 1913; in 1920, £3,548,478; in 1927, £2,112,024. The important place that Germany occupied in the colony's export trade—it took most of the palm kernels—was taken by the United Kingdom and the United States. The tonnage of vessels entered and cleared in 1927 was 4,058,059 tons. Revenues for 1913 and 1927 were £618,383 and £719,637; expenditures for the same years were £622,439 and £754,610. The public debt on Dec. 31, 1927, amounted to £1,729,848. After 1912 the railway from Boia Junction was extended to Kamabai (104 miles). The natives gave excellent assistance to Great Britain during the World War and aided in the reduction of Kamerun. Their dependence for foodstuffs completely upon importations led to want after the War because of prevailing high prices.

SILESIA, sĭ-lē′shĭ-ȧ or -shȧ, Upper. This region was the seat of a bitter conflict in the years 1919–21, resulting in the transfer to Poland of the southern and eastern districts (see below). This left German Upper Silesia with an area of 3746 square miles and a population (in 1925) of 1,379,278. The population is mixed. According to the German census of 1910, there were 1,258,186 inhabitants of Polish extraction and 884,045 Germans in German Upper Silesia as constituted before the World War.

Because of this preponderance of the Polish nationals, the Poles, championed by the French, strongly pressed before the Peace Conference their claims for annexation of the whole region. There was an economic factor, however, not to be disregarded. The region was responsible for one-fifth of Germany's total coal production. The vast coal basin, stretching from Oppeln south and east into Teschen and Galicia, by 1913 had produced 45,000,000 tons of coal. Besides, great iron fields, as well as zinc and lead deposits, contributed to make the section one of the most important industrial centres of central Europe. By the decision of the Peace Conference, the region was constituted a plebiscite area and the Inter-Allied Commission was provided for and granted police powers. From February, 1920, until the final disposition of the region (October, 1921), the whole of Upper Silesia was in a ferment. By the French and the Poles, Germans were accused of colonizing the area; the Allied Commission, on the other hand, was charged by Germans with showing partiality toward the Poles and permitting them to intimidate inhabitants in the southern and eastern districts. On Mar. 20, 1921, the plebiscite was taken. The count showed 717,122 votes for Germany and 483,514 for Poland. In the chief industrial centres, the vote was preponderantly German. As the division of the territory came up for consideration before the Inter-Allied Commission, the disorders increased. Not until Allied troops were despatched in June, 1921, did some semblance of order appear.

The impasse caused by the irreconcilability of the rival demands finally prompted the Supreme Council to turn over adjudication to the League of Nations, August 12. A commission made up of representatives of Japan, Brazil, China, Spain, and Belgium, reported on October 20. The report, as accepted by the League Council, virtually conceded all of Poland's claims. The southern and eastern districts, constituting an area of 1241 square miles, with a population of 892,537, were turned over to Poland. The new boundary, running from Oderberg in the south along the Oder River northwest to a point a little below Ratibor, thence northeast to Beuthen, thence northwest to a point west of Lublinitz, and finally northeast again to Lissau, gave to Poland the greater share of the so-called Industrial Triangle containing four-fifths of the coal production and nearly all the metallurgical plants, viz., half of the county of Zabrze, all of the county of Kattowitz, and a little more than half of the counties of Beuthen and Königshütte. Something of the nature of the division may be seen in the fact that of the 67 collieries in operation in Upper Silesia, 47 were allocated to Poland. These mines, in 1920, had produced 31,750,000 metric tons, of which the 47 mines falling to Poland were credited with a production of 23,763,740 metric tons. In the territory allotted to Poland, 510,000 votes had been cast in the plebiscite, of which 285,000 had been for Poland and 222,000 for Germany. As a rule, German votes had been in a majority in the cities. Because the industrial life of the whole region would be dislocated if boundary lines were drawn immediately, the League Council provided a body of administrative regulations. All of Upper Silesia, for 15 years, was to be under the supervision of a mixed commission of Poles and Germans. Railways were to continue in operation under their old concessions and rates were to be uniform. The existing systems of water supply were to be continued. Though the German and Polish customs laws were to apply forthwith at the new frontier, natural products coming from one of the two zones and destined for consumption in the other were to cross the frontier duty-free. The same was to be true for unfinished products needing completion. For 15 years, Poland was to permit exportation into Germany of any of the mineral products in the Polish zone, and Germany was to reciprocate. Property rights were to be respected as well as the rights of minorities. On Oct. 27, 1921, the German government informed the Council of Ambassadors of its willingness to accept the League's decision, though it protested against what it termed the unfairness of the division of territory. During June and July, 1922, the Inter-Allied forces evacuated the region, and were replaced by Poles and Germans. The Germans proceeded in September, in their zone, to hold an election on the question of home rule as against continuance as a province in the Prussian state. By a vote of almost 10 to 1, the decision favored the erection of a self-governing state. The Poles, on their part, divided Polish Upper Silesia, together with Teschen, into three electoral districts for elections to the Polish Parliament.

See POLAND, under *History*; CZECHOSLOVAKIA.

SILK. The United States is the largest and most important silk-consuming and silk-manufacturing country in the world, notwithstanding the fact that it is dependent entirely upon foreign countries for raw materials, taking approximately three-quarters of the world's production, or more than all other countries combined. Raw silk is also the leading import of the United States. As Japan is the leading producer of raw silk (see Table I), it is natural that the greater part of the United States' silk imports come from that country, with China and Italy ranking second and third, respectively. In 1928 the raw silk imported into the United States amounted to 88,269,000 pounds, valued at $373,331,000. The countries from which it was imported were as follows:

	Pounds	
France	40,081	$ 243,403
Italy	792,231	3,599,571
China and Hongkong	10,527,407	45,948,660
Japan	64,111,650	318,123,930
Other countries	17,946	81,680

The total imports of silk and manufactured silk during the year 1928 were valued at $414,628,396. That most of this material is consumed in the United States is indicated by the fact that in 1928 the total manufactures of silk exported were valued at $18,647,749.

The condition of the silk-manufactures industry in the United States in recent years is shown by the accompanying statistics from the U. S. Bureau of the Census.

The world's production of raw silk including tussah silk for the crop years from 1913–14 to 1922–23 is given below. The years 1923–29 are given in Table I.

WORLD'S RAW SILK PRODUCTION BY CROP YEARS

(*In pounds*)

1913–14	59,972,000	1918–19	56,307,000
1914–15	48,468,000	1919–20	61,040,000
1915–16	53,090,000	1920–21	46,500,500
1916–17	59,800,000	1921–22	64,638,000
1917–18	59,007,000	1922–23	69,857,000

Raw silk not only is Japan's leading export but is the most important item in commerce between that country and the United States, naturally affecting to a marked degree relations between the two nations. An American technical committee visited Japan in 1928 and was in conference with representatives of Japanese silk organizations and firms regarding raw-silk classification. At these conferences, an analysis was made of the problems confronting the industry and plans were inaugurated for an international technical raw-silk conference to be held in the United States, in which raw-silk-producing and -consuming countries were to participate. A study was to be made of raw silk in relation to the requirements of silk manufacturers so that mutual benefits and further and more complete standardizations would result. Table III (on page 1457), from the Silk Association of America gives Japanese production and exports for the ten calendar years 1919–28.

As showing the importance of raw silk in international commerce, there was established on Sept. 11, 1928, a national Raw-Silk Exchange in New York which straightway functioned satisfactorily and apparently filled a distinct need. This exchange was able to create a recognized price basis and formed a connecting link between the supply market in Japan and the consumer in

TABLE I—WORLD RAW SILK PRODUCTION, INCLUDING TUSSAH SILK

[*Compiled by the Statistical Bureau of the Silk Association of America*]

	1928–1929 [a] Pounds	1927–28 Pounds	1926–27 Pounds	1925–26 Pounds	1924–25 Pounds	1923–24 Pounds
Europe	11,188,000	11,034,000	9,215,000	10,449,000	12,533,000	11,519,000
Italy	10,560,000	10,201,000	8,499,000	9,656,000	11,585,000	10,803,000
France	452,000	650,000	529,000	573,000	739,000	562,000
Spain	176,000	183,000	187,000	220,000	209,000	154,000
Levant	2,381,000	2,293,000	2,359,000	2,524,000	1,984,000	1,676,000
Asia: Total quantity exported [b]	91,050,000	87,270,000	84,337,000	72,874,000	69,631,000	53,015,000
China, Shanghai	12,534,000 [c]	12,313,000 [c]	10,825,000 [c]	10,394,000 [c]	8,817,000 [c]	8,697,000 [c]
China, Canton	5,919,000	5,809,000	7,055,000	5,302,000	6,550,000	6,018,000
Japan	72,366,000	68,839,000	66,193,000	56,978,000	54,064,000	38,100,000
India	231,000	309,000	264,000	200,000	200,000	200,000
Total, pounds	104,619,000	100,597,000	95,911,000	85,847,000	84,148,000	66,210,000
Tussah	958,000	970,000	1,400,000	2,205,000	1,712,000	990,000
Grand total, pounds	105,577,000	101,567,000	97,311,000	88,052,000	85,860,000	67,200,000

[a] Estimated.

[b] The total production of raw silk in Asia is an unknown quantity, therefore expert figures have been used.

[c] Excludes tussah silk.

The domestic consumption of raw silk including tussah) in China is estimated to be 52 per cent of the production. The exports from Canton and Shanghai during the season 1928–29 were 19,400,000 would indicate a crop of approximately 41,000,000 pounds. The Japan crop was estimated at 87,500,000.

TABLE II—SILK INDUSTRY

Source: U. S. Bureau of the Census.

Section, and year	Establishments	Wage earners (average number)	Primary horse power	Wages	Cost of materials	Value of products	Value added by manufacture
Silk manufactures:							
United States—							
1899	483	65,416	53,565	$20,982,194	$62,406,665	$107,256,258	$44,849,593
1909	852	99,037	92,100	38,570,085	107,766,916	196,911,667	89,144,751
1914	902	108,170	111,417	47,108,469	144,442,321	254,011,257	109,568,936
1919	1,369	126,782	173,748	108,226,330	388,469,022	688,469,523	300,000,501
1921	1,565	121,378	([a])	113,395,626	337,558,799	583,418,756	245,859,957
1923	1,598	125,234	206,020	126,849,454	479,038,263	761,322,119	282,283,856
1925	1,659	132,509	212,609	142.733,539	484,122,527	808,979,399	324.856,872
1927	1,648	127,643	221,249	140,053,588	445,390,676	750,123,705	304,733,029
Paterson, N. J.—							
1921	593	16,666	([b])	17,954,052	48,697,534	87,332.529	38,634,995
1923	614	16,830	([b])	20,482,777	69,687,125	112,100,378	42,413,253
1925	691	16,368	([b])	22,043,617	66,601,152	110,848,379	44,247,227
1927	704	14,628	([b])	21,016,614	50,960,197	105,871,838	48,911.641

[a] Not called for in schedule for 1921. [b] Not available.

the United States. A grading and warehousing committee, as well as an inspection bureau, was established and arrangements were made for a definite basis for the various transactions. Future contracts formed an important feature of the business of the silk exchange and it was believed that the industry would be stabilized through the facilities thus provided. Transactions during the first year of operation of the National Raw Silk Exchange, totaled 165,555 bales of raw silk, valued at approximately $107,610,750. This turnover, it was stated, was equivalent to 31 per cent of the entire amount of Japanese silk consumed during the period.

TABLE III—JAPAN'S RAW SILK PRODUCTION AND EXPORTS

From *The Silk Association of America*

Ten Calendar Years, 1919–1928

Years	Production	Exports to all Countries		
	Pounds	Pounds	Value	Value per lb.
1928	87,501,800 [a]	72,468,239	$347,115,227	$4.79
1927	82,980,000	69,018,045	357,378,742	5.18
1926	76,100,000	58,595,358	349,592,478	5.97
1925	71,000,000	57,996.280	367,256,829	6.33
1924	62,642.738	49,281,276	282,370,601	5.73
1923	55,854,209 [b]	34,825,625	275,045,045	7.90
1922	52,891,738	45.528.341	334,018,700	7.34
1921	51,567,548	34,653,203	207,936,385	6.00
1920	48,220,449	23,102,422	190,784,374	8.26
1919	52,567,399	37,853,124	310,873,826	8.21

[a] Estimated.

[b] Includes approximately 4,000,000 pounds destroyed in earthquake, Sept. 1, 1923.

The necessity for such attempts at stabilizing is most apparent when it is realized that few commodities fluctuate more from year to year than raw silk, and an accompanying table indicates the average price per pound at New York over a number of years. Often there is a considerable fluctuation in a single year, as for example in 1928, when the monthly average for Japanese double extra cracks ranged from $4.83 per pound in July to $5.38 in April, or in 1926, when from an average of $6.76 the price fell to $5.63 in December. Yearly averages are given in Table IV.

TABLE IV—RAW SILK: AVERAGE PRICE PER POUND AT NEW YORK

Yearly average or year	Japanese raw silk [a]	Chinese raw silk [b]
1916–1920	$6.88	$7.96
1921–1925	6.74	7.41
1913	3.72	4.46
1920	8.64	9.94
1921	5.92	6.51
1922	7.18	8.03
1923	8.22	9.18
1924	6.01	6.67
1925	6.38	6.68
1926	6.04	6.35
1927	5.36	5.56
1928	5.12	5.13

[a] Double extra cracks.

[b] Steam filature, third category; formerly known as China best No. 1.

TABLE V—IMPORTS OF UNMANUFACTURED SILK
Source: U. S. Bureau of Foreign and Domestic Commerce.

Yearly average [a]	All unmanufactured silk		Year [a]	Total unmanufactured		Unmanufactured silk			Cocoons	Waste
	Quantity	Value		Value	Quantity	Total	Japan	China		
	1000 pounds	1000 dollars		1000 dollars	1000 pounds	1000 pounds	1000 pounds	1000 pounds	1000 pounds	1000 pounds
1871–1880 [b]	1,340	6,390	1910	67,130	23,457	20,363	11,958	4,084	49	3,045
1881–1890	5,328	16,775	1913	84,915	32,102	26,049	17,425	5,511	158	5,894
1891–1900	9,259	26,843	1920	301,038	39,660	30,058	22,904	5,932	201	9,401
1901–1905	15,798	45,968	1921	264,723	52,332	45,355	31,704	9,587	128	6,849
			1922	371,629	58,467	50,712	40,029	8,378	117	7,638
1906–1910	20,281	67,414	1923	401,655	61,954	49,482	33,354	12,262	410	12,062
1911–1915	30,190	82,703								
1916–1920	45,641	235,332	1924	335,041	60,603	51,281	44,307	4,681	132	9,189
1921–1925	62,030	356,287	1925	408,386	76,795	63,764	49,685	10,341	95	12,936
			1926	402,676	77,666	66,422	53,793	10,250	111	11,133
			1927	399,088	86,344	74,005	61,797	10,788	59	12,281
			1928	373,331	88,269	75,489	64,112	10,527	55	12,725

[a] Fiscal years to 1915, inclusive; calendar years thereafter.
[b] Figures represent raw silk only, quantity for other unmanufactured silk not having been reported.

The accompanying tables are of interest as showing the development of the American silk industry in recent years as revealed by imports of unmanufactured silk and the production of fabrics and other manufactures in census years. This is shown further in the data collected by the U. S. Department of Commerce at the biennial census of manufactures taken in 1928, when the establishments engaged primarily in the manufacture of silk products, not including knit goods made of silk, reported, for 1927, a total output valued at $750,123,705, a decrease of 7.3 per cent, as compared with $808,979,399 report for 1925, the last preceding census year. The total for 1927 was made up as follows: All-silk broad silks, 385,530,447 square yards, valued at $376,919,357; silk-mixed broad silks, 127,296,292 square yards, $108,696,047; velvets, 5,484,095 square yards, $11,909,215; plushes, 1,309,694 square yards, $2,747,745; upholsteries and tapestries, 3,705,240 square yards, $8,302,979; thrown silk, for sale, 11,408,721 pounds, $70,247,417; spun silk, for sale, 4,455,990 pounds, $15,696,165; ribbons, $36,040,945; miscellaneous products, $70,998,258; receipts for contract work, $48,565,577. In addition, silk products were manufactured to some extent by establishments engaged primarily in other lines of manufacture. The value of such commodities thus made as secondary products outside the industry amounted to $7,131,055 in 1927 and $4,729,234 in 1925.

The American silk industry embraces two classes of establishments: (1) Those engaged primarily in the manufacture of finished silk products, not including knit fabrics, hosiery, and other knit goods made of silk; (2) those engaged primarily in the manufacture of silk yarn, known technically as organzine, tram, hard or crêpe twist, and spun silk, and in the manufacture of warps. The greater part of the work performed in the second class of establishments is done, on a contract basis, on materials owned by others.

Of the 1648 establishments reporting for 1927, 819 were located in New Jersey, 490 in Pennsylvania, 181 in New York, 35 in Connecticut, 33 in Massachusetts, 31 in Rhode Island, 14 in Virginia, 7 in Maryland, and the remaining 38 in 15 other States. Paterson, N. J., with an output in 1927 valued at $106,000,000, is the largest centre of the industry. In 1925 the industry was represented by 1659 establishments, the decrease to 1648 in 1927 being the net result of a loss of 340 and a gain of 329. Of the establishments lost, 255 went out of business prior to 1927, 39 were idle throughout the year, 26 reported commodities other than silk as their principal products in 1927 and were therefore transferred to the appropriate industries, and 20 reported products valued at less than $5000. (No data are tabulated at the biennial censuses for establishments with products under $5000 in value.) Of

TABLE VI—PRODUCTION OF THE PRINCIPAL CLASSES OF SILK GOODS
Source: U. S. Bureau of the Census.

Class		Quantity (thousands of units)				Value (thousands of dollars)			
		1914	1921	1925	1927	1914	1921	1925	1927
Value, all classes		......	......	......	......	254,011	583,419	808,979	750,124
Broad silks:									
All silk	square yards	142,713 [a]	230,903	384,725	385,530	96,690	284,761	426,000	376,919
Silk mixed	do	73,320 [a]	47,508	98,391	127,296	41,030	56,296	103,121	108,696
Velvets	do	16,318 [a]	6,410	6,078	5,485	8,570	16,000	14,525	11,909
Plushes	do	9,115 [a]	5,501	925 [b]	1,310	10,136	12,126	2,352 [b]	2,748
Upholsteries and tapestries	do	478 [a]	1,276	2,675	3,705	840	3,826	5,037	8,303
Thrown silk for sale (organzine, tram, and crêpe twist)	pounds	4,070	6,430	9,660	11,409	16,024	47,071	66,478	70,247
Spun silk for sale	do	1,607	4,737	4,692	4,456	4,577	17,115	20,364	15,696
Machine twist, sewing, and floss silk	do	1,562	1,888	1,624	1,382	9,682	17,921	14,991	12,242
Rayon yarn, thrown, twisted, or wound into different forms from those in which purchased	pounds	(c)	(c)	4,687	8,602	(c)	(c)	10,228	15,788
Ribbons		......	......	......	......	38,201	53,598	52,061	36,041
Fringes, gimps, braids, and binding		......	......	......	......	4,099	22,792	21,307	18,792
All other products		......	......	......	......	15,762	22,083	23,573	24,176
Receipts for contract work		......	......	......	......	8,401	29,829	48,943	48,566

[a] Quantity for 1914 given in linear yards.
[b] In addition, 772,881 square yards, valued at $1,872,500, of silk and silk-mixed plushes were reported by establishments engaged primarily in the cotton-goods and woolen-goods industries.
[c] No comparable data. Included in "All other products."

the establishments gained, 16 had manufactured other classes of commodities as their principal products in 1925 and 313 reported for the first time at the 1927 census.

The United States not only imports manufactured silk, but has a considerable export of silk manufactures. Manufactures of hosiery by 1928 were reported to the amount of 899,824 dozen pairs valued at $9,657,763, the Philippine Islands, British South Africa, Cuba, and South America being important customers.

TABLE VII—IMPORTS AND EXPORTS OF MANUFACTURED SILK

Source: U. S. Bureau of Foreign and Domestic Commerce.

[In thousands of dollars]

Yearly average [a]	All silk manufactures Imports [b]	All silk manufactures Exports
1871–1880	27,063	53
1881–1890	34,162	83
1891–1900	29,775	268
1901–1905	32,215	425
1906–1910	33,725	835
1911–1915	28,306	2,210
1916–1920	47,121	16,735
1921–1925	40,941	12,992
Year [a]	All silk manufactures Imports	All silk manufactures Exports
1920	75,419	26,821
1921	48,276	9,672
1922	37,413	11,824
1923	44,597	11,136
1924	37,699	14,148
1925	36,719	18,182
1926	40,570	17,788
1927	42,234	18,647
1928	41,298	18,647
	Silk fabrics [c] Imports	Silk fabrics [c] Exports
1920	35,551	8,775
1921	24,331	3,338
1922	17,923	3,870
1923	17,930	2,659
1924	13,462	2,711
1925	14,255	3,152
1926	18,627	3,870
1927	17,862	2,768
1928	16,426	3,448

[a] Fiscal years, 1871 to 1915 inclusive; calendar years thereafter.

[b] Imports of rayon are included in the total of silk manufactures prior to 1911. Rayon was first shown separately in the imports entered for consumption in 1907. The values of rayon imports for consumption from 1907 to 1910, inclusive, were as follows: 1907, $908,099; 1908, $1,360,291; 1909, $1,427,909; 1910, $2,062,357.

[c] Broad silks only; classed as dress goods in exports prior to 1922. Pile fabrics are not included in the imports of silk fabrics for any year nor in exports after 1921.

SILVER. The production of silver in the United States was greatly increased during the period from 1920 to 1923, because of the passage of the Pittman Act (Apr. 23, 1918) which provided for the purchase by the United States Treasury for coinage purposes of a certain volume of silver at the fixed price of $1 per ounce. Recently, American silver producers have claimed that this act was never completely carried out and they have taken their case to the courts in an attempt to force the United States Treasury to complete its purchase of silver under the terms of the Pittman Act.

Approximately 85 per cent of the world's silver production is from the American continents. Mexico is the leading producer, followed by the United States and Canada. Utah is the leading silver producer in the United States, followed by Montana, Idaho, Arizona, Nevada, and Colorado in the order named. A large proportion of the domestic silver production is from the silver-lead and silver-lead-zinc ores of Utah and Idaho, as well as from the copper ores of Utah, Montana, and Arizona.

Featuring the silver market in recent years has been the demonetization and debasement of silver coinage in a number of European countries such as France, Belgium, and Great Britain. Thus, a large supply of secondary silver has come upon the market and, together with unsettled conditions in China and India, the two largest consumers of silver, has served to depress silver prices. Commercial consumption of silver is reported as excellent, particularly in the United States, though it appears likely that prices will remain not far from their present level, as the production of silver from the large copper and lead-zinc operations increases. The enactment by the Indian government of its Re-

PRODUCTION OF SILVER IN THE WORLD [a]

Calendar years	Fine ounces	Commercial value
1914	172,263,596	$ 95,261,769
1915	173,000,507	89,911,664
1916	181,298,645	124,352,374
1917	186,611,879	166,676,449
1918	203,428,148	200,266,876
1919	179,849,940	201,588,402
1920	173,260,580	176,621,835
1921	171,285,542	108,110,295
1922	213,541,784	145,067,467
1923	243,265,000	157,876,000
1924	239,107,000	159,675,000
1925	245,186,000	169,335,000
1926	253,186,000	157,256,000
1927	252,182,000	142,155,070
1928		

[a] Bureau of the Mint.

PRODUCTION OF SILVER IN THE UNITED STATES

Calendar years	Fine ounces	Commercial value
1914	72,455,100	$40,067,700
1915 [a]	74,961,075	37,397,300
1916	74,414,802	48,953,000
1917	71,740,362	59,078,100
1918	67,810,139	66,485,129
1919	56,682,445	63,533,652
1920	55,361,573	60,801,955
1921	53,052,441	53,052,441
1922	56,240,048	56,240,048
1923	73,335,170	60,134,839
1924	65,407,186	43,822,814
1925	66,155,424	45,911,864
1926	62,718,746	39,136,497
1927	58,646,622	33,252,635
1928	56,020,268	32,771,857

[a] Record production.

PRODUCTION OF SILVER IN THE UNITED STATES IN 1928

States	Silver Ounces	Silver Value [a]
Alaska	463,423	$ 271.103
Arizona	6,346,744	3,712,845
California	1,409,525	824,572
Colorado	3,973,410	2,324,445
Georgia	4	2
Idaho	8,877,857	5,193,546
Illinois	2,616	1,530
Michigan	4,349	2,544
Missouri	151,736	88,766
Montana	10,001,981	5,851,159
Nevada	5,391,732	3,154,163
New Mexico	799,414	467,657
North Carolina	3	2
Oregon	28,234	16,517
Pennsylvania	6,724	3,934
South Carolina	4	2
South Dakota	89,634	52,436
Tennessee	94,987	55,567
Texas	1,391,295	813,908
Utah	16,855,729	9,860,601
Washington	94,495	55,280
Wyoming	13	8
Philippino Islands	36,359	21,270
Totals	56,020,268	$32,771,857

[a] Value at 58.5 cents per ounce, the average New York price of bar silver.

serve Bank Bill in 1926 was a bearish influence on the silver market, as the Bill provided for the sale of part of the Indian government's large silver reserves on the open market. In 1928 the Indian government announced, however, that action on the sale of its silver reserves had been postponed.

SIMMEL, Georg (1858–1918). A German philosopher and historian (see Vol. XXI). One of the clearest and internationally most respected thinkers before the World War, Simmel took to heart the European catastrophe. He sought refuge in the philosophy of art and composed an appreciation of *Rembrandt* (1917). Shortly before his death, he wrote his philosophic testament, published under the title, *Lebensanschauung* (1918). He published also *Zur Psychologie der Kriegsneurose* (1918). A number of studies on Simmel and the various phases of his philosophy were published in Germany after his death; among these may be mentioned Max Adler's *Georg Simmels Bedeutung für die Geistesgeschichte* (1919).

SIMMONS, Furnifold McLendel (1854–). A United States Senator (see Vol. XXI). He was reëlected Senator from North Carolina in 1918 and 1924 (receiving a majority of 111,000 in 1924). In the period of Democratic control of the Senate, he was chairman of the committee on finance (1913–19) and coauthor of the Underwood-Simmons Tariff Act. In 1929 he was ranking Democratic member of the finance committee, as well as senior Democratic Senator. He was also a member of the committee on commerce and of the joint committee on internal revenue taxation. He was member for North Carolina of the Democratic National Committee from 1924 to 1928. For many years, he was in control of the Democratic State organization and his refusal to support Alfred E. Smith, the Democratic presidential candidate in 1928, was held responsible for the Hoover victory in that State.

SIMMONS COLLEGE. A nonsectarian technical institution for women at Boston, Mass., founded in 1899. The student enrollment increased from 1083 in 1915 to 1459 in the fall of 1928. During the same time, the faculty was increased from 118 to 130 members, and the library from 22,000 to 44,000 volumes. Productive funds in 1928 totalled $3,290,296 and the income for the year was $495,416. Certain changes in the requirements for admission were instituted in 1920; three years instead of two of language were required, "free margin" subjects were accepted with limitations, and no conditions were allowed. President, Henry Lefavour, Ph.D., LL.D.

SIMON, Charles Edmund (1866–1927). An American physician, biochemist, bacteriologist, and zoölogist, born at Baltimore and educated at Johns Hopkins (A.B., 1888) and the University of Maryland (M.D., 1890). In 1897 he opened a private clinical laboratory in Baltimore, the first of its kind, and from 1910 to 1920, was a member of the medical faculty of the University of Maryland, where he taught especially biochemistry and pathology. He was lecturer in zoölogy at Johns Hopkins University (1920–22) and in filtrable viruses (1922–27), becoming a full professor there in June, 1927. He died in November. His chief publications are *Physiological Chemistry* (1901); *Infection and Immunity* (1911); and *Human Infection Carriers* (1919). He was also managing editor of the *American Journal of Hygiene.*

SIMON, Rt. Hon. Sir John (Allsebrook) (1873–). A British lawyer and public official who was educated at Fettes College, Edinburgh, and Wadham College, Oxford. He was a fellow of All Souls College, was called to the bar in 1899, and first came into prominence as junior counsel for the British government in the Alaska Boundary Arbitration of 1903. He entered Parliament as a Liberal in 1906, retaining his seat until 1918, became King's Counsel in 1908, a Bencher of the Inner Temple in 1910, was knighted in the same year, made a Knight Commander of the Royal Victorian Order in the next, and a Privy Councilor in 1912. He was Solicitor General (1910–13), Attorney General with a seat in the cabinet (1913–15), and was Secretary of State for Home Affairs (1915–16), resigning because he did not approve of conscription. He served on the French front, however, as a major in the Royal Air Force (1917–18). In 1922 he reëntered Parliament. His *Three Speeches on the General Strike* (1926) had an important modifying influence on the Trade Union Congress. He declared the strike illegal and the funds of the participating unions attachable. In 1927 he was appointed chairman of the Parliamentary Statutory Commission on Indian Reforms which was to suggest recommendations for the proposed amendment of the Government of India Act of 1919. See India, under *History.*

SIMONDS, Frank H(erbert) (1878–). An American journalist (see Vol. XXI). In 1914 he became military contributor, and after the World War, foreign editor of *The Review of Reviews* (New York), and was an associate editor of the New York *Tribune* from March, 1915, to December, 1918. After 1918 he contributed to a syndicate of American and European newspapers. He was decorated by the governments of France, Rumania, Poland, Belgium, and Greece. He wrote: *They Shall Not Pass—Verdun* (1916), and a *History of the World War* (5 vols.).

SIMONS, George Albert (1874–). An American clergyman, born at LaPorte, Ind., and educated at Drew Theological Seminary. He entered the ministry of the Methodist Episcopal Church in 1899 and preached in Brooklyn and New York City. In 1907 he became superintendent of the Finland and St. Petersburg Mission Conference and was superintendent of the Russia Mission Conference (1921–24) and the Baltic and Slavic Mission Conference after 1924. He founded three publications, *Methodism in Russia, Christiansky Pobornik,* in Petrograd and the *Baltic and Slavic Bulletin.* During the World War, he was chairman of the Red Cross Committee in Russia. In the winter of 1920, he had charge of the distribution of relief supplies sent by the Methodists to Finland and Russia. He was manager of the Russia Methodist Book Concern. In 1923 he established the M. E. Training Institute for the Baltic States.

SIMPLON TUNNEL. See Tunnels.

SIMPSON, Sutherland (1863–1926). A Scottish American physician and physiologist, born in the Orkneys, Scotland, and educated at the University of Edinburgh (Sc.B., 1894; M.D., 1901). He was head of the departments of physiology and biochemistry at Cornell University (1908–26) and was the author of many papers on physiological subjects, on the central nervous system, animal heat, and secretions.

SIMS, William Sowden (1858–). An American naval officer (see Vol. XXI). He was president of the Naval War College in 1917, became a vice admiral in command of United States naval forces operating in European waters in 1917, and an admiral in 1918, was again appointed president of the War College in 1919, and retired in 1922 with the rank of rear admiral. In 1920 in an extensive report to the United States Senate subcommittee, he alleged grave errors in the management of United States naval operations during the World War. He was coauthor with Burton J. Hendrick of *The Victory at Sea* (1920), awarded the Pulitzer Prize for the best book on the history of the United States published that year.

SINCLAIR, sĭn′klâr, Harry Ford (1876–). American oil producer and refiner, born at Wheeling, W. Va. He was educated at public schools in Kansas, and studied pharmacy at the University of Kansas. After spending some years in the drug business, he turned his attention to oil and became president of the Sinclair Oil and Refining Corporation and the Sinclair Gulf Corporation, which in 1919 were consolidated as the Sinclair Consolidated Oil Corporation, of which he became chairman. During 1923–24, the leasing from the Government of the Teapot Dome oil properties by this corporation led to a congressional investigation and a demand for the annulment of the leases. In 1917 he was appointed a member of the committees on oil, raw materials, minerals, and metals of the National Research Council. In addition to his oil interests, he held office or directorships in various fiduciary corporations in Oklahoma, Texas, and Pittsburgh, Pa. In March, 1927, Sinclair was tried and found guilty of contempt of the U. S. Senate in refusing to testify on the Teapot Dome leases. A prison sentence of three months was imposed, which he served in 1929. In November, 1927, a mistrial was declared in the conspiracy charge related to the Teapot Dome leasing because agents of the defense had approached jurors. In a second trial, Sinclair was acquitted on April 21, 1928, of charges of conspiracy with Fall to defraud the Government.

SINCLAIR, May (? –). An English writer of psychological novels and critic (see Vol. XXI). Her later books were written with a greater technical perfection. They included *Tasker Jevons* (1916); *Mary Olivier: a Life* (1919); *Mr. Waddington of Wyck* (1921); *Anne Severn and the Fieldings* (1922); *A Cure of Souls,* thought by many to be her best novel (1924); *Arnold Waterlow: a Life* (1924); *The Rector of Wyck* (1925); *Far End* (1926); and *The Allinghams* (1927). She also published *A Defense of Idealism: Some Questions and Conclusions* (1917); *The New Idealism* (1922); and *The Dark Knight,* a volume of poetry (1924).

SINGAPORE. See Straits Settlements.

SINGMASTER, Elsie (Mrs. Harold Lewars) (1879–). An American author, born at Schuylkill Haven, Pa., and educated at Radcliffe College. She wrote: *When Sarah Saved the Day* (1909); *When Sarah Went to School* (1910); *Gettysburg—Stories of the Red Harvest and the Aftermath* (1913); *Katy Gaumer* (1914); *Emmeline* (1916); *The Long Journey* (1917); *Life of Martin Luther* (1917); *History of Lutheran Missions* (1917); *Basil Everman* (1920); *John Baring's House* (1920); *Ellen Lewis* (1921); *Bennett Main* (1922); *The Hidden Road* (1923); *A Boy at Gettysburg* (1924); *Bred in the Bone* (1925); *What Everybody Wanted* (1928). She also contributed short stories to magazines.

SINKIANG, sĭn′kyäng′. A Chinese outer territory, consisting of Chinese Turkestan, Kulja, and Kashgaria, thus comprising all Chinese dependencies lying between Mongolia and Tibet. Area, 550,580 square miles; estimated population, 2,500,000. The whole was regarded as a separate province and the capital, Urumchi, or Tihwafu, was the seat of the Chinese civil governor. A more assiduous cultivation of the soil, in which irrigation helped greatly, accounted for an increasing prosperity. Leading products include cereals, fruits, vegetables, wool, cotton, silk, jade, and gold. Principal imports from China proper are tea, silks, and cotton piece goods. Imports from India are cotton piece goods, indigo, leather, paints, silk piece goods, spices, etc. Principal centres for Chinese trade are Urumchi and Kucheng, while the principal centres of British trade are Yarkand, Kashgar, and Khotan. Before the World War, the Russian interest in the country was keen and through political agents and traders from Russian Turkestan, its influence was spreading through the population. This penetration for a time ceased as a result of the revolution, so that in 1928, it was not yet evident whether the Soviet government meant to win over Chinese Turkestan's Turanian population. A trade agreement with Russia was concluded in 1924.

SINN FEIN. See Ireland, under *History.*

SITWELL, Edith (1887–). A British poet, sister of Osbert and Sacheverell Sitwell (see below). She was born in Scarborough and educated privately. Her first book, *The Mother and Other Poems,* appeared in 1915, and in the next year, she began her editorship of *Wheels,* an annual anthology of verse (1916-21), which she and her brothers hoped would become a rallying point for the younger, more advanced poets. The Sitwells contended that poetry should not be written in stanzas or lines of predetermined length, and that all subjects which reflect life should be treated. Of the three, Miss Sitwell's poetry was the most musical. In her longer poems, she frequently used traditional forms and was able to make these forms seem distinctly her own. Her poems were *Twentieth Century Harlequinade and Other Poems,* with Osbert Sitwell (1916); *Clowns' Houses; Bucolic Comedies* (1923); *Sleeping Beauty* (1924); *Troy Park* (1925); *Elegy on Dead Fashion* (1926); *Poor Young Things,* with both her brothers (1926); and *Rustic Elegies* (1927). She also wrote an essay on *Poetry and Criticism* (1925).

SITWELL, Osbert (1892–). A British dramatist and poet, brother of Edith and Sacheverell Sitwell (see above and below). Born in London and educated at St. David's, Reigate, and Eton, he immediately joined the Sherwood Rangers (1911), later transferring to the Grenadier Guards (1912–19). He served in France (1914–16) and then developed blood poisoning, the complications of which made him ill for several years. He wrote in a bitingly satiric vein, *The Winstonburg Line* (1919), a poem attacking Winston Churchill's plan of campaign in northern Russia. His imagination was less colorful than his brother's or sister's, his most effective work being realistic. He wrote *Twentieth Century Harlequinade and Other*

Poems, with his sister (1916); *Argonaut and Juggernaut* (1919); *Who Killed Cock Robin?* (1921); *Out of the Flame* (1923); *Triple Fugue and Other Stories*, excellent satirical prose (1924); *Discursions on Travel, Art and Life* (1925); *Before the Bombardment*, a novel of pre-war times (1926); *Poor Young Things*, poems by all three Sitwells (1926); *England Reclaimed* (1927); *All at Sea*, with his brother Sacheverell (1927), and *The People's Album of London Statues*, illustrated by Nina Hamnett (1928).

SITWELL, SACHEVERELL (1897–). A British writer and poet, brother of Edith and Osbert Sitwell (see above). He was born at Scarborough, attended St. David's, Reigate, Eton, and Balliol College, and received further education in the library of the British Museum. He came under the combined influence of the Caroline, minor Elizabethan, and Chinese poets, and the futurism of Manetti. Perhaps his best piece of writing was *Southern Baroque Art* (1924). He wrote also *The People's Palace* (1918); *Doctor Donne and Gargantua* (1921); *The Hundred and One Harlequins* (1922); *Actor Rehearsing and Other Poems* (1924); *The Thirteenth Cæsar* (1924); *All Summer in a Day: An Autobiographical Fantasia* (1926); *Exalt the Eglantine and Other Poems* (1926); *Poor Young Things*, poems of all three Sitwells (1926); *Cyder Feast* (1927); *German Baroque Art* (1927); and *All At Sea*, with his brother (1927).

SIXTUS LETTERS. See WORLD WAR, DIPLOMACY OF THE.

SKANDERBEG III, KING OF THE ALBANIANS (1894–), and known also as King Zogu. An orthodox Sunni Moslem, he was born at Burgavet Castle in the mountainous district of Matya, where his family reigned over 13 local tribes. He was educated at the Monastir Officers' Training School, the College of Galata Serail in Constantinople. He learned German from the Austrians, with whom he served as an officer during part of the World War. In the chaos of 1920, he and his sharpshooters were conspicuous in enforcing order. He was a delegate to the Constitutional Assembly, and Minister of the Interior in the Regency (1920). During 1922–24 he was Premier. The Nationalists, opposed to his arbitrary methods, revolted in June, 1924. Zogu fled to Jugoslavia, but returned to Tirana on Dec. 24, 1924, ordered new elections and proclaimed a republic (Jan. 22, 1925). On January 31, the Assembly chose him Premier, commander-in-chief of the army, and President of the Republic for seven years. On Sept. 8, 1928, he was crowned King. He obtained pledges of loyalty from the landowners and leaders of the strongest tribes and was able to maintain order. He signed a treaty of alliance and defense with Italy in November, 1926, accepted from her a loan of 50,000,000 lire, and allowed the formation of an Albanian National Bank, which was backed and controlled by Italians. See ALBANIA, *History*.

SKATING. Skating, long a popular recreation, has become a sport affording keenest competition among both amateurs and professionals. The Scandinavian countries in Europe, Canada, and the United States hold their annual national skating championships, while international tourneys are staged practically every season. Many women pursue this sport with skill and enthusiasm, especially as regards figure skating. The International Skating Federation controls amateur skating competitions. Rinks of immense size in the larger cities of Europe and the United States have been constructed to accommodate the thousands who follow skating purely as a recreation.

SKINNER, HENRY (1861–1926). An American physician and entomologist, born in Philadelphia and educated at the University of Pennsylvania (B.S., 1881; M.D., 1884). He was at different times State entomologist of Pennsylvania, professor of entomology of the Pennsylvania Horticultural Society, head of the entomological department of the Academy of Natural Sciences, Philadelphia, and president of the American Entomological Society. From 1890 to 1911, he was editor of the *Entomological News*.

SKINNER, OTIS (1858–). An American actor (see VOL. XXI). He has starred in *Mister Antonio* (1916–18); *The Honor of the Family* (1918–19); *Pietro* (1919–20); *At the Villa Rose* (1920–21); *Blood and Sand* (1921–22); *Sancho Panza* (1923–25); *Merry Wives of Windsor* (1927–28); *A Hundred Years Old* (1929). He is the author of *Footlights and Spotlights* and *Mad Folk of the Theatre.* In 1928 he received a medal of the American Academy of Arts and Letters for diction on the American stage.

SKINNER, ROBERT P. (1866–). An American diplomat. He was born at Massillon, Ohio, and received his high-school training at Cincinnati. From 1886 to 1897, he was owner and editor of the *Evening Independent* at Massillon. He was then United States Consul at Marseilles (1897–1901), and Consul General at Marseilles, Hamburg, Berlin, and London (1901–24). Becoming a foreign-service officer, he was Consul General at Paris (1924–26), and in 1926 was appointed United States Minister to Greece. He is the author of *Abyssinia of Today* (1906).

SKINS. See LEATHER.

SLADEN, FRED WINCHESTER (1867–). An American army officer, born in Massachusetts, and graduated from the United States Military Academy in 1890. He was on duty in Oregon, Washington, Idaho, and the Philippines, engaged in relief work in San Francisco after the earthquake and fire in 1906, and was in China during 1914 and 1916, and on the Mexican border in 1916–17. He was secretary of the War Department General Staff in 1917 and 1918. He was commander of the 5th Infantry Brigade of the 3d Regular Division in France and Germany in 1918 and 1919 and participated in the Aisne, Château-Thierry, Marne, St. Mihiel, and Meuse-Argonne engagements. He served as superintendent and commandant of the U. S. Military Academy, 1922–26, and in command of the Department of the Philippines at Manila after 1926. He was made a major general in 1924.

SLEEPING SICKNESS. This popular name of the affection known to the medical profession as epidemic encephalitis is unfortunate, because this title is preëmpted by a chronic affection which is endemic among the African blacks. (The last-named disease is known technically as trypanosomiasis.) Although the acute form of sleeping sicknesss is by no means new, having flourished in different localities under various names in the past, it was not recognized as a separate morbid entity until about 1916 and, since that period, it has become familiar to medical men throughout the temperate zones. Nothing is known of its intimate nature. It has a high mortality and is apt to leave its victims badly damaged. It occurred at first in epidemic incidence, but attacked only a relatively small proportion of the community. The severity of its nature is due to the fact that it attacks some of the most important portions of the central nervous system.

Epidemic encephalitis is characterized by a great variety of symptoms and a number of clinical types have been isolated, some of which may appear in abortive form. Hence, diagnosis may be difficult in the individual case, for somnolence may be absent and be replaced by excitement and constant muscular twitching. In some localities, this form may predominate, and may be recognized in a disease which prevailed in Italy some 80 years ago. This persisted for some years and at no time was drowsiness mentioned as a characteristic symptom. This is an additional reason against the use of the term "sleeping sickness."

The term "epidemic" is in turn shown to be unsuitable, for reports from many countries illustrate that any epidemic quality once shown by this affection no longer exists, new cases appearing in a purely sporadic fashion. The acute stage of the disease must be distinguished carefully from the sequels, which, particularly in cases in childhood, include peculiar character alterations. Although the latter may develop in patients originally sound and of healthy stock, they resemble closely those seen in inborn moral degenerates. As a result, our conceptions of degeneracy must undergo a change, for the latter is hardly yet regarded as an acquired condition, although it sometimes follows severe injuries to the head. The interest in encephalitis today is shown by the fact that provision is made in the new Neurological Institute (New York City) for the care of a large number of patients suffering from this disease and presumably its more remote consequences.

SLESVIG. See SCHLESWIG.

SLEVOGT, MAX (1868–). A German painter who was born in Landshut, attended college at Würzburg, and studied at the Academy of Munich. He is represented in the art museums of Munich, Stuttgart, Hamburg, and Dresden. Among his most famous works are "Feierstunde" ("Hour of Rest") at the Munich Pinakothek and the triptych "Der verlorene Sohn" ("The Prodigal Son"). He is also a portraitist and has attracted attention by his 15 lithographs of the *Iliad*.

SLOAN, JOHN (1871–). An American artist, born at Lock Haven, Pa. He received his art education in evening classes in the Pennsylvania Academy of Fine Arts under the late Thomas P. Anschutz. He was particularly noted for his scenes of city life. His lithographs are humorous and vivid. Mr. Sloan has made many drawings for magazines, and his work as an illustrator included designs for Paul de Kock's novels. For his painting, "The Coffee Line," at the Carnegie Institute, Pittsburgh, Pa., he received honorable mention in 1905. "The Dust Storm" is in the Metropolitan Museum, New York City, and examples of his work are included in the print collection at the New York Public Library. He was an instructor at the Art Students' League in New York City and director of the Society of Independent Artists.

SLOAN, MATTHEW SCOTT (1881–). An American electrical engineer. He was born at Mobile, Ala., and graduated at the Alabama Polytechnic Institute. For four years (1902–06), he was with the General Electric Company at Schenectady, N. Y. He then went to the Birmingham Railway, Light & Power Co., where he was chief engineer and president (1906–14). After three years as general manager of the New Orleans Railway & Light Co., he held a like position in the New York Edison Company (1917–19), and since 1919 he has been president of the Brooklyn Edison Company, Inc. In 1929 he was elected president of the National Electric Light Association.

SLOSSON, EDWIN EMERY (1865–1929). An American chemist, writer, and lecturer (see, VOL. XXI). He was editor of *The Independent* (1903–21) and director of Science Service (1921–29). His later works include *Six Major Prophets* (1917); *Creative Chemistry* (1919); *Easy Lessons in Einstein* (1920); *The American Spirit in Education* (1921); *Plots and Personalities* (1922); *Chats on Science* (1923); *Sermons of a Chemist* (1925).

SLOVAKIA. See CZECHOSLOVAKIA.

SLOVENES. See JUGOSLAVIA, *History*.

SMALL ARMS AND MACHINE GUNS. If we include under the heading "Small Arms" (see also ORDNANCE), shoulder rifles, pistols, machine guns, ammunition, and accessories, the period after 1914, which of course included the World War, was marked principally by developments in machine guns. Prior to the War, practically all machine guns used the same calibre ammunition as did the shoulder rifles with which the infantry was equipped, and were employed as a means by which a given number of individual soldiers could deliver a greater volume of fire at the enemy than if equipped with shoulder rifles. Under stress of actual combat, machine guns were soon divided into different types especially suited for particular uses. The lighter-weight types were adapted to firing short concentrated bursts of fire and the heavier types were developed for playing the continuous leaden stream of the machine-gun barrage. Special types were developed for mounting in tanks and in airplanes and special mounts were developed for employing machine guns in anti-aircraft work.

The special-type guns necessitated the development of special types of ammunition; for instance, armor-piercing, for use against tanks and armored airplanes, tracer and incendiary ammunition for use against observation balloons and gasoline tanks of airplanes. The need for increased fire power led to the development of larger calibre bullets for which heavier and heavier machine guns became necessary, with the result that the sphere of employment of the machine gun was enormously increased and its range of action multiplied two and one-half to three times.

Shoulder Rifles. In 1905 the United States Army adopted the Springfield rifle, calibre .30, model of 1903, as standard equipment for infantry and cavalry troops. This rifle and the standard ammunition for it have been regarded as eminently satisfactory under battle conditions. The experience of the World War has led to suggestions for modifications of the Springfield rifle in minor particulars, such as providing a large aperture sight to be located on the receiver near the eye, telescopic sights for issue to individual sharpshooters, and possibly a change in the stock to provide a pistol grip.

Unfortunately, due to difficulty of production, it was impossible to manufacture enough Springfield rifles to equip completely the United States troops or to provide any for troops of the Allied armies, much as they desired this superior weapon. The greater number of the United States troops were equipped with the modified Enfield rifle of British design chambered for rimless .30-calibre United States ammunition instead of the older type British .303 cartridges with projecting rim which tended to increase the danger of jams. Incidentally, the United States ammunition had a much higher velocity than the British cartridge and was much more effective at all ranges at which rifle fire is employed.

Automatic Rifles. The second type of weapon using standard small-arms ammunition is intended to be a portable arm for front-line troops, capable of being fired from the hip if necessary, and to some extent even while proceeding forward to the attack. Its normal employment, however, is from the ground supported by a light biped at the muzzle, the gunner taking the prone position. For this purpose, the British Army used the Lewis gun, the Germans, the Maxim 08–15, and the French, the Chauchat, the United States troops being armed to a considerable extent with the latter weapon prior to the issue of the standard Browning automatic rifle developed contemporaneously with the entrance of the United States into the world conflict. The Browning was probably the most successful weapon of its type in use at the end of the War, but mature reflection on the relative merits of the type led to a conclusion that it was a misfit, being too light for sustained automatic fire and too heavy to be fired from the shoulder. Later tendencies were toward providing a much heavier barrel in order that it might be fired for a greater length of time without putting it out of action by overheating. Provided in addition with a substantial biped mount, it comes under the classification of machine rifles to which the French Chauchat, the British Lewis, and the German Maxim more nearly belong than to the class of strictly automatic rifles.

Pistols. The Colt automatic pistol, calibre .45, was beyond question the most effective weapon of its kind in use prior to the outbreak of the War and only a few minor improvements in it were found desirable as a result of battle experience. Unfortunately, manufacturing facilities were not available to handle increased demands under new tactical requirements and it was therefore necessary to issue a considerable number of .45-calibre revolvers to United States troops which, even at that, were much better equipped in this respect than the troops of any other nation engaged in the War.

Machine Guns. In 1914 the principal types of machine guns were the Benet-Mercie, the Colt, the Maxim, the Vickers, the Lewis, and the Hotchkiss. In May, 1917, the Browning (heavy) machine gun received its initial test and was at once adopted as standard for the United States Army. The new gun demonstrated its superiority to all other types of machine guns then in use by the armies of the world. Although the maximum range of this gun was found to be less than some types of French, and also German, machine guns, the fault lay in the ammunition used and not in the gun itself With improved ammunition, this gun, which is recoil-operated and water-cooled, has been found a most effective weapon for delivering a sustained fire of great volume.

Aircraft Machine Guns. The machine gun found a new field of employment in connection with aircraft, two general types of mounting being developed as the result of combat experience in the clouds. For the use of the pilot, two or more guns are rigidly mounted on the airplane structure and fired directly to the front, the bullets being fired between the rapidly revolving blades of the propeller by means of a synchronizing mechanism connecting the motor and the gun. Guns may be mounted also on the airplane wings and fired by mechanical or electrical control. For the use of the observer, one or more free guns are so mounted as to permit firing in any direction. Vickers aircraft machine guns were used to a considerable extent for the pilot and Lewis guns for the observers. Marlin aircraft guns were later adopted when Vickers became unavailable, due to great care necessary in the manufacture of ammunition for this gun. Browning machine guns were modified for aircraft use, but were not entirely satisfactory, due to the haste in which they were developed. Several attempts to improve this gun have been made recently, but up to 1929 none has been entirely satisfactory.

Super-Machine Guns. The Browning .30-calibre machine gun was brought out contemporaneously with the entrance of the United States into the world conflict. It proved so successful from its first test that early effort was made to apply its principles to the design of a machine gun to fire .50-calibre ammunition. The first design fired a bullet of 600 grains at a muzzle velocity of 2450 feet per second. About this time, several German anti-tank guns were captured. Inasmuch as the 13-mm. ammunition for these guns fired an 800-grain bullet at a muzzle velocity of 2500 feet per second, a second design of .50-calibre machine gun was brought out firing an 812-grain bullet at a muzzle velocity of 2600 feet per second.

A water-cooled .50-calibre machine gun has been designed for ground use by infantry troops, but it develops so much energy in firing that it is impossible to hold it steady for horizontal fire, using a tripod of such light weight as can be conveniently transported by infantry. An air-cooled type for mounting on aircraft has proved very successful and bids fair to be universally adopted as a synchronized weapon. A water-cooled type has also been developed for anti-aircraft use and the ground type was also found suitable for anti-aircraft use. This gun has a maximum range of approximately 7500 yards. Its armor-piercing bullet will penetrate one-inch armorplate at short ranges, and the tracer bullet will give a brightly illuminated trace for approximately 2200 yards. The gun is similar to the .30-calibre Browning gun, the principle difference being the substitution of the spring and oil buffer to central recoil for the spring type used with the .30-calibre gun.

Anti-Aircraft Machine Guns. At first, it was thought that anti-aircraft machine gunnery involved merely providing a simple mount which would permit all-around traverse and elevation of 85 or 90 degrees. The usual type of mount used by anti-aircraft machine gunners during the War consisted of an adapter head with a pintle at the lower part of the bracket which revolved freely on the head of a tripod. The upper part of the bracket was provided with a U-shaped opening in which the machine gun was mounted, thus making it possible to elevate the gun about its transverse axis and to traverse it by rotating the entire mount adapter about the pintle. The anti-aircraft machine gun made a place for itself in the equipment of all armies, and considerable effort has been expended in the development of more satisfactory mounts for this type of weapon. In order to increase the volume of fire, it is probable that more than one gun will be mounted on each tripod. A semi-ball mount adapter has been manufactured and tested since the Armistice and future design was tending toward this type.

The effective range of .30-calibre ammunition limits the employment of the ordinary machine gun to attack upon the personnel of aircraft or upon the structure of low-flying unarmored planes. The development of the super-machine gun of .50 calibre bids fair, however, to displace the earlier .30-calibre gun, not only on account of its greater range but because its much larger bullet permits the development of more satisfactory armor-piercing, incendiary, and tracer varieties.

Small-arms Ammunition. The War vastly increased the ranges at which small-arms ammunition was expected to be used effectively. In order to meet insistent demands for greater range, extensive test firings were continually held in all armies and every effort made to improve the shape of the bullet and increase the effectiveness of the powder charge. In general, it has been found desirable to further sharpen the nose of the bullet in order to reduce the effect of air resistance and also to "boat-tail" or taper the base, in order to eliminate or greatly reduce the drag caused by the vacuum at the base. The new contour of the bullet has improved its ballistic qualities and the length of the bullet has been increased in order to add weight. With the increased remaining velocity at any given range, a considerable increase in hitting power has been obtained. Consult McFarland, *Ordnance and Gunnery* (New York, 1929), and current issues of *Army Ordnance* (Washington, D. C.). See STRATEGY AND TACTICS.

SMALLPOX AND VACCINATION. Much information has been gained about this affection of late years. The conviction is growing that there are different strains of the disease, one of which is naturally mild and the other severe. Should this dualistic view obtain a permanent foothold, many peculiarities of the disease may be explained. A severe type of disease may, of course, have its virulence modified and appear alternately in mild or severe form; but there may be a mild form which is never severe under any circumstances. This appears to be the case with the alastrim of the West Indies, which is believed to be the same as the mild smallpox of West Africa, from which it was originally derived. The latter has long been regarded as distinct from the severe smallpox of East Africa. The severity of the latter, as of the other virulent strains of the disease in the tropics, makes it difficult to control by vaccination, to which must be added the great difficulty of obtaining fresh virus, and the difficulty in enforcing vaccination decrees in primitive communities.

The alleged failure of vaccination in the Philippines was readily shown to have been due to lax enforcement of the laws, the turning in of bogus returns, and other irregularities. The unvaccinated were the sufferers and the country later was properly revaccinated, with resulting return of immunity. During the World War, there were numerous striking examples both of immunity of vaccinated troops exposed to virulent disease and the spread of the disease among the unvaccinated.

Paul Test. A new diagnostic test is in force in some localities which will prevent the long quarantine of suspects. This consists in the inoculation with the suspicious matter of the rabbit's cornea, cock's wattles, etc. Smallpox pus provokes a peculiar reaction not obtained with the use of any other substance. This is known as the "Paul test."

Post-vaccinal Encephalitis. Within the past few years and with the possibility that the complication may be traced back to an earlier period, there have been cases of a post-vaccinal manifestation which bears a marked resemblance to epidemic encephalitis, or sleeping sickness, and which has given rise to the belief that the general disturbance set up by vaccination may awaken that disease in an individual who chances to harbor the offending virus in a quiescent state. With cumulative study, this hypothesis is rendered improbable, for most of the cases have occurred in two countries, Holland and England, and the victims have been limited very largely to children above the age of three—in other words, young children—and those past puberty have been almost immune. Aside from the two countries mentioned, in which jointly over 200 cases have been reported, cases are scattered or absent and so far as known not a single one has been reported in the Western Hemisphere. Critics of vaccination, who would ordinarily have expected health authorities and medical societies to suppress or garble reports of this kind, must have been astonished to note the unanimity with which the profession as a whole has freely aired the subject. The vaccine cannot be accused, for invariably the victims were only a minute fraction of the total vaccinated. The lesson thus far is to vaccinate before the age of 3 and after that of 13.

SMALLWOOD, WILLIAM MARTIN (1873–). An American zoölogist born at Warsaw, N. Y., and educated at Syracuse University and at Harvard. He was instructor in biology at Syracuse (1896–98), professor of biology and geology at Allegheny College (1898–1902), and associate professor of zoölogy (1903–07), and professor of comparative anatomy (after 1907) at Syracuse University. He published papers on the embryology of mollusca, and *A Text Book of Biology* (1913; 2d ed., 1920); *Practical Biology* (1916); *Biology for High Schools* (1920); *Man the Animal* (1921); *The New Biology* (1924).

SMELL. See TASTE AND SMELL.

SMIDDY, TIMOTHY A. (1877–). An Irish economist, High Commissioner of the Irish Free State in London (since November, 1928). He was born in Cork, went to college there, pursued his studies in France and Cologne, and later became professor of economics and dean of the faculty of commerce at University College, Cork. He was a member of the Trade Boards of Ireland, economic adviser to the Irish plenipotentiaries who were negotiating the Anglo-Irish Treaty in December, 1921, the Dail Eireann's fiscal agent and envoy to the United States (1922), and chairman of the fiscal committee of the Irish Free State (1923). In October, 1924, he went to the United States as the Irish Free State's first Minister in Washington (1924–28). He wrote articles on educational and economic subjects.

SMILLIE, smĭl'ĭ, Robert (1859–). A British Labor leader, born at Belfast, of Scottish parents. At 14 years of age, he went to work in a shipyard at Govan, and two years later went to Lanarkshire where he worked in the mines for 16 years. In 1912 he was elected to the presidency of the Miners' Federation of Great Britain, from which ill health compelled him to resign in 1921. He was president of the Scottish Miners' Federation (1894–1918; after 1921), and was on the General Council of Trade Unions, being chairman in 1924–25. In 1923 he entered Parliament for Morpeth. He wrote *My Life for Labor* (1924).

SMITH, Alfred Emanuel (1873–). An American public official, born in New York City. He was educated in the parochial schools of the city and from 1895 to 1903 was clerk in the office of the Commission of Jurors in New York City. He was a member of the Democratic organization, and of the Tammany Society, and served in the New York Assembly from 1903 to 1915. In 1911 he was Democratic leader and, in 1913, Speaker in that body. From 1915 to 1917, he was sheriff of New York County. In the latter year, he was elected president of the Board of Aldermen and in 1918, Governor of New York State. He was defeated for reelection in 1920, but in 1922, 1924, and 1926 was successful, serving four terms in all. Governor "Al" Smith was one of the most conspicuous candidates for the Democratic nomination for the Presidency in 1924. (See United States, *History.*) In 1928 he was nominated by the Democratic Convention for President on the first ballot. The election was hotly contested, especially in the South, where Smith's attitude on prohibition figured largely in the campaign. He lost Florida, North Carolina, Texas, and Virginia; but in the popular vote throughout the nation, he had the largest total that any Democratic candidate had received since 1916. In the Electoral College, he received the vote of six Southern States, Massachusetts, and Rhode Island. In 1929 he was awarded the Lætare Medal by Notre Dame University for distinguished services as a Roman Catholic layman. Previously, he had received the degree of LL.D. from Columbia and other universities.

SMITH, Alfred H(olland) (1864–1924). An American railway president (see Vol. XXI). During the World War, he was appointed assistant director general of railroads in charge of transportation in trunk-line territory east of Chicago and north of the Ohio and Potomac rivers, and regional director of the Eastern District. On June 1, 1919, he was reappointed president of the New York Central lines.

SMITH, Allen John (1863–1926). An American physician, pathologist, and writer on scientific subjects, born at York, Pa., and educated at Pennsylvania College (A.B., 1883), and at the University of Pennsylvania (M.D., 1886). He was professor of pathology at the University of Texas (1891–1903), and at the University of Pennsylvania (1903–10), and professor of comparative pathology and tropical medicine at Pennsylvania (1910–26). He served through the World War in the U. S. Army Medical Department as major and lieutenant colonel. In 1902 he published *Lessons and Laboratory Exercises in Bacteriology.*

SMITH, David Stanley (1877–). An American composer, born at Toledo, Ohio. While pursuing his regular academic studies at Yale, he also took the course in composition there under Professor Parker. When he graduated in 1900, his *Commencement Ode* for baritone, male chorus, and orchestra was produced as part of the commencement exercises. From 1901 to 1903, he was in Europe, continuing his studies under Thuille in Munich and Widor in Paris. In 1903 he was appointed instructor in the theory of music at Yale; in 1909, assistant professor; in 1916, full professor; in 1920, dean of the Department of Music, succeeding Prof. Horatio Parker; and in 1925, Battell professor. For many years, he was also organist at various churches in New Haven. In 1917 he became conductor of the Horatio Parker Choir; in 1918, conductor of the Choral Art Club; and in 1919 he succeeded Parker as conductor of the Oratorio Society and the New Haven Symphony Orchestra. His works consist of: two symphonies, a symphonic poem, *Darkness and Dawn*; the overtures, *Joyeuse, Sérieuse,* and *Prince Hal*; *Symphonic Ballad, Allegro giocoso, Commemoration March, L'Allegro, Il Pensieroso, Impressions, Poems of Youth, Fête Galante, Epic Poem*; *Prelude, Chorale and Fugue,* and *Cathedral Prelude,* for organ and orchestra; the choral works with orchestra, *The Windswept Wheat, The Fallen Star, The Dark, Pan, Rhapsody of St. Bernard,* and *Vision of Isaiah*; 3 string quartets; a quintet; a piano trio; anthems; and part-songs and songs.

SMITH, Frederick Edwin. See Birkenhead, First Earl of.

SMITH, Very Rev. Sir George Adam (1856–). A Scottish theologian (see Vol. XXI). He was moderator of the General Assembly of the United Free Church of Scotland in 1916–17, delivered addresses on the moral aims of the Allies in the United States in 1918, and was Baird lecturer at the University of Glasgow in 1922. In 1916 he was made a fellow of the British Academy. His later publications include *Syria and the Holy Land* (1918); *Deuteronomy* (The Cambridge Bible) (1918); *The Teaching of the Old Testament in Schools* (1923); and *Jeremiah* (1923).

SMITH, George Otis (1871–). An American geologist (see Vol. XXI). With the exception of one year, he has been director of the U. S. Geological Survey continuously since 1907. In 1922–23 he was a member of the United States Coal Commission. He has written reports on aërial, economic, petrographic, and physiographic geology, and was editor and coauthor of *Strategy of Minerals* (1919).

SMITH, Herbert Booth (1883–). An American clergyman, born at St. Louis, Mo., and educated at Princeton Theological Seminary. He was ordained to the Presbyterian ministry in 1909 and held pastorates in Rochester, N. Y., Knoxville, Tenn., and at Immanuel Church, Los Angeles, Calif. (from 1916). In the last-named city, he ministered to a congregation of 3000. He wrote *Five Sermons on Democracy* (1918); *The New Earth and Other Sermons* (1920); *Science and Prayer* (1924); *Beyond the Sunset* (1927).

SMITH, Hugh McCormick (1865–). An American ichthyologist born at Washington, D. C., and educated at Georgetown University (M.D., 1888). He was assistant in the United States Fish Commission (1886–92), in charge of the division of fisheries (1892–96), in charge of scientific inquiry (1897–1903), Deputy United States Commissioner of Fisheries (1903–13); and Commissioner of Fisheries (1913–22). As deputy commissioner and commissioner of fisheries, he directed the activities of the Bureau of Fisheries and published various papers on the commercial fisheries and aquatic resources of the United States. Since 1923 he has been adviser in fisheries and since 1926, director of the Siamese Department of Fisheries at Bangkok.

SMITH, Jeremiah, Jr. (1870–). An American lawyer and adviser on finance. He was born at Dover, N. H., and graduated at Harvard (A.B., 1892; LL.B., 1895). He began the practice of law at Boston in 1896. In the World War, he served with the A.E.F. as captain of the Quartermaster's Department. He was with the American Mission to Negotiate Peace as counsel and adviser to the Treasury Department. He served with distinction as Commissioner General of the League of Nations for Hungary in 1924–26 and in that capacity was instrumental in bringing about the financial reconstruction of Hungary. See Hungary, under *History*.

SMITH, J(ohn) M(erlin) Powis (1866–). An American theologian. He was born in London, came to America, and studied at the University of Chicago. He was graduate student and fellow of the university (1895–99) and literary secretary to President Wm. R. Harper (1899–1906). After 1915, he was professor of Semitic languages and literature. He is the author of *Biblical Ideas of Atonement,* with E. D. Burton and G. B. Smith (1909); *Commentaries on Micah, Zephaniah, Nachum and Malachi* (1911–12); *Commentaries on Amos, Hosea and Micah* (1914); *The Prophet and his Problems* (1914); *A Guide to the Study of the Christian Religion,* with G. B. Smith (1916); *Religion of the Psalms* (1922); *The Moral Life of the Hebrews* (1923); *The Prophets and Their Times* (1925); *The Psalms* (1926); and has collaborated on Harper-Smith's *Hebrew Method and Manual* (1921) and Harper-Smith's *Elements of Hebrew* (1921). He also collaborated with A. R. Gordon, T. J. Meek, and L. Waterman in an American translation of the Old Testament (1927).

SMITH, Norman Kemp (1872–). A British philosopher. He studied at St. Andrews University, and in Berlin and Paris, and from 1897 to 1906 lectured at Glasgow University. He was professor of psychology at Princeton in 1906 and McCosh professor of philosophy at the same university in 1914. Since 1919 he has been professor of logic and metaphysics at Edinburgh. He is the author of *Studies in Cartesian Philosophy* (1902); *Commentary to Kant's Critique of Pure Reason* (1918); and *Prolegomena to an Idealist Theory of Knowledge* (1924).

SMITH, Theobald (1859–). An American pathologist (see Vol. XXI). Since 1915 Dr. Smith has been director of the Department of Animal Pathology in the Rockefeller Institute for Medical Research. He has been a member of the Institute's board of directors since 1901. His researches have been concerned chiefly with the nature and causation of infectious diseases. In addition to receiving honorary degrees from the universities of Harvard, Chicago, Washington, Yale, Princeton, Breslau, and Budapest, he was honored by membership in numerous foreign medical and public-health societies.

SMITH COLLEGE. A nonsectarian institution for women at Northampton, Mass., founded in 1871. The enrollment of the College increased from 1638 in 1914 to 2103 in the fall of 1928; the faculty from 146 to 227 members; and the library from 50,000 to 155,000 volumes. Largely through an endowment campaign conducted in 1920, the productive funds of the College were increased from $1,695,892 to $5,127,523 in 1928. In 1918 a school of social work was established and in 1921 an experimental school for the training of teachers of retarded children. Entrance examinations for all students were required beginning with the fall of 1919. In 1925 a music building and a gymnasium were opened and three dormitories, to complete a quadrangle, and the Tryon Art Gallery were completed. In that year, 32 members of the Junior Class conducted their studies in France and this innovation has become a regular custom. In 1927, in honor of Dr. Neilson's 10 years service as president, the William Allan Neilson Chair of Research was established by his friends and admirers. In 1928 a revised curriculum was put in operation, requiring proof before the senior year of ability to read ordinary prose in two foreign languages, substituting for required courses the selection of work in each of four main fields of learning, and opening to freshmen, courses in religion, psychology, philosophy, and government. President, William Allan Neilson, Ph.D., L.H.D., Litt.D., LL.D.

SMITH-LEVER ACT. See Agricultural Extension Work; Education in the United States.

SMITHSONIAN INSTITUTION. An institution in Washington, D. C., created in 1846 for the increase and diffusion of knowledge. In addition to its own work, the institution administers the following governmental bureaus: The National Museum, the National Gallery of Art, the Bureau of American Ethnology, the International Exchange Service, the National Zoölogical Park, the Astrophysical Observatory, and the United States Regional Bureau of the International Catalogue of Scientific Literature. It also administers the Freer Gallery of Art.

Each year the institution assists in, or entirely supports, field researches in various branches of science, often contributing valuable material to the National Museum. One of the most important of the institution's recent investigations has been the study of the relation of solar radiation to weather. From observations made at stations in Washington, California, Chile, and at the observatory of the National Geographical Society at Mt. Brukkaros, Southwest Africa, Dr. Charles G. Abbot, director of the research, and his associates established, in 1927, a cycle of sun radiation at 25⅔ months, which, by corresponding with the known weather conditions, makes possible long weather forecasts. Another field study carried on by the institution is in the geology and palæontology of the Canadian Rocky Mountains, directed for over 20 years by Dr. Charles D. Walcott, secretary of the institution until his death in 1927. Besides the technical papers published each year by the institution and the governmental bureaus under its direction, 117 volumes and pamphlets were issued in 1928, and 183,196 copies distributed. Secretary of the institution, Dr. Charles G. Abbot, elected Jan. 10, 1928.

SMOKELESS POWDER. See Explosives.

SMOKE SCREEN. See World War, *Naval Operations*.

SMOOT, Reed (1862–). An American legislator (see Vol. XXI), United States Senator from Utah. He was first elected in 1909 and was reëlected in 1914, 1920, and 1926. He was chairman of the finance committee and a member of the public lands and surveys, appropriations, and rules committees in the Senate. He was conceded to be the first authority on finance and governmental expenditures, and had much to do with the preparation of the various tariff bills passed during his time of service.

SMUTS, smŭts, RT. HON. JAN CHRISTIAN (1870–). A South African soldier and statesman (see VOL. XXI). As a commander-in-chief of the British forces in German East Africa, he had entirely broken the German power there by the end of 1916. Lloyd George then summoned him to London for the deliberations of the war cabinet, of which he was the only Dominion member. He represented South Africa in the Imperial War Cabinet and at the Paris Peace Conference (1919). In the same year, he became Premier and Minister for Native Affairs of the South African Union, being faced by the Nationalist agitation led by General Hertzog. In 1920 he resigned as Minister of Defence, a post he had held since 1910, and in the general election of that year he failed to obtain a majority for his party in Parliament. Faced with the necessity of a union with another party, he turned to the Unionists, and with their help, his South African Party obtained a good majority in the election of 1921; however, the Labor and Nationalist parties joined forces against him, and in June, 1924, he was succeeded by a Nationalist-Labor coalition with General Hertzog at its head. He wrote *Holism and Evolution* (1926), a philosophical book.

SMYRNA, smẽr′ná. A vilayet, or province, of Turkey, including the city of Smyrna. The population at the census of 1927 was 531,579 for the vilayet and 153,845 for the city. By the Treaty of Sèvres (Aug. 10, 1920), Greek diplomacy, largely the work of Venizelos, achieved a triumph when this important region of Anatolia (Asiatic Turkey) was assigned to Greece; but it was won only to be lost again, and by the definitive Treaty of Lausanne (July 24, 1923), it reverted again to Turkey. The artificial nature of the earlier settlement, the defeat at home of Venizelos (December, 1920), and the triumph of Nationalist Turkey (1921–22), all contributed toward hastening the downfall of Greek power in Asia. Venizelos, in his memorandum of Dec. 31, 1918, to the Peace Conference, had asked for the creation of an autonomous Smyrna, made up of the Turkish vilayets of Aidin and Brusa; this region, he claimed, was inhabited by Greek majorities and was set off topographically from eastern Asia Minor; but earlier Allied commitments, notably those to France and Italy, prevented the erection of such a territory, with the result that the Smyrna region awarded to Greece by the Treaty of Sèvres was indefensible on ethnographic, economic, and geographical grounds.

Practically, the treaty clauses meant that Smyrna was to be under the provisional Greek administration for five years, as a transitional stage, and then to be annexed to Greece. The settlement was attacked, ethnographically, on the following grounds: It did not solve the Greek problem in Anatolia for at least 66 per cent of the Greeks lived outside the zone. Again, it would be impossible to move the other Greeks to this enclave, for they consisted largely of traders and the like, and therefore had fixed economic interests in their places of residence. From the economic point of view, the settlement was a poor one because Smyrna was not essentially a Greek city but a great entrepôt of trade linking the West with Anatolia, and seating a commercial class that included French, Dutch, and British merchants and capitalists, as well as Greek. As for geography, it was at once recognized that the frontiers, as created, cut across rivers, valleys, and railways, and only in the south followed a natural line of division.

Smyrna, originally, had been promised to Italy by the secret agreement of St. Jean de Maurienne (April, 1917); but the reluctance of the Italian people to countenance a costly imperialistic adventure accounted largely for the failure of the Italian government to push its claim or stand in the way of the Greek aspirations. Therefore, the Greek occupation of Smyrna at the invitation of the "Big Three" proceeded unopposed (May 15, 1919). But not unopposed by Turkey, for the occupation was attended by dramatic results. Spurred on by Greek excesses in the Smyrna zone and their deep-seated hatred of the Greeks, whom they regarded as inferiors, Turks throughout the whole of Anatolia sprang to their nation's defense, and gave support to the newly organized Nationalist government located at Angora. Both sides mobilized for war, until by 1921 there were 200,000 Turks and as many Greeks under arms. The Powers made little effort to interfere except for an attempt at the London Conference of Mar. 11, 1921, to rewrite the Sèvres clauses respecting Smyrna. Military interference was out of the question, and in May, 1921, the Powers declared their neutrality, and as was at once evident, abandoned the Greeks to their fate. The war in Anatolia was waged during 1921–22 with varying fortunes (see GREECE), and suddenly terminated in September, 1922, when the Greeks fleeing to the coast entered the city of Smyrna to make for their ships. The Allies took over the city on September 8, the Turks entered September 11, and on September 14 a fire broke out that almost gutted the city and accounted for the loss of thousands of lives.

The Greeks were out of Anatolia in 1922, and the strength of Turkey as against the impotence of Greece, made the question of Smyrna's disposition now relatively simple. The ultimate character of the settlement was foreshadowed in the Armistice of Mudania (Oct. 10, 1922) between Turkey and Great Britain, France and Italy, which among other things assured Turkey of complete sovereignty over Anatolia. A preliminary step was taken in the Lausanne Agreement (May, 1923) between the Turks and Greeks by which the question of Greek damages in Smyrna was amicably settled on the basis of compensation in Thrace. (See THRACE.) Finally, in the Treaty of Lausanne (July 24, 1923), the Greek loss of Smyrna was confirmed. One of the most brutal, and yet possibly necessary, elements rising out of the Greek defeat was the arrangement made for the exchange of Greek and Turkish populations. But for the aid rendered by the Refugee Commission which was created by the League of Nations Council and headed by Henry Morgenthau of New York, the task might well have been insuperable. See GREECE, under *History*.

SMYTH, ETHEL (MARY) (1858–). A British composer (see VOL. XXI). Until the outbreak of the World War, her works were far more appreciated and more frequently performed in Germany than in her native land. It was only during the War that her works began to gain recognition in England, and she was amply compensated for the public's earlier indifference. In 1922 she was made Dame of the British Empire, and in the midst of the Schubert Centennial, in 1928, London arranged a splendid celebration in honor of her seventieth birthday. Her latest works include two one-act operas, *Fête Galante* (London, 1923), and *Entente Cordiale* (Bristol, 1926). She published her autobiography in two books, *Impressions that Remained* (2 vols., 1919), and *Streaks of Life* (1922).

SNEDDEN, DAVID (1868–). An American educationalist, born at Havilah, Calif. He was graduated from St. Vincent's College in 1889 and took post-graduate courses at Stanford and Columbia universities. For several years, he served as principal of schools in California, and from 1901 to 1905 was assistant professor of education at Stanford University. In the latter year, he was appointed adjunct professor of education at Columbia, serving until 1909, when he became State Commissioner of Education in Massachusetts. In 1916 he became professor of education in Columbia. Professor Snedden was a member of many learned societies and published, among other works; *Administration of Education for Juvenile Delinquents* (1906); *Educational Administration in the United States* (1908); *Problems of Vocational Education* (1911); *Problems of Secondary Education* (1917); *Vocational Education* (1920); *Sociological Determination of Objectives in Education* (1921); *Educational Sociology* (1922); *What's Wrong with American Education?* (1927). From 1918 to 1920, he was president of the National Society for Vocational Education.

SNOWDEN, snō'd'n, RT. HON. PHILIP (1864–). An English public official (see VOL. XXI). During the World War, he was a member of the Liquor Control Board, and in 1924 was appointed Chancellor of the Exchequer in Ramsay MacDonald's cabinet. In 1927 he resigned from the Independent Labor Party after 34 years of membership, and six years as chairman (1903–06, 1917–20). He was Chancellor of the Exchequer in the second Labor cabinet formed in June, 1929, and in this capacity headed the British delegation to The Hague reparations conference in August. There he secured, subject to the ratification of interested governments, a considerable increase in annuities allotted to Great Britain under the Young Plan. Besides contributing to reviews, he wrote *Wages and Prices* (1920); *Labor and National Finance* (1920); *Labor and the New World* (1921); and *If Labor Rules* (1923). His wife, ETHEL SNOWDEN, who was nominated by the Government to the Board of Directors of the British Broadcasting Corporation, wrote *Through Bolshevik Russia* (1920) and *A Political Pilgrim in Europe* (1921).

SNOW REMOVAL. See ROADS AND PAVEMENTS.

SNYDER, VIRGIL (1869–). An American mathematician, born at Dixon, Iowa. He studied at Iowa State University, Cornell, and Göttingen (Ph.D., 1894). He returned to Cornell as instructor of mathematics and in 1910 became professor. His original investigations include studies on the geometry of the line and sphere, configurations of ruled surfaces, and birational transformations, the results of which he published. He became editor of the *Bulletin* of the American Mathematical Society in 1903. Besides various scientific papers, he wrote *Differential Calculus*, with James McMahon (1898); *Differential and Integral Calculus* (1902); *Elementary Text-book on the Calculus* (1912); *Analytic Geometry of Space* (1913). He also edited *Plane Geometry* (1910) and *Solid Geometry* (1912).

SOAPSTONE. See TALC AND SOAPSTONE.

SOCCER. This branch of football has attained its greatest popularity in the British Isles where crowds of 100,000 and more gather to watch the important league and cup matches. Canada and the United States latterly have been taking up this sport with ever-increasing interest, leagues and college and school elevens being organized in large numbers. The players for the professional teams in Canada and the United States are recruited chiefly from English and Scottish players of reputation. This practice has aroused considerable trouble in the soccer world, but steps were being taken to eradicate the resultant evils, such as the promiscuous enlisting of star players under contract. A "soccer war" developed in the United States in 1928, when the American Soccer League broke away from the domination of the United States Football Association.

SOCIAL DEMOCRATIC PARTY. See SOCIALISM, *Germany*.

SOCIAL INSURANCE. It may be said that the post-war period threw into sharp relief a phase of the modern industrial system that had not appeared so important before 1914 the insecurity of the working population. Before the War, with employment general, as foreign markets were being exploited, only passing attention was given to the status of the laboring class. For superannuation, there was relief in the poor house; for unemployment, disability, etc., one might seek charity. Only after the War did governments—and this is more particularly true of European nations than the United States—begin to concern themselves with the position of the worker in an industrial society. Out of this, there have been evolved the elaborate social-insurance schemes for the purpose of giving security to the proletariat. Social insurance concerns itself with unemployment, disability because of accident and occupational disease, sickness, invalidity, maternity, and old age. For the appearance of these programmes, these reasons may be cited: the fear of revolution in the days immediately following 1918; the wiping out of the rentiers and the funds of charitable organizations as a result of the depreciation of the currencies of central European countries; the influence of the International Labor Office; the breakdown of the laissez-faire principle.

In the United States, the movement has been slower than in Europe. The United States did not suffer the fearful hardships of the War and the danger of revolution was remote. Unemployment was a national problem in 1921–23 and 1928, but serious attention was not paid to general schemes of amelioration. While old-age pensions were being discussed, by 1929 only seven States had legislation on their statute books. Workmen's-compensation acts were more or less general though of unequal value; the same was true of widows' pensions. The high cost of medical service was bringing to the forefront schemes for health insurance. Nevertheless, social insurance was not yet beyond the preliminary stage of discussion. It was agreed, however, that the time would not be long before the United States would have joined England, France, Germany, and Russia in writing elaborate social-insurance codes on its statute books, because the increasing mechanization of industry was bringing in its train early superannuation, more accidents, smaller employment rolls, etc. See WORKMEN'S COMPENSATION; OLD-AGE PENSIONS; MOTHERS' PENSIONS; UNEMPLOYMENT.

Workmen's Compensation. In Europe, advances have been great. Since the War, the following countries have amended their workmen's-compensation codes to include office and agricultural workers: Italy, France, Netherlands, Russia, Portugal, and Luxemburg. France included domestic servants in 1923. More liberal definitions of "injury" have been written, waiting times have been lowered, and maximum benefits have been raised. Occupational diseases were beginning to be considered compensable and in some countries lists of enumerated diseases have been prepared. Other countries to enact such legislation were: Bolivia (1924); Brazil (1919); Bulgaria (1918); China (1923); Ecuador (1921); India (1923); Spain (1922); and Uruguay (1920).

Insurance against Sickness. The idea of protecting the industrial population against illness has spread. Old laws have been broadened to include workers in industry, commerce, and even agriculture. The laws are becoming universal in their application, covering all occupations and all causes of invalidity. Thus, in Great Britain, 86 per cent of the wage-earning population was insured; in Germany, 77 per cent; in Austria, 75 per cent. At the end of 1928, the following 19 countries were insuring workers against illness: Austria, Bulgaria, Czechoslovakia, France, Great Britain, Greece, Estonia, Germany, Hungary, Lithuania, Luxemburg, Norway, Poland, Portugal, Rumania, Russia, Jugoslavia, Chile, and Japan. In addition to the lengthening of the list of countries, there has been an extension of the idea to include not only money benefits but also medical services, greater benefits for wage earners with dependents, and maternity protection. In 14 countries, health insurance covers the wife of the worker in her confinement, giving her not only a money benefit but also the care of a physician or midwife, prenatal attention, postnatal care of child, etc. In every European country but Russia, the health-insurance schemes were based on contributory payments by the workers; in half of the countries, the state also contributed. An important tendency was decentralization of the funds with the state occupying a minor rôle and with the insured persons and the employers becoming more important. The state acted as judge, supervisor, and financial promoter. It is interesting to note how these tendencies depart from the socialistic ideology of the nineteenth century.

Old-age Insurance. In the following countries, there have been enacted invalidity and old-age-pension codes: Argentina (1923) Belgium (1920, 1924); Bulgaria (1924); Greece (1922); Portugal (1919); Russia (1922); Jugoslavia (1922); Chile (1924); Cuba (1923, 1924); Italy (1923); Spain (1919, 1921); and France (1928). Canada (1927) enacted a noncontributory old-age pension law based upon federal contributions being matched by provincial contributions. Norway (1923) and Uruguay (1919) also passed noncontributory laws. The Great Britain law of 1924 was passed to extend old-age benefits on a contributory basis to persons between 65 and 70, at which age pensions were to be granted. It was reported that this law affected 15 million workers. In Canada, British Columbia (1927), Yukon, Saskatchewan, and Manitoba (1928) all complied with the federal law and established noncontributory old-age pensions. See OLD-AGE PENSIONS for development in the United States.

Unemployment Insurance. Great Britain, by the Act of 1920, greatly extended her unemployment insurance scheme until it had almost universal application. The following countries have followed this example: Queensland, all workers (1922); Austria, industrial and commercial workers (1920); Germany, all workers (1924); Irish Free State, industrial and commercial workers (1920); Italy, same (1923); Poland, same (1924); and Russia, all workers (1922). In all these cases are to be found the compulsory principle with state participation. Voluntary insurance schemes were introduced in Denmark, France, and Norway before the War. After the War, the following other countries sponsored similar experiments: Belgium, Netherlands, Finland, Spain, Switzerland, and Czechoslovakia. For developments in the United States, see UNEMPLOYMENT.

International Labor Office. Undoubtedly, the International Labor Office's rôle in the advance of social-insurance legislation has been great. Between 1919 and 1927, of the 54 draft conventions and recommendations adopted for submission to the member states, 17 were concerned with phases of social insurance. Ratifications, indeed, have been slower, but there can be no doubt that the publicity attendant upon the Labor Office's work sooner or later succeeded in crystallizing public opinion. See INTERNATIONAL LABOR OFFICE for further discussion of draft conventions and recommendations.

SOCIALISM. The history of socialism after 1914 did not bring forth any noticeable change in principle. The great struggle in the Socialist ranks in this period was concerned primarily with tactics, for throughout these years the Socialist principle retained its solid Marxian basis. While there was much debate among the three foremost groups, the Communists under Lenin, the orthodox Socialists under Kautsky, and the "revisionists" under Bernstein, none of these groups ever seriously questioned the fundamental Marxian doctrine. In regard to procedure, two distinct camps appeared, the one favoring the attainment of the Socialist aim through the dictatorship of the proletariat, and the other striving for the same end by utilizing the existing political and economic institutions. In addition, socialism came to lean more and more on organized labor and under the influence of syndicalism, adopted industrial unionism and guild socialism, tactics of a more strictly industrial character. The disruption of international socialism, the final reconstitution of the International, and the continual shadow of Russia mark the years from 1914 to 1929.

The Socialist International. Early in 1914, plans had been made to hold an International Congress on Aug. 23, 1914, in Vienna, for the commemoration of the founding of the International Workingmen's Association 50 years before. This congress was never held because, with the outbreak of the World War, international socialism broke up into its component national parts. The general strike against war was not called in spite of all previous plans for such action, and the War swept international socialism away regardless of individual mass meetings and protests against war in various countries. Most Socialists placed their country's needs ahead of their socialistic principles. Only the Russian, some of the British, and a small minority of the German Socialists remained passive. During 1915, more or less determined efforts were made to reconstruct the disrupted International, and toward this end a conference was held at the instance of the Scandinavian Socialists during January, 1915, in Copenhagen. Only the Scandinavians and the Dutch, 16 delegates in all, attended. In February of the same year, the Socialists of the Allied countries held a conference in London, which, however, concerned itself with victory rather than with peace and criticized the imperialism of all the warring countries only perfunctorily. More important than either of these two was the conference held at Zimmerwald, Switzerland, in September, 1915, at the invitation of the Italian Socialists, at which were present representatives of all the important Socialist parties, exclusive of the British, to whom passports had been refused. This conference emphasized the international solidarity of all Socialists and issued a manifesto condemning the War. Nothing definite, however, was accomplished.

The International Socialist Bureau, which had been removed at the outbreak of the War from Brussels to The Hague and which was now under the direction of the Dutch Socialists, held a conference at its seat July 30–Aug. 2, 1916, which was attended by representatives from Sweden, Denmark, Holland, the United States, and Argentina and at which resolutions were adopted placing the responsibility for the War on the capitalist system. The Socialists of belligerent and neutral countries, who had convened during the previous year at Zimmerwald, met again in August, 1916, at Kienthal, Switzerland. The majority of the 40 delegates at this conference represented the Italian Official Socialist Party, and the Swiss and Russian Socialists. Only two Germans and three Frenchmen attended, and hence the conference accomplished very little.

Renewed efforts at international unity brought about the so-called Peace Conference of Stockholm in June, 1917. The plan initiated with the Russian Workmen's and Soldiers' Council and found response among the German and Austrian Socialists who drew up an elaborate peace programme on the basis of "no annexations and no indemnities." Of all the important Socialist parties, only the Germans attended, and the conference was therefore an utter failure. More concrete results were produced by the Inter-Allied Labor and Socialist Conference of Feb. 21–23, 1917, at London. It voted a declaration of war aims, commonly called the London Memorandum, which endorsed President Wilson's four principles essential to peace and the British Labor Party's programme as to war aims, and advocated the League of Nations. Another Inter-Allied Socialist Congress met in London during September, 1918. Amid continued attempts during 1919 to revive the disrupted Second International, 12 Radical Socialist parties met at the instance of the Russian Soviet government at Moscow, Mar. 2–6, 1919, and formed the Third International, a strictly Communist organization. The International Socialist Bureau, the only remnant left of the Second International, summoned the Berne Conference of February, 1919, at which 26 countries were represented. The conference settled a number of points of conflict and also expressed its opposition to the Communist International.

At the Congress of Genoa, August, 1920, international socialism was finally reconstituted after six years of discord. The organization was, however, by no means complete, for many Socialist units remained outside its fold. The congress declared emphatically against the acts and programme of Lenin and Soviet Russia and adopted in the main British Labor Party features and principles. A score of Socialist parties attended the conference and affiliated with the new international body. Amsterdam was chosen as the permanent seat. The Third International held a congress at Moscow in 1921, which was attended by several hundred delegates from 42 countries. The result of this meeting was the maintenance of the Soviet doctrine in all its purity. Socialist groups that were opposed both to the nationalist tendencies of the Second International and the exclusive Communist character of the Third International organized in Vienna, Feb. 2, 1921, the International Working Union of Socialist Parties, or, as it was commonly termed, the Second-and-a-Half International. The chief adherents of this body were the Independent Labor Party, the German Independent Socialists, the Socialist Party of France, the Austrian, Swiss, and Rumanian Socialists, and the Russian Mensheviks. This intermediary organization soon manifested a desire, however, to coöperate with the other Internationals, and at its instance, a conference of the three Internationals was held in the Reichstag Building in Berlin, Apr. 2–5, 1922, at which a basis for common procedure was discussed.

While the conference and the subsequent meeting of its Committee of Nine, Berlin, May 23, 1922, ended in a failure, so far as the Moscow International was concerned, it succeeded in bringing the other two organizations closer together. This rapprochement continued during the remainder of the year and at the meeting of the executives of the two bodies at The Hague, Dec. 10, 1922, it was decided to call a congress at Hamburg for May 20 of the following year, in order to bring about united Socialist action. At this congress, 424 delegates from 30 countries, representing 43 Socialist parties or groups, were present. The Vienna International and the Second International merged and formed the Labor and Socialist International with its permanent seat in London. Thus, the Socialist parties of the world, with the exception of the Communist groups, were united for the first time since August, 1914. The new organization and the Third International continued their hostility to each other.

In the following years, however, the Second International did not play a particularly significant rôle, Socialist development being almost exclusively along nationalist lines. In 1925 the Second International met at Marseilles (August), where 600 delegates representing 30 nations assembled. These reported that they stood for seven million party members and 28 million votes. Resolutions passed by the congress favored the 8-hour day, approval of the League of Nations, and undying enmity for the Communists. In 1926 these Socialists plainly showed that their loyalties were nationalist rather than internationalist when the World Migration Congress, called by the International, refused to pass a resolution favoring free migration for working populations. Socialists from the European countries opposed restriction but had to bow before the wishes of the delegates from Canada, Australia, and New Zealand, who supported their governments in restrictive legislation. This congress met at London in June and was attended by delegates representing 15 million trade-unionists. During the period, it became apparent that the International Labor Office was largely taking the place of the Second International in watching out for the interests of the laboring classes throughout the world.

The United States. The American Socialist Party lost rather than gained during 1914. Although it elected Meyer London to Congress, it polled at the November elections over 200,000 votes less than in 1912. During 1915 there was a great deal of strife in the party over the nonparticipation of the American Socialists in the Copenhagen Conference. The party was rather successful in that year in electing candidates to State and local offices. At the presidential election of 1916, however, it polled over 150,000 votes less than in 1912. America's entrance into the War in 1917 had the same disrupting effect on the American Socialist Party that the War had had on the Socialist parties of other countries. After endeavoring in vain to have the party repeal its expression of opposition to the War, a patriotic group seceded and formed the Social Democratic League in 1918. During the same year, the American government suppressed many anti-war activities of the Socialists by imprisoning a number of them, including Eugene Debs. New factional disputes arose in 1919 after the Chicago Convention at which the party declared in favor of the Second International. The radical elements left the party and formed the groups subsequently known as the Communist Party and the Communist Labor Party (see COMMUNISM). Thus, the American Socialist Party lost considerable influence due to its middle-course policy. On the one hand, it alienated the more conservative elements; while, on the other hand, it lost those who were Communist in sympathy and wished to stand squarely on the Moscow programme.

In 1920 the American Socialists took a definite stand against Moscow by insisting on using their own judgment as to their principles and tactics. That year was also marked by the suspension of the five Socialists elected to the New York State Assembly. When these were reëlected, three of them were again suspended in December of the same year. At the national elections in 1920, the party polled about one million votes. In 1921 the sentences of Debs and a number of other Socialists, imprisoned during the War under the Espionage Act and other war-time measures, were commuted. At the Convention of 1922, the Socialist Party voted for affiliation with the Vienna International and for unreserved recognition of Russia. In Wisconsin, the Socialists sent Victor Berger (died 1929) to Congress in the elections of 1922, while Daniel W. Hoan became mayor of Milwaukee for a third term. In New York City, the Socialist Party joined in the elections with the Farmer-Labor Party to form the American Labor Party. An invitation from the Workers' Party, the successor of the Communist Party, for coöperation in various matters was rejected unanimously at the annual convention, May 19–23, 1923. In the elections of the same year, the Socialist Party in New York City coöperated again with the Farmer-Labor Party.

The events of 1924–28 showed that Socialism in the United States had not yet recovered from its decline. The Socialist National Convention on July 6, 1924, at Cleveland, threw in its lot with the La Follette movement, and by this step set back the progress of socialism for at least a decade. Men like Victor Berger and Morris Hillquit prevailed over the counsels of the group represented by Scott Nearing and endorsed a liberal programme that said nothing of the basic principles of socialism. The defeat of La Follette (see UNITED STATES) proved the futility of hoping for Socialist success without a permanent organization and a definite code of principles. The Socialist Party was unable to repair its political fences during the next four years, with the result that it entered the presidential campaign weaker than ever before. In April, the party placed in nomination Norman Thomas of New York and James H. Maurer of Pennsylvania on a platform calling for public ownership of natural resources and public utilities, governmental relief of unemployment by the extension of public works, outlawry of war, the recognition of Russia, etc. The valiant efforts of Mr. Thomas availed nothing, despite a brilliant campaign, in which he sought to win away the liberals from supporting Smith on the ground that the Democratic candidate was doomed to defeat. Only some 300,000 votes were cast for Thomas, one-third of which came from New York City. The vote was the smallest in the history of the party since 1900. See COMMUNISM.

Great Britain. Early in 1914, the three outstanding British Socialist societies, the British Socialist Party, the Independent Labor Party, and the Fabian Society, drew up a plan for closer coöperation, but here, as elsewhere, Socialist progress was checked by the advent of the War. In England, as in Germany, there was at first organized Socialist protest against the War. This changed, once the conflict had become a reality. The Labor Party, only partially Socialist in character and composition, gave full support to the Government while the Independent Labor Party remained aloof. Thus, on the whole, British socialism and the Labor Party remained loyal to the Government throughout the War (except for a group of British Socialists) and in the closing years of the struggle, Socialist members of the Labor Party accepted posts in Lloyd George's war cabinet. After the War, in 1919, unsuccessful attempts were made to bring together the British Socialist Party, the Independent Labor Party, and the Fabian Society. There had been a fourth group, the former Social Democratic Federation, now called the National Socialist Party, which in 1920 assumed its old name and joined the Labor Party. The latter, still only partially a reflection of Socialist views and principles, became in the post-war period increasingly Socialist in character and its gains in the elections of 1919 were regarded as Socialist gains. In 1920 it expressed itself as opposed to the Third International. At the same time, the Radical British Socialist Party became the British Communist Party (see COMMUNISM) and was joined by the Socialist Labor Party, an offshoot of the American Socialist Labor Party. Toward the end of the War, guild socialism (q.v.) and syndicalism (q.v.), two nonpolitical and strongly industrial movements, began to exert an ever-increasing influence on British socialism, but toward the end of the period 1924–29, this influence had waned. The elections of 1922 made the Labor Party, with 142 members in the Commons, the chief party of opposition and after the elections of 1923, which increased its strength to 191 seats, the Labor Party took over the government with the passive support of the Liberals.

The Labor government, headed by the very able Ramsay MacDonald, continued in control from Jan. 21 to Nov. 4, 1924, when the general election of that year returned a Conservative government with a powerful majority. The Labor Party became the official Opposition and worked steadfastly with its eye on the general election of 1929. As a result of the failure of the general strike and the disaster that overtook the miners, Communist sentiment for a time was strong and the Labor Party found itself confronted by a strong opposition from within. The wise direction of Mr. MacDonald, together with unemployment, the heavy burden of debt, and the high cost of the armaments programme, all contributed toward the rehabilitation of the party, with the result that the end of 1928 and the early months of 1929 saw Labor candidates winning a number of by-elections from Conservatives. So great were the preliminary successes of the party that it was announced that candidates would be placed in the field in rural districts. In the election manifesto of July, 1928, the party announced that it was its intention to transfer "capitalism into socialism" by peaceful methods. It also was opposed to a reduction in wages, favored the repeal of the Trade Unions Act, was for a 48-hour week, extension of the factory code and the minimum wage, and nationalization of coal, transport, power, life insurance, etc. During the period after the War, the Labor Party acted as the leading spirit of the Second International. As a result of the three-cornered contest, Laborites obtained a plurality of seats and the summer of 1929 saw the second English Socialist government with MacDonald once more as the Premier. See GREAT BRITAIN, under *History*.

Germany. While the War was still imminent, the German Socialists voiced their protest against it in organized mass meetings, but once war was declared, the Social Democratic Party in the Reichstag, with a few exceptions, supported the Government and voted the war credits. As the War progressed, dissatisfaction with the party's attitude toward the Government and the War appeared in the Reichstag group and, although few in numbers during 1914 and 1915, the dissenters were strong enough in 1916 to break with the party and form a new organization, the Socialist Union of Labor, which mustered 20 members in the Reichstag and adopted a programme uncompromisingly opposed to the War. During 1917, the new organization grew in strength and called itself the Independent Social Democratic Party. With the disastrous close of the War, and the revolution, the Majority Socialists took over the government. When the Independent Socialists seemed to be willing to support them, a minority among them, which had been most outspoken in its hostility to the War, seceded and expressed sympathy with the Soviets. The Spartacists, as these ultra-radicals called themselves, began an uprising in January, 1919, which was forcibly suppressed by the Majority Socialist government. As a result of the elections of 1919, the Government passed completely into the hands of the Majority Socialists, but the Independents also made considerable gains. Of the three Socialist groups which thus existed in Germany, the Majority and Independent Socialists favored the Second International; and the Spartacists, the Third International. At their annual national congress at Görlitz in September, 1921, the Majority Socialists decided to coöperate with the bourgeois parties. In September, 1922, in the Convention of Nüremberg, the Majority Socialists and the Independents combined into the United Social Democratic Party. The Reichstag group of the Communists joined in 1923 the Reichstag group of the United Socialists and formed with some of the former Independents the left wing of that party, but in the Reich, the Socialists lost many members to the Communists. This leftward trend within the Socialist rank and file became clearly apparent in the elections of May, 1924, when the seats of the United Socialists in the Reichstag were reduced from 166 to 100, while the Communists obtained 60 seats against 15 in the old Reichstag.

In the national elections of May 20, 1928, the Social Democrats (Socialists) elected 152 deputies to the Reichstag and polled the largest popular vote in the election. Out of the 30,500,000 votes cast, the Social Democrats received 9,000,000. The Communists elected 52 deputies and received a popular vote of 3,000,000. The Social Democrats had run on a platform which included: loyalty to the Republic; more protection for the workers; separation of Church and State; and the socialization of industry. For the rôle played by the Social Democrats in the politics of the country, see GERMANY, under *History*.

France. The elections of 1914 increased the number of seats of the Socialists in the French Chamber to 101. The outbreak of the War found the French Socialists giving uniform support to their Government. They regarded the War as a war of defense on the part of France and dropped the anti-militarist plank from their platform. During 1915 and the greater part of 1916, they continued this solid indorsement of the Government, but late in 1916, a steadily growing minority element sprang up which opposed the War. At the Socialist Congress of Bordeaux, October, 1917, it became apparent that the majority had swung over to the minority viewpoint; but a fusion of the two groups did not take place, since no agreement could be reached on the question of war credits. In April, 1919, the French Socialist Party voted to remain in the Second International, protested against the Peace Treaty of Versailles, and condemned the League of Nations. At the elections of 1919, it polled 1,750,000 votes, a gain of 40 per cent, but its representation in the Chamber was reduced to 55 seats. In 1921 the Communist element seceded from the Socialist Party and founded an independent organization, which polled 321,444 votes against 578,466 for the Socialists, in the elections of May, 1922. At its national congress at Lille, 1923, the French Socialist Party rejected a proposal from the Communists for united action against the occupation of the Ruhr and the danger of an imperialist war. On the same occasion, it voted for recognition of Russia. In the May elections of 1924, it increased its membership in the Chamber from 55 to 101 seats. With the secession of the Communist element, the party became more moderate, this being manifested by its apparent willingness to support a Radical Socialist government, without, however, actually participating therein. During 1924–28 this continued to be the rôle of socialism in France.

SOCIAL PSYCHOLOGY. The new science of social psychology was called into being to supplement the science of individual psychology. The latter science, being investigated on an experimental, physiological basis, did not bring together the complex facts and tendencies of human life, as they manifest themselves in the interaction among individuals or among groups, and it was therefore necessary to add a new member to the intellectual encyclopædia.

The best illustration of the early development of social psychology is to be found in the writings of Wilhelm Wundt. For nearly half a century, the director of the Leipzig laboratory dominated the science of psychology in Germany. In his later years, he turned from individual psychology to *Volkpsychologie,* but he continued to apply the same "structural" formula—the search for elements and laws. He defined the social mind as an individual synthesis possessing actuality, although in his physiological psychology actuality was regarded as immediacy of experience and was therefore personal. Moreover, in dealing with the group as a synthesis, Wundt entangled himself in the same difficulty as in his apperceptive synthesis of the individual mind. The apperceptive synthesis was a union of psychophysical sensations, and yet it had a reality over and above its component atoms.

So, too, the group mind was a synthesis of individual minds and seemed to have a substantial existence of its own. Wundt held that the attributes of the group mind were to be determined by the analysis of its products; thus the attributes of the German mind were to be formulated by an analysis of the collective acts of the German people, those of the French mind by an analysis of French acts, etc.; but in practice, Wundt's laws of folk psychology were but applications of individual psychology; just as in practice his analysis of immediate psychological experience tended to be degraded more and more into mere physiology.

In Germany, Wundt's folk psychology met the opposition of those who approached collective phenomena from the study of history and the evolutionary development of peoples. Krüger was the leader of this group—the school of *Entwicklungspsychologie*, or developmental psychology of groups. The conflict paralleled the historic quarrel in France between the objective sociologists and psychologists like Gabriel Tarde who hoped to explain all social phenomena through the mechanism of the instinct of imitation.

In the United States and in England, the issues were never so sharply drawn; for one reason, because no rigorous discipline was developed for the study of social facts. McDougall's *Social Psychology* served for many years as a model for all students of the subject. Its method was thoroughly empirical—empirical, that is, in the British sense, without being objective. Inspired largely by the *Dynamic Sociology* of Ward, Professor McDougall had undertaken to put into relief the component individual motivations which go to make up the movement of life which we call society. These motivations were found in the instinctive equipment of the individual, together with the emotions that were associated with the instincts (see INSTINCTS). Authorities disagreed as to the number of instincts and inherited dispositions man possessed at birth; whether these instincts were immutable or could be propitiated by a favorable environment; and, finally, as to the relation of these instincts to ethics and religion.

The most recent development in social psychology grows out of a number of contributing circumstances. The attack upon the conception of instincts, on which the social psychology of McDougall and others was founded, with the attempt to substitute the reflex as the only inherited mechanism, had a profound effect upon current thought. Added to this was the advent of the conditioned reflex (see BEHAVIORISM) which furnished the mechanism by which complex forms of behavior similar to those conceived as instincts could develop in the early life history of the individual. Furthermore, the psychoanalytic movement (see PSYCHOLOGY, ABNORMAL AND PSYCHOANALYSIS) looked upon social institutions and customs as powerful forces affecting the life of the individual, thwarting his desires, and distorting his behavior. The progress of mental measurement made available the instruments required for measuring the effects of one individual or a group of individuals upon the attitudes and actions of other individuals. These various factors have crystallized into a new social psychology represented by the work of F. H. Allport (*Social Psychology,* 1924). Its nature is indicated in the following quotation (Allport):

> Social psychology is the science which studies the behavior of the individual in so far as his behavior stimulates other individuals, or is itself a reaction to their behavior; and which describes the consciousness of the individual in so far as it is a consciousness of social objects and social relations. . . . Behavior in general may be regarded as the interplay of stimulation and reaction between the individual and his environment. Social behavior comprises the stimulations and reactions arising between an individual and the social portion of his environment, that is, between the individual and his fellows. Examples of such behavior would be the reactions to language, gestures, and other movements of our fellowmen, in contrast with our reactions toward non-social objects, such as plants, minerals, tools, and inclement weather. . . . In and through others many of our most urgent wants are fulfilled; and our behavior toward them is based on the same fundamental needs as our reactions toward all objects, social or nonsocial. It is the satisfaction of these needs and the adaptation of the individual to his whole environment which constitute the guiding principles of his interactions with his fellowmen.

There is no place in this conception of social psychology for a "collective mind," or a "group consciousness." See William McDougall, *The Group Mind,* 1920.

> There is no psychology of groups which is not essentially and entirely a psychology of individuals. Social psychology must not be placed in contradistinction to the individual; it is a part of the psychology of the individual, whose behavior it studies in relation to that sector of his environment comprised by his fellows.

For a criticism of the point of view of Allport, see R. S. Woodworth, "Social Psychology: A Review," *Journal of Abnormal and Social Psychology*, 1925.

Typical of the experimental studies of the interaction among individuals and groups are F. H. Allport, "The Influence of the Group upon Association and Thought," *Journal of Experimental Psychology*, 1920; H. E. Burtt, "Sex Differences in the Effects of Discussion," *Journal of Experimental Psychology*, 1920; L. E. Travis, "The Effect of a Small Audience upon Eye and

Hand Coördination," *Journal of Abnormal and Social Psychology*, 1925. Among the more important systematic treatises on Social Psychology are F. H. Allport, *Social Psychology*, 1924; L. L. Bernard, *An Introduction to Social Psychology*, 1926; C. A. Ellwood, *Introduction to Social Psychology*, 1918; Knight Dunlap, *The Foundations of Social Psychology*, 1925; R. H. Gault, *Social Psychology*, 1923; William McDougall, *The Group Mind*, 1920; E. A. Ross, *Social Psychology*, 1915.

SOCIAL WORK. See CHARITIES.

SOCIETY ISLANDS. See PACIFIC OCEAN ISLANDS.

SOCIOLOGY. See SOCIAL PSYCHOLOGY.

SODDY, FREDERICK (1877–). A British physicist, chemist, and economist (see VOL. XXI). He held the professorship of chemistry at Aberdeen from 1914 to 1919, when he became Lee's professor of inorganic and physical chemistry at Oxford. In 1921 he was Nobel Prize winner in chemistry. He is the author of *Science and Life* (1920); *Cartesian Economics* (1922); *Inversion of Science* (1924); *Wealth, Virtual Wealth and Debt* (1926); and *The Wrecking of a Scientific Age* (1927).

SÖDERBLOM, LARS OLOF JONATHAN (NATHAN) (1866–). A Swedish archbishop and ecclesiastical historian. Born in Helsingland and educated at Hudiksvall and the University of Upsala, he served as pastor of the Swedish church in Paris (1894–1901) and as professor of ecclesiastical history in the University of Upsala and, in 1912–14, at Leipzig University. In the latter year, he became Archbishop of Upsala and pro-chancellor of the University of Upsala. In 1921 he was elected to the Swedish Academy. His works include *Religionsproblemet* (2 vols., 1911); *Natürliche Theologie und allgemeine Religionsgeschichte* (1913); *Ur Religionens historia* (1915); *Religionen och staten* (1918); *När stunderna växla* (4 vols., 1921); *Christian Fellowship* (1923), also in German, Swedish, and Dutch; *Kristenhetens Moete* (1926); *Kristi Pians Historia* (3d ed., 1928); *Die Einheit der Kirche und der papstliche Stuhl* (1928).

SOILS. Important advances are being made in the efficient use of the soil in crop production. Soils are being surveyed and mapped and the best crop adaptations and methods of soil management are being determined with a certainty not heretofore possible. The potential possibilities thus disclosed have gone far to allay fear of an imminent shortage of food with increasing population.

One of the most important of the many agencies fostering the study of soils is the International Society of Soil Science. The First International Congress of Soil Science, held at Washington in 1927, under the auspices of this society and of the American Society of Agronomy, brought together a representative body of scientists from all parts of the world to discuss soil problems, and gave a great impetus to the application of science to their solution.

Soil surveying and mapping is of world-wide interest as an aid in the better utilization of soils. A generalized soil map of Europe has recently been made under the auspices of the International Society of Soil Science, and a similar map for the United States has been prepared by the Bureau of Soils of the U. S. Department of Agriculture. Less comprehensive and complete soil maps are available for other regions. These soil surveys are especially useful in differentiating lands which can be profitably tilled from those that are marginal or of doubtful value for cultivation, and in determining those especially suited to certain kinds of crops. The soil surveys of the United States by 1929 had covered over 800,000,000 acres, or about one-half of the arable area of the country. With such knowledge as these surveys, supplemented with more detailed investigation in soil fertility, supply, the present tendency in the United States is to discourage the bringing of more land under cultivation but to encourage the making of better use of that already available.

Soil conservation, particularly protection against erosion, is receiving much attention. The grave consequences of unrestrained soil erosion, as typically illustrated in China, is evident in varying degrees in other countries. It has been estimated that 15,000,000 acres of tillable land have been rendered permanently unproductive in the United States by erosion, and that the annual loss to farmers from this cause amounts to over $200,000,000, involving a loss of soil fertility far in excess of that resulting from the growth and removal of crops. Progress is being made in determining the kinds of soil most subject to destructive erosion and the best means of preventing it. The relation of soil colloids and various physical and chemical properties to erosion are being studied, and the advantages of terracing and plant cover as preventive measures have been demonstrated.

Recent investigations emphasize the importance of certain minor constituents of soils, such as manganese, copper, iodine, and others, in relation to production and the food and forage value of crops. It seems clear that these substances play a more important part in this respect than has been fully recognized. The relation of crops to varying degrees of acidity or alkalinity of the soil is becoming better understood as a result of continued study of the subject, as are the best means of adjusting such conditions to different kinds of crops.

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ical Contributions 13, A Classified List of Soil Publications of the United States and Canada (June, 1927); *14, List of the Publications on Soils Issued by the U. S. Department of Agriculture, 1844–1926* (May, 1927); and *15, List of the Publications on Soils Issued by the State Agricultural Experiment Stations of the United States through 1926* (July, 1927).

SOISSONS. See WORLD WAR, *Western Front.*

SOKOLOFF, sō-kô'lôf, NIKOLAI (1886–). An American violinist and conductor, born at Kiev, Russia. Having received his first instruction from his father, he entered the Yale University School of Music in 1899, studying the violin under C. M. Loeffler. In 1903, he became a violinist in the Boston Symphony Orchestra. His career as a virtuosa began in 1911 with a tour of England and France. For a time, he lived in San Francisco, where he organized a string quartet in 1916 and made his début as conductor with the Philharmonic Orchestra there, which he conducted during the summer of 1916. In 1918 he became conductor of the Cleveland Symphony Orchestra, which he brought to a high degree of efficiency. He also appeared as guest-conductor with several of the great American orchestras and with the London Symphony Orchestra. In 1919 he formed a string quartet with Edlin, Kalodkin, and de Gomez, members of the Cleveland orchestra.

SOLAR CONSTANT. See ASTRONOMY; METEOROLOGY.

SOLAR PHYSICS. See PHYSICS.

SOLAR SYSTEM. See ASTRONOMY; PHYSICS.

SOLF, WILHELM (1862–). A German public official, born in Berlin. He was much interested in the Oriental languages, studied Sanskrit, and lived a long while in Calcutta. Returning to Germany, he studied political science and was appointed Governor of German Samoa in 1900 and German colonial secretary in 1911. He achieved much success in the reform of German colonial administration. He was appointed Secretary of State for Foreign Affairs in October, 1918, and in this capacity conducted the negotiations for the Armistice. He continued to hold this office under the revolutionary Socialist government until December, 1918, when he resigned. In 1920 he was appointed Ambassador to Tokyo. He wrote *Weltpolitik und Kolonialpolitik* (1918), and *Kolonialpolitik, Mein Politisches Vermächtniss* (1919).

SOLOMON ISLANDS. See PACIFIC OCEAN ISLANDS.

SOMALILAND. A British African protectorate comprising the Somali Coast on the Gulf of Aden, extending from Labadu to Bandar Ziyada. Its area is 68,000 square miles; its population about 344,700, for the most part Mohammedan and nomadic in character. The chief towns had, by the 1921 census, the following populations: Berbera, 30,000; Zeyla, 7000; Bulhar, 7300. The exports are largely pastoral in nature, i.e., skins and hides, cattle and sheep. The imports are foodstuffs and textiles. Exports for 1927 were £355,575, as compared with £216,596 in 1913–14. Imports for 1927 and 1913–14 were £427,516 and £238,218. Expenditures still continue in excess of revenues and imperial grants-in-aid are necessary to make up deficits. Revenues for 1926–27 were £90,568 (largely from customs); expenditures, £149,125. Transport still depends for the most part on the camel. In 1920 the Mullah Mahommed, who for 20 years dominated the interior and consistently fought off the attempts at British penetration, was completely broken when an attack from the air by British airplanes wrecked his camp and killed great numbers of his followers. He himself died in hiding soon afterward, and with him passed the power of the dervishes. British rule was thus triumphant.

French Somali Coast. A French colony lying between Italian Eritrea and British Somaliland on the Gulf of Aden. Area, 5790 square miles; population (estimate of 1928) 85,778. Jibuti, the largest town in 1921 had 8366 inhabitants of whom 354 were Europeans. Chief exports include hides and skins, ivory, salt, and fish; total in 1926, 401,543,750 francs. Chief imports are cotton goods and foodstuffs; total in 1926, 457,751,424 francs. A large share of the trade was in transit to and from Abyssinia via the railway from Jibuti to Addis-Abeba (590 miles). The influence of the railway (completed in 1917) on trade was seen in the increased tonnage entering Jibuti. In 1912, 247 ships of 737,748 tons entered; in 1926, 1423 ships (245 French) of 1,145,271 tons. The local budget for 1928 balanced at 13,002,000 francs. As a result of the enlightened colonial policy, the natives continue orderly.

Italian Somaliland. A colony and three protectorates of Italy extending along the east coast of Africa from British Somaliland to the Juba. Area, 190,000 square miles; population about 1,200,000. Mogadiscio, the capital of the colony, has a population of 25,000. Attempts were made in the south, in the colony, to turn the native Somali from pastoral pursuits toward agriculture. In 1922, under the Duke of Abruzzi, 7500 acres were put under cotton. In the north, however, the native products continue to be cattle, sheep, and skins. Exports for 1927 were 25,300,950 lire; imports, 156,246,673 lire. Leading imports are cotton goods, sugar, rice, petroleum, yarn. Leading exports are hides (from 75 to 80 per cent), dura, maize, gum, butter, cotton. The budget for 1928–29 called for revenues and expenditures of 76,255,250 lire. There are no railways. Mileage of roads in 1928 was 1500 miles. Communications were maintained by 29 wireless stations. By the secret Treaty of 1915, to facilitate Italy's entry into the War, Great Britain agreed to augment Italy's territories to the right of the Juba River in order to assure Italian control of this important watercourse. Italy also obtained the port of Kismayu. See AFRICA, *History.*

SOMERVILLE, sŭm'ẽr-vĭl, EDITH ANNA ŒNONE (1861–). An Irish novelist and artist, specializing in illustration (see VOL. XXI), who collaborated as an author with her cousin Violet Martin ("Martin Ross," died 1915). Miss Somerville had exhibitions of her paintings at the Goupil Galleries (1920) and at Walker's Gallery (1923 and 1927). Her later books include *Irish Memories* (1918); *Mount Music* (1919); *Strayaways* (1920); *Wheel-tracks* (1923); *The Big House of Inver*, and *French Leave* (1928). Although Miss Martin was dead, the books were still signed Somerville and Ross. In 1927 a de luxe edition of their sporting works, called the Hitchcock edition, was published.

SOMME, BATTLES OF THE. See WORLD WAR, *Western Front.*

SOMMERFELD, ARNOLD JOHANNES WILHELM (1868–). A German physicist, who was born at Königsberg and educated at the university there. He has been professor of theoretical physics at the University of Munich since 1906. In 1929 he was elected a foreign associate of the National Academy of Sciences (American). He has published numerous works on physics, including *Atomic Structure and Spectral Lines* (trans. 1923); *Three Lectures on Atomic Physics* (trans. 1926); *Probleme der modernen Physik* (1928).

SONIC SOUNDING. See NAVIGATION.

SONNECK, OSCAR GEORGE THEODORE (1873–1928). An eminent American musicologist (see VOL. XXI). In 1921 he became vice president of G. Schirmer, Inc. and when the American section of the International Society of Contemporary Music was organized in 1923, he was elected its first president. In 1927 he was chosen by the Government to represent the United States at the Beethoven Centennial in Vienna. He added to the list of his publications: *Early Opera in America* (1915); *Suum Cuique*, a collection of essays (1916); *Miscellaneous Studies in the History of Music* (1921); *Beethoven: Impressions of Contemporaries* (1927); *Beethoven Letters in America* (1927); *The Riddle of the Immortal Beloved* (1927).

SONNINO, sô̇n-nē′nô̇, SIDNEY, BARON (1847–1922). An Italian statesman (see VOL. XXI). He was Minister of Foreign Affairs in Salandra's cabinet (1914–16), during which time he negotiated the secret Treaty of London, and again under Orlando during the Peace Conference, which he attended as second Italian delegate from Jan. 18 to June 19, 1919, when he retired on the Orlando cabinet's going out of office. Sonnino was blamed in some quarters for the Allies' policy toward Italy at the Peace Conference. He was later made a senator. In 1925 his parliamentary speeches were published in three volumes.

SOREL, sô̇-rĕl′, GEORGES (1847–1922). A French engineer and social philosopher (see VOL. XXI). During the World War, he temporarily left the syndicalist ranks and seemed to accept the ultra-nationalistic philosophy of Maurras. The Russian Revolution, however, brought back his faith in social reform through violence, and in a new edition (1920) of his celebrated *Réflexions sur la Violence*, he included a brilliant plea for the Russian Dictator, Lenin. Among his writings published since the War is a collection of essays under the general title, *De l'Utilité du Pragmatisme* (1919).

SORLEY, WILLIAM RITCHIE (1855–). A British philosopher (see VOL. XXI). He has held the professorship of moral philosophy at Cambridge University since 1900. His publications include *Moral Values and The Idea of God* (Gifford Lectures, 1918; 1925); *Reconstruction and the Renewal of Life* (1919); *The History of English Philosophy* (1920); and *Tradition* (1926).

SOROLLA Y BASTIDA, sô̇-rōl′yȧ ĕ bȧ-stē′dȧ, JOAQUÍN (1863–1923). A Spanish painter (see VOL. XXI). His work for the Hispanic Society of America, which included a series of portraits of Spanish writers and a "Panorama of the Forty-Nine Provinces of Spain," was finished in 1920, and was the last work done before he became paralyzed. The Hispanic Society's museum in New York contains the largest and best collection of his paintings.

SOSMAN, ROBERT BROWNING (1881–). An American chemist born at Chillicothe, Ohio. He studied at Ohio State University and received his Ph.D. (1907) from the Massachusetts Institute of Technology. In 1908 he entered the service of the Geophysical Laboratory of the Carnegie Institution of Washington as physicist. He was consulting chemist of the nitrate division of the Ordnance Bureau of the United States Army during the World War. His special investigations included studies of the electromotive force of solutions, conductivity and ionizations of aqueous solutions 0–300°, specific volume of minerals at fusion temperatures, and other similar topics pertaining to mineral chemistry and physics. He wrote *The Properties of Silica* (1927).

SOUND. See AUDITION; PSYCHOLOGY, EXPERIMENTAL; PHYSICS.

SOUNDING, DEEP-SEA. See NAVIGATION.

SOUTH, UNIVERSITY OF THE. An institution of higher education founded at Sewanee, Tenn., in 1857, under the auspices of the Protestant Episcopal Church. The student enrollment increased from about 160 in 1914 to 345 in the fall of 1928; the members of the faculty from 20 to 28; and the library from 35,000 to 43,000 volumes. The productive funds were $400,000 in 1914 and largely through an endowment campaign carried on in 1919, the income was increased from $125,000 in 1915 to $341,000 in 1928. A stone dormitory was opened in 1921 and courses in forestry were added to the curriculum in 1923. President, Benjamin Ficklin Finney, LL.D.

SOUTH AFRICA, UNION OF. A self-governing British Dominion, constituted by the South African Act of September, 1909, as a legislative union, comprising the provinces; the Cape of Good Hope, Natal, Transvaal, and the Orange Free State. Total area: 471,917 square miles. Total population in 1928 was estimated at 7,777,583, as compared with 5,973,394 in 1911. Whites increased from 1,276,242 to 1,738,937 in the same period. Natives in 1928 numbered 5,277,023; Asiatics, 183,771; and mixed and others, 577,852, according to official estimates. In 1921 Europeans included 21.93 per cent of the total population. Of the white population (1921), 847,508 were classed as urban and 671,980 as rural; urban colored numbered 888,177 and rural, 4,520,915. The total European population according to the final audit of the 1926 census was 1,676,660, an increase of 10.34 per cent since 1921.

There were 115.92 white males to 100 white females in 1911 and 106.05 to 100 in 1921. The following record the marriage, birth, and death rates of whites per 1000 of the white population for 1913 and 1921: marriage rate, 9.08 and 8.48; birth rate, 31.68 and 28.42; death rate, 10.27 and 10.41. Provincial towns in 1921 were: Johannesburg, Transvaal, 288,131, of which 151,836 were white; Cape Town, Cape of Good Hope, 207,404, of which 113,302 were white; Durban, Natal, 146,310, of which 57,095 were white; Pretoria, Transvaal, 74,052, of which 45,361 were white; Port Elizabeth, Cape, 46,094, of which 25,982 were white; East London, Cape, 34,673, of which 20,374 were white.

Religion and Education. In 1921 whites professed the following faiths: Dutch churches, 838,982; Anglicans, 294,026; other Protestants, 207,466; Roman Catholics, 61,246; Jews, 63,103. In 1913 there were 4286 schools for whites with 203,421 pupils which increased by 1927 to 4665 schools with 336,459 pupils; in 1913 there were 2363 schools for colored pupils with 167,708 pupils, which increased by 1927 to 3501 schools with 304,617 pupils. Expenditure for education increased from £2,268,026 to £6,766,688. Primary and secondary schools are controlled by the four Provincial Administrations. In 1927 there were 10 institutions of higher learning with 6460 students and 682 instructors. In 1918 the University of the Cape of Good Hope was divided into three universities, viz., University of Cape Town, University of Stellenbosch, University of South Africa. The other six institutions became constituent colleges.

Agriculture. This industry has made great advances in recent years, partly as a result of the stimulus of high prices during the World War, but as much because of the enlightened deinterest manifested by the Union agricultural department which coördinated the activities in all four provinces. The maize crop increased from 863,252 tons in 1911 to 1,381,500 tons in 1927. Similarly, wheat increased from 181,032 tons in 1911 to 276,289 tons in 1926. The 1918 crops were 304,485 tons wheat and 1,264,009 tons maize. Other crops include oats, barley, kaffir corn, potatoes, citrus and deciduous fruits, and tobacco. Droughts and locusts are frequent. Cotton culture has gained in popularity. In 1910, 22 bales were produced; in 1926, 24,936,775 pounds of unginned cotton. The 1927 crop was 11,822,612 pounds. In Natal and the native reserves, the yield of sugar cane was 2,311,293 tons in 1926. Tea and tobacco showed little or no advances. The pastoral industries rank high in importance. Stocks increased from 1911 to 1927 as follows: sheep, 30,656,000 to 40,109,826; cattle, 5,796,000 to 10,109,826. In 1927 there were 7,565,613 goats and 848,272 swine. Horses numbered 856,040 in 1926, when there were 103,668 ostriches.

Wool production, measured in exports, showed gains. In 1913, 176,971,000 pounds were exported; in 1928, 285,000,000 pounds. Mohair (derived from the Angora goat) maintained its important position. In 1928, 8,250,000 pounds were produced. By 1921, the Union was self-sufficing as regards its meat and dairy supplies and was even beginning to export considerable quantities of both. Ostrich-farming, which had been hard hit during the War, recovered to some extent after the Armistice. The great yield of 1913 of 1,023,000 pounds of ostrich feathers glutted the market so that production during the ensuing years dropped. The number of ostriches dropped off steadily. Irrigation projects from 1912 on became the interest of the Government. In 1921–22 a total of £1,010,000 was spent. In 1922 the works in the Lake Mentz region along the lower course of the Sunday River were opened. These serve 4900 acres. The project aimed ultimately to reach 40,000 acres. In 1921 the total area under irrigation was 808,899 acres. In 1925–26, £403,137 were spent on irrigation, and in 1926–27, £342,918.

Manufacturing. The War gave an impetus to local industries. The number of establishments increased from 3998 in 1916 to 7172 in 1926–27. Leather tanning extract, tobacco, cement, showed the greatest advances. Value added to products by manufacture in 1926–27 was £47,507,685, gross value of manufactured products in 1926, £97,878,822. Average number of persons employed in 1926–27, 202,689, of whom 80,755 were Europeans. Local industries were encouraged by tariffs and rebate during 1914–19, and from 1921 on the Government applied itself to aiding industrial developments. Bounties were offered for pig iron manufactured, for steel produced from native ores, and for meat exported.

Mining. The gold-mining industry is the dominating factor in the economic life of the Union of South Africa. In 1927 the value of mineral production was £61,158,470, to which gold contributed £42,997,608, diamonds, £12,392,308, and coal, £3,825,664. The production of the more important minerals was as follows: asbestos, 22,043 short tons; coal, 13,306,000 short tons (in 1928, 13,388,000); copper, 10,741 short tons; diamonds, 4,708,000 carats; gold, 10,122,000 fine ounces; silver, 1,012,000 fine ounces; tin concentrates, 1929 short tons. The diamond situation in the Union was so demoralized in 1927 by the discovery of alluvial deposits in western Transvaal, that governmental intervention became necessary, and a comprehensive alluvial diamond act was passed in October, 1927, curbing the alluvial production at once and giving the Government broad powers of restriction and regulation of output.

Commerce. The following are total import and export figures for selected years:

	1911	1919	1927
Imports	£38,035,000	£50,791,000	£73,955,308
Exports	£57,308,000	£104,561,000	£80,046,654

Leading imports are foodstuffs, cotton piece goods, machinery, oils, wood, hardware, iron and steel manufactures, and leather goods. Leading exports are gold, wool, diamonds, hides and skins, corn, mohair, and coal. Proportions of the merchandise import trade by countries of origin, for 1910 and 1927, were: Great Britain, 70 and 42.8 per cent; United States, 8 and 15.3 per cent. In 1927 German imports were 6.2 per cent (9 per cent in 1913). Proportions of export trade by countries of destination, for 1910 and 1927, were: Great Britain, 81 and 65.2 per cent; United States, 17 and 2.2 per cent. Exports to Germany for 1927 were 5.7 per cent. Principal imports from the United States are oils, automobiles, cotton piece goods, hardware and cutlery, lumber and agricultural and mining machinery. The leading ports are Cape Town, Durban, Port Elizabeth, and East London. In 1912, 4106 vessels of 12,205,300 tons entered, and 4080 vessels of 12,163,081 tons cleared, the ports. In 1927 these were: entered, 1403 vessels of 5,268,000 tons; cleared, 1389 of 5,250,000 tons.

Transportation. In May, 1910, the provincial railways were amalgamated into a single system denominated the South African Railways under the control of the Union. To this were added the railways of Southwest Africa in April, 1922. On Dec. 31, 1913, the total government mileage was 8282; in March, 1927, this was 12,624 miles. New lines built were from Prieska to Kalkfontein, for military purposes; Krugersdorp to Mafeking; the completion in the Cape Province of the Mossel-George-Oudtshoorn line connecting Cape Town and Port Elizabeth. In 1913 earnings of the railways were £13,214,000; in 1926–27 they were £24,093,347.

Finance. Revenues and expenditures for 1911–12 were £17,369,030 and £13,234,505 and for 1927–28 £30,094,004 and £23,008,174. The budget for 1928–29 estimated ordinary receipts at £27,516,000 and ordinary expenditures at £22,641,137. Chief sources of revenue are income, super-excess profits and dividend taxes, customs and excise, interest, posts, telegraphs, and telephones. Native taxes are hut and poll taxes. The public debt in 1912 was £117,260,534; in 1928, £238,926,064. Expenditures for war purposes raised by loans during 1915–22 totaled £23,173,985. After 1913 the provinces were made to depend for their finances upon assigned revenues made to them by the Union together with annual subsidies limited to 50 per cent of their normal expenditures. Expenditures were primarily for education. In June, 1921, a central Reserve Bank was established at Pretoria with branches at Cape Town and other important centres. The subscribed capital was £1,000,000 and on Dec. 31, 1927, the Bank had issued £7,200,000 in notes. On June 30, 1922, the note-issuing powers of the joint-stock banks had come to an end. In addition to its functions as a bank of issue, and the principal holder of the gold reserves of the country, the Reserve Bank operated as a bank of discount.

In 1929 the Union of South Africa decided to maintain a legation in the United States and Eric H. Louw was made the first Minister.

History. The generation of Boers who had fought against Great Britain in 1902 was alive when the World War broke out in Europe. Many of the Boers still entertained nationalistic aspirations and saw in the War an opportunity to gain release from the domination of the British Empire. However, the more important Boer leaders, such as Botha and Smuts, were true to the British purpose and by the weight of their example gained the Union for the Allies and gave material assistance in subjugating the German African colonies. The Dutch nationalistic cause was, nevertheless, real, and in 1914 assumed serious proportions. The immediate reason for the disaffection was the decision of the Government to send a force against German Southwest Africa. In October, 1914, a serious rebellion was launched by Boer irreconcilables most of whom sought to further their own aims rather than the purposes of Germany. The leaders were General de Wet and General Beyers, while the man to whom all looked for inspiration was General de La Rey. Unfortunately for the rebels, General de La Rey was shot and killed by a police patrol on Sept. 15, 1914, while on his way to join the insurgent camp. The rebellion broke out actively, however, under de Wet and Beyers, and General Botha was obliged to take the field against his erstwhile companions in arms. After some desultory fighting, the Boers were dispersed and de Wet surrendered (Dec. 1, 1914) and Beyers was drowned in the Vaal River while trying to evade capture (Dec. 9, 1914). The losses were not heavy, although the forces engaged were considerable. In all, 10,000 rebels had taken up arms. Only one of the leaders, Fourie, was sentenced to death for his part in the insurrection. Clemency was shown to the others in the way of light prison sentences, so that by December, 1915, de Wet was free.

With active opposition gone, the move on German Southwest Africa went through successfully, with the result that by July, 1915, the colony was subjugated. Considerable aid also was rendered by Briton and Boer alike in the European and East African campaigns, 150,000 South Africans seeing service. Throughout the war period, the Dutch Nationalists, led by General Hertzog, continued in opposition and a coalition of the South African Party (Botha-Smuts) and the Unionists was necessary to carry on the government. Republican propaganda became more and more virulent and by 1917 the Nationalists were outspoken in favor of a republic. They appealed to President Wilson to intercede; in fact, General Hertzog made a trip to Paris via New York to lay the matter before the President, but without success. At Versailles, Botha and Smuts signed the treaty for the Union. Botha having died in 1919, Smuts became Prime Minister. The election of 1920 indicated that the Nationalists had gained ground rather than lost. The poll showed: Nationalists, 45; South Africans, 40; Unionists, 25; Labor, 21. The only hope for a strong government was a permanent alliance between the two pro-British parties, and this Smuts was able to effect after many pourparlers in 1920. The election of 1921 could therefore be held on the frank issue of republicanism. The result gave Smuts a clear majority, the poll returning 76 of the enlarged South African Party, 47 Nationalists, 10 Laborites.

In 1922, the Nationalists and Laborites came to an understanding by which the urban districts were to be contested exclusively by Labor candidates and the rural districts by Nationalists, the condition being, however, that the Republican agitation was to cease for the life of the existing Parliament; however, the Nationalists openly set forth their secessionist principles the following year with the result that two of the most important Labor leaders, Colonel Creswell and Mr. Barlow, were estranged. Inherently weak as the Labor-Nationalist alliance was, it harried the Government during three uneasy years, reduced the Government's parliamentary majority, little by little, until it was finally only four, and eventually provoked General Smuts to dissolve the Union Parliament on Apr. 7, 1924, and appeal to the electorate in a general election. From 1921 on, the Government had been steadily losing ground, for a variety of reasons. The Nationalists still smarted under the defeat of 1914; the Laborites resented the severity with which strikes had been suppressed; there was general complaint over the fact that Smuts had consistently neglected dominion affairs because of his international interests. The result was, in the elections of June, 1924, a decisive defeat for the Government's party and the return of the Labor-Nationalist alliance. Even Smuts himself lost his seat. General Smuts resigned on June 23, and was succeeded by a Labor-Nationalist coalition headed by General Hertzog. Colonel Creswell, leader of the Laborites, joined the cabinet with the portfolio of Minister of Defense and Labor. Particularly significant was the pact of April 21 between the two government groups which was to serve as the basis of the coalition. By it, the Nationalists promised to relinquish their secessionist agitation for five years, while the Laborites, for the same period, pledged themselves to refrain from Socialist propaganda.

Within the next year or two, the coalition Government introduced a large number of measures calculated to reshape governmental policies in accordance with their ideas. None aroused such a storm of controversy as that for the adoption of a Union flag, in line with an effort to define South African nationality more precisely. The bill was introduced in May, 1926. It derived its importance from the fact that the selected design did not include the Union Jack, symbol of the British Empire. At once, the old fires of racialism as between Briton and Boer, quiescent now for some time, blazed up anew.

The Premier's party opposed the Union Jack as the remainder of "domination, conquest, and defeat," while the British faction was so determined to include it that threats of disunion were heard if the Government's design should be adopted. In the meantime, Premier Hertzog departed for London to attend the important Imperial Conference. The chief work of the conference was to define more closely the changed status of the dominions within the Empire, and the result of its deliberations, the recognition of an equal and autonomous position for all the dominions and for Great Britain, was so gratifying to General Hertzog that he declared it removed "all further grounds of doubt and suspicion" as to the national status of South Africa. He spoke also in warm terms of the helpful attitude of British statesmen.

When the flag question again came up in the session opening in January, 1927, there was accordingly a more favorable atmosphere for negotiation and agreement; but in the following months, the conciliatory feeling was dissipated as the debate again became bitter in the extreme. It was October before an agreement was finally reached by adopting two flags, the Union Jack and a flag with horizontal stripes of orange, white, and blue, and a shield bearing the Union Jack and the emblems of the former Orange Free State and the Transvaal. The two flags were to be flown over government buildings in the Union and provinicial capitals, in ports, and over government offices abroad.

The coalition between the Nationalist and Labor parties continued to work harmoniously; but in 1928 the success of the arrangement was threatened by factionalism in the Labor ranks, which split the party wide open. As the 1929 elections approached, the old controversy between adherents of the Empire and secessionists threatened to break out again when the Government proposed a trade treaty with Germany. It was denounced as being directly opposed to the idea of imperial preference which the Union had previously advocated. It formed a leading issue in the elections, which were held on June 12, 1929.

The other issue brought forward most prominently was the perennial dispute over the status of the natives, which came to the front again when the Assembly, on February 25, failed to give the two-thirds vote necessary for adoption to the Premier's native-representation bill. When this failed, he abandoned the rest of his programme relating to the question of relations between natives and whites. The election resulted in a decisive victory for the Nationalists, to whom early reports gave 71 seats in the Assembly, a clear majority over all. The South African Party obtained 50 seats, the Creswell Laborites, 5, and the National Council Laborites, 3.

Among the major problems which presented themselves in the post-war years was that relating to the status of immigrants from India. It was very acute on the eve of the War, but was allowed to rest during the world conflict, partly for the sake of patriotic solidarity, and partly because of the agreement which had been reached in 1914 between General Smuts and Mahatma Gandhi (whose leadership of the passive-resistance movement among the Indians of South Africa before the War served as training for his subsequent and more prominent career in India). By this agreement, the Government promised that the existing laws relative to the rights of Indians in the Union would be enforced in a just manner and with due regard to vested rights; this was generally understood to mean that the rights of Indian residents would not be further curtailed by legislation or by administrative interpretation of the laws.

During the war period, however, this interpretation was challenged. In the Transvaal, where by a state law Indians were forbidden to purchase land, as individuals, the Indian merchants evaded this restriction by forming joint-stock companies to acquire real estate. The frequency of their purchases alarmed the white community, who insisted on the prohibition of this practice by new legislation, and accordingly an act of the Union Parliament in 1919, forbade corporations of Asiatics to acquire realty. Once more race hatred burst into flames. Curiously enough, the most frenzied agitation against the "Asiatic peril" was not in Natal, where about four-fifths of the 150,000 Indians in the Union were concentrated, outnumbering the whites, but in the Transvaal, where the number was relatively small. The explanation of the seeming paradox is that in Natal the greater number of the Indians were coolie laborers on sugar and tea plantations, whereas in the Transvaal the Indians were merchants and traders, often prosperous and aggressive business men whose competition was feared, perhaps in an exaggerated degree.

The Union government in 1920 appointed an Asiatic Inquiry Commission to go into the whole matter. The Commission's report, dated March, 1921, sustained the 1919 law and recommended that in Natal Asiatic landownership for agricultural purposes should be confined to the coastal zone, while elsewhere a policy of voluntary segregation should be pursued. This expression of anti-Indian sentiment, though couched in the most restrained terms, was sufficiently pointed to evoke a protest from the Government of India, which, by the way, was at this time manifesting grave concern regarding the rights of Indians in Kenya Colony (see KENYA). When, in the summer of 1921, the problem was aired in the British Imperial Conference at London, the determined efforts of the Indian government to secure the adoption of a general principle of equal rights for natives of India were met by an even more determined, and successful, opposition by the South African delegates, General Smuts and Sir Thomas Smartt. There the matter rested. In 1924 a fresh outburst of racial antipathy was caused by agitation for and against the Class Areas Bill, which proposed to impose drastic restrictions, amounting almost to prohibition, on the holding of property, leases, and trading licenses by Asiatics, outside of designated areas.

The bill was violently denounced, but had the approval of the Assembly, and would no doubt have passed but for the fall of the Smuts government. An ordinance passed by the Natal Provincial Council, however, which also aroused intense opposition, received the Governor General's assent in December. It disfranchised Asiatics in local elections. In 1925 the Hertzog government revived the Class Areas Bill in an amplified form, which covered the recommendations of the Asiatic Inquiry Commission. Indian residents in South Africa at once became a unit in denouncing the measure. They appealed by cable to the Government of India, and sent a delegation to India in December, while another delegation came from India to South Africa at about the same time. As a result of the agitation, the Government of India suggested a round-table conference, which after some delay the Union government accepted. A deputation came from India to South Africa in December, 1926, and the conference on Feb. 21, 1927, arrived at a settlement which was accepted by both countries. Under it, the Reserved Areas bill was dropped, Indians domiciled in the Union were encouraged to conform to Western standards, and government aid was offered in a scheme of voluntary repatriation of Indians in South Africa.

More fundamental and far-reaching was the Government's other color problem, the determination of the status of the natives. Many Bantus were well-educated and engaged in the professions, and they demanded citizenship and equality of treatment. Contention centred around the question of segregation of natives in restricted areas, the Nationalists and South Africans favoring, and the Unionists opposing, such segregation. In 1920 a segregation act was passed applicable to the rural districts. It stood frankly for white supremacy and though it granted some autonomy to the natives, it held out no hope for political fusion of the two races. In 1923 an act was passed permitting natives to settle in urban districts.

After the Nationalists came into power in 1924, the Premier did not formulate a party policy on the natives question until Nov. 13, 1925. A series of proposals in brief gave the natives seven European representatives in the Assembly, to be elected by natives only; provided for a system of local and general councils with powers chiefly advisory; and did away with existing native franchise in the Cape Province. These measures, it was understood, were to be accompanied by the setting aside of additional land areas in which the natives were to be segregated. The proposals were not pressed until after the government had succeeded in forcing through a "color-bar" bill in 1926, which had been rejected in the previous year and which kept colored persons out of certain skilled employments. Premier Hertzog then introduced four bills incorporating the proposals already advanced, but they did not come up for discussion until March, 1927. No action was taken during the 1927 session. By the time of the January, 1928, session, opposition among not only the natives but also the more liberal Europeans in South Africa and even in England, as well as the church people, and others, had grown so strong that the Government, for the time being at least, dropped the bills entirely.

Labor troubles during the War period, among the natives particularly, were frequent and for some years after the War, there was great unrest. Strikes occurred on the Rand and elsewhere during 1917–20, and blood was spilled at Port Elizabeth in 1920. On May 24, 1921, at Bulhoek, a body of natives calling themselves Israelites, on refusing to disperse and leave for their homes, were fired upon and 400 casualities were the result. Labor unrest, due to the closing of the diamond mines after the depression of 1921, was equally acute. In 1922 a strike in the gold, coal, and diamond mines took on serious proportions and led to open warfare. A general strike was called on one hand, and martial law was declared on the other; Fordsburg, one of the strongholds of the strikers, was shelled and finally taken. Though hostilities were brief, the losses on both sides were 183 killed and 524 wounded. Financial losses were placed at $25,000,000. The miners contended that owners were attempting to introduce wholesale native labor and cut wages radically; the owners and the Government charged the outbreaks to the extremists who had communistic leanings. By 1925 the labor unrest which followed the war in South Africa as in the rest of the world, was fairly quieted and ensuing years were peaceful.

The Governor General of South Africa for 1914–20 was Lord Buxton; he was succeeded by Prince Arthur of Connnaught, who in 1923 gave way to the Earl of Athlone.

SOUTH AMERICA, EARLY CIVILIZATION OF. See ETHNOGRAPHY.

SOUTH AUSTRALIA. A state of the Australian Commonwealth occupying the central and southern part of the continent. Area, 380,070 square miles; population (excluding aborigines) in 1911, 408,558; in 1928, 576,576; average annual increase, 2.45 per cent. Adelaide, the largest city, including suburbs, had 327,686 inhabitants in 1927 (200,117 in 1913). The area under cultivation continues to increase, the total in acreage in 1926–27 being 3,883,920. Wheat in particular shows gains. From 16,938,988 bushels of wheat in 1913–14, production mounted to 24,066,012 bushels in 1927–28. Other crops are barley, oats, hay, and vines. Pastoral activities continue to occupy a prominent rôle. Mineral production in 1927 amounted to £1,188,522, (£634,318 in 1913). Value of production for 1926–27, agricultural, £16,635,366; pastoral, £6,128,006; manufacturing, £13,077,334; mining, £1,032,353; dairying, £1,881,658; total, £41,154,716. Imports and exports for 1913 were £7,348,240 and £9,809,763; for 1926–27, £15,454,801 and £17,123,012. Government accounts showed: revenues and expenditures for 1913–14, £4,822,766 and £4,604,129; for 1927–28, £11,346,903 and £11,621,834. The public debt, from £33,564,332 in 1914 mounted to £90,612,402 in 1928. See AUSTRALIA.

SOUTH CAROLINA. The thirty-ninth State in size (30,989 square miles) and the twenty-sixth in population; capital, Columbia. The population increased from 1,515,400 in 1910 to 1,683,724 in 1920, a gain of 11.1 per cent; estimated population, 1928, 1,864,000. The white population increased from 679,161 (1910) to 818,538 (1920); the Negro (which exceeds the white), from 835,843 to 864,719; native white, from 673,107 to 812,137; foreign-born white, from 6054 to 6401. Urban population rose during the decade from 224,832 to 293,987; rural, from 1,290,568 to 1,389,737. The growth of the principal cities was as follows: Charleston, 58,833 in 1910 to 67,957 in 1920, and 75,900 (estimated) in 1928; Columbia, 26,319 to 37,524, and 50,600 in 1928, estimated; Greenville, 15,741 to 23,127.

Agriculture. As South Carolina is one of the most important cotton-producing States, agricultural conditions have reflected the ravages of the cotton-boll weevil, which reached the State in 1918 or 1919. This is indicated by a comparison of the acreage and production of cotton for the various years: 1920, 2,946,000 acres, 1,623,000 bales; 1922, 1,912,000 and 492,000; 1924, 2,404,000 and 807,000; 1928 (estimated), 2,355,000 and 725,000. (See BOLL WEEVIL AND COTTON.) The number of farms increased 9.2 per cent, or from 176,434 in 1910 to 192,693 in 1920, but thereafter fell sharply to 172,767 in 1925. The total acreage in farms decreased from 13,512,028 (1910) to 12,426,675 (1920) and 10,638,900 (1925). The improved land in farms totaled 6,184,159 acres in 1920, while the percentage of total land area used for agricultural purposes decreased from 69.2 (1910) to 63.7 (1920) and 58.4 (1925). The total value of farm property mounted from $392,128,314 in 1910 to $953,064,742 in 1920, or 143 per cent, but fell back to $523,084,383 in 1925; the average value per farm was $2223 in 1910, $4946 in 1920, and $3028 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 59,969 were operated by owners; 368, by managers; and 112,430, by tenants. The comparative figures for 1910 were 64,350,863 and 11,221. White farmers in 1920 numbered 83,683, of whom 83,542 were native; the Negro farmers numbered 109,005. White farmers in 1925 numbered 82,186, and the Negro farmers, 90,581. Farms reported as under mortgage, 14,299 in 1920, numbered 15,521 in 1925. Dairy cows numbered 228,569 in 1920; 146,556 in 1925. The number of swine, 844,981 in 1920, was 534,642 in 1925. "Beef' cows decreased in number from 64,949 in 1920 to 60,391 in 1925; sheep, from 23,581 in 1920 to 14,418 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 17,064,000 bushels; wheat, 800,000; oats, 7,751,000; potatoes, 4,068,000; sweet potatoes, 4,214,000; tobacco, 82,288,000 pounds; peanuts, 6,900,000; and hay, 380,000 tons. Comparative figures for 1913 are corn, 38,512,000 bushels; wheat, 972,000; oats, 8,460,000; potatoes, 800,000; tobacco, 33,288,000 pounds; and hay, 244,000 tons.

Manufactures. The industrial development of South Carolina has been gradual but well maintained. The chief increase in recent years was in the various phases of cotton manufacturing. In 1920 there were six cities in the State with more than 10,000 inhabitants, having 10.3 per cent of the total population of the State. These cities, in 1919, reported 21.3 per cent of the value of the State's manufactured products. There were 1854 manufacturing establishments in the State in 1909; 2004 in 1919; 1134 in 1925; and 1059 in 1927. Persons engaged in manufactories numbered 78,040, 86,360, 100,144, and 108,992, respectively, and the capital invested amounted to $173,220,870 in 1909, and $374,537,636 in 1919. The value of the products in 1909 was $113,235,945; in 1919, $381,452,984; in 1925, $373,359,810; and in 1927, $358,334,205. The abnormal increase in value of products in and about 1919 being to a great extent due to the change in industrial conditions produced by the World War, statistics of this item cannot be used as an exact measurement of the growth of manufactures between the industrial censuses of 1914 to 1919.

The first industry as to value of product is the manufacture of cotton goods, valued in 1909 at $65,930,000; in 1919, at $228,440,000; in 1925 at $230,665,000; and in 1927 at $231,272,599. The manufacture of cottonseed oil and cake stood second till lately, with a product valued in 1909 at $10,903,000; in 1919, $38,675,000; in 1925, $13,015,407; and in 1927, $12,608,931. Fertilizers, formerly third, in 1909 were valued at $9,025,000; in 1919, $30,412,000; in 1925, $15,972,729; and in 1927, $11,739,872. The production of mineral and soda waters was next in order: in 1909, $740,000; in 1927 beverage products totaled $3,186,308. The chief manufacturing cities are Charleston and Columbia.

According to the returns received at the quintennial census of electrical industries taken in 1928, the total output of electric current in South Carolina in 1927, as reported by the central electric light and power plants was 1,116,266,957 kilowatt hours, an increase of 32.2 per cent, as compared with 844,416,989 kilowatt hours generated in 1922. During the same period, the generator capacity increased from 292,880 kilowatts to 490,148 kilowatts, or 67.4 per cent. There were 58 electric light and power establishments in 1927 comprising 23 commercial and 35 municipal plants, as compared with 40 commercial and 47 municipal plants in 1922. In this period a number of municipal plants were abandoned in favor of commercial systems which assumed the generating stations and distribution lines.

Education. South Carolina has undoubtedly a more difficult educational problem than most of the other States, due to the extremely large Negro population and to the large rural population. Recent steps in educational progress have been chiefly toward mastering these difficulties. While South Carolina had in 1920 the largest percentage of illiteracy of any of the States, it also showed the largest decrease in the decade 1910–20. The movement has since continued. The Legislature has passed many important laws designed to improve educational conditions. Among these were the compulsory-education law passed in 1918 and revised in 1920, which proved a great stimulus and incentive to school attendance and added thousands of pupils to the enrollment list. The general assembly of 1922 made unusually liberal appropriations for public education. The State has an excellent rural grade-school act, supplemented by an equalizing act guaranteeing the seven-month term. Great progress was made in vocational education, especially in agriculture, textiles, home economics, and the training of teachers. Coöperation is given by Clemson College, Winthrop College, and the State Colored College. The total enrollment in public schools in the academic year 1925–26 was 483,269. Of this number, 435,425 were enrolled in the kindergarten and elementary grades and 47,844 in the secondary grades. According to color, the enrollment was: white, 248,562; colored, 234,707. Of the colored pupils, only 7347 were enrolled in the secondary grades. In 1913, the total enrollment was 361,161; 167,914 white, 193,247 colored. The enrollment in the high schools in 1922 was 113,461. Expenditures for schools in 1925–26 were: current, $12,603,571; outlays, $3,454,795. The percentage of illiteracy in the State decreased from 29.6 per cent in 1910 to 23 per cent in 1920. Among the native whites, it decreased from 11.4 to 8.5 per cent; among the colored population, from 46.9 to 38.7. Among the foreign-born whites, it remained for both periods 6.5.

Finance. State expenditures in the year ended Dec. 31, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $12,815,410 (of which $3,737,384 was aid to local education); for interest on debt, $401,366; for permanent improvements, $9,819,582; total, $23,036,358 (of which $10,564,098 was for highways, $1,966,769 being for maintenance and $8,597,329 for construction). Revenues were $17,464,224. Of this, property and special taxes formed 32.8 per cent; departmental earnings and charges for officials' services, 7.5 per cent; sales of licenses and taxes on tobacco in various forms, soft drinks, and gasoline, 48.1 per cent. Property valuation was $422,169,895; State taxation thereon, $2,894,979. Net State funded debt on Dec. 31, 1927, was $29,566,742, chiefly in the form of highway bonds.

Political and Other Events. South Carolina, consistently Democratic since the Civil War, has experienced no political party overturn after 1914. Ellison D. Smith was reëlected to the Senate in 1914, and Richard I. Manning was elected governor. Governor Blease, whose term was a sensational one, brought it to a close by wholesale pardon of State prisoners. At the expiration of his term, he had freed more than 3000 prisoners as a protest against the prison laws of the State. In January, 1915, prior to his leaving office, he disbanded the organized militia of the State, as a result of a difference with the Federal War Department over its administration. Manning, on taking office, revised the order disbanding the militia. State-wide prohibition was adopted by a majority of the people, to go into effect Jan. 1, 1916. Governor Manning was reëlected in 1916. It was necessary to hold two primaries, as under the South Carolina primary system, a nominee must receive a majority of all the votes cast. In the first primary, Blease led by more than 20,000 votes but lacked 500 of the majority. In the second primary, however, Governor Manning received the majority of the votes. In 1916 Wilson received 61,846 votes for President, and Hughes, 1550. Upon the death of Senator Tillman in 1918, Christie Benet was appointed senator and in November, N. B. Dial was elected as successor. R. E. Cooper was elected governor. On May 20, 1922, he resigned and was succeeded by Lieutenant Governor Wilson G. Harvey. In 1922 Thomas G. McLeod defeated Governor Blease in the Democratic primary for governor and was elected. The presidential vote in 1924 was: Davis, 49,008; Coolidge, 1123; La Follette, 620; ex-Governor Blease was elected senator. Extensive development of hydroelectric power plants has proceeded for a number of years. In 1926 John D. Richards was elected governor. He made energetic efforts to enforce the State blue laws. In 1928 the presidential vote was: Smith, 62,700; Hoover, 3188.

Legislation. In 1915 several important measures relating to the regulation of the liquor traffic were enacted. The Legislature in 1916 enacted a State system of rural credits. Liquor laws were amended, as were the laws relating to insurance and public utilities. The Legislature of 1919 put further restrictions on child labor and enacted compulsory school attendance of children under 14. The Legislature of 1921 provided for a State Board of Fisheries and passed an act regulating the storage, grading, and marketing of cotton and other nonperishable farm products. The Legislature of 1923 passed a measure under which cities with populations between 20,000 and 50,000 are permitted to adopt the manager plan of city government. The Highway Commission received authority over automobile traffic in 1925.

SOUTH CAROLINA, UNIVERSITY OF. A nonsectarian coeducational State institution at Columbia, S. C., chartered in 1801 and opened in 1805. The enrollment of students increased from 540 in 1915 to 1475 in the fall of 1928. The faculty consisted of 82 professors, instructors and assistants. Dormitories for men and a dormitory for women were completed in 1923–24 and in 1925 an addition to the school of pharmacy, a women's dormitory and the Abney Library were finished. In 1926 courses in music and art were added to the curriculum. Sloan College, a physics and engineering building; two annexes to the library; an atheletic field house; and an astronomical observatory were erected in the following year. President, Davison McDowell Douglas, D.D., LL.D.

SOUTH DAKOTA. The fourteenth State in size (77,615 square miles) and the thirty-seventh in population; capital, Pierre. The population increased from 583,888 in 1910 to 636,547 in 1920, or by 9 per cent; estimated population, 1928, 704,000. The white population increased from 563,771 (1910) to 619,147 (1920); native white, from 463,143 to 536,756. The Indians decreased in number from 19,137 to 16,384 and the foreign-born whites, from 100,628 to 82,391. Urban population rose from 76,673 to 101,872; rural, from 507,215 to 534,675. There are two important cities in the State, Sioux Falls and Aberdeen. The former increased from 14,094 in 1910 to 25,202 in 1920; the latter, from 10,753 to 14,537.

Agriculture. As South Dakota is almost entirely an agricultural State, it was greatly affected by conditions which prevailed during and after the World War. From 1917 to 1920, there was a period of prosperity due to the world-wide demand for wheat and other grains which are the chief agricultural products of the State. This period was succeeded by depression caused especially by overproduction of wheat, which rendered this crop unprofitable. These conditions prevailed from 1921 to 1923. The number of farms decreased 3.9 per cent, or from 77,644 in 1910 to 74,637 in 1920, but rose thereafter to 79,537 in 1925. The acreage in farms increased from 26,016,892 (1910) to 34,636,491 (1920), but fell to 32,017,986 (1925).The improved land in farms totaled 18,199,250 acres in 1920. The percentage of the total land in farms rose from 52.9 in 1910 to 70.4 in 1920, dropping to 65.1 in 1925. The total value of farm property increased 142.2 per cent, or from $1,166,096,980 in 1910 to $2,823,870,212 in 1920, but shrank to $1,658,921,488 in 1925; the average value of farm property was $15,018 in 1910, $37,835 in 1920, and $20,857 in 1925. These values reflect alterations in the purchasing power of money incident and subsequent to the War. Of the total number of farmers in 1925, 46,160 owned their own farms; 331 were managers; and 33,046 were tenants. In 1910 owners numbered 57,984; managers, 431; and tenants, 1923. White farmers in the State in 1920 numbered 73,025, compared with 74,836 in

SOUTH DAKOTA CROPS FOR 1928 AND 1913

	1928			1913		
Crop	Acres	Bushels	Value	Acres	Bushels	Value
Corn	4,469,000	93,849,000	$58,186,000	2,640,000	67,320,000	$37,699,000
Wheat	3,262,000	34,546,000	29,320,000	3,775,000 [b]	33,975,000	24,122,000
Barley	1,644,000	35,675,000	17,124,000	958,000	16,765,000	7,712,000
Flaxseed	588,000	3,410,000	6,854,000	....	....	....
Oats	2,193,000	59,211,000	19,540,000	1,590,000	42,135,000	14,326,000
Rye	162,000	1,458,000	1,152,000	50,000	660,000	330,000
Potatoes	67,000	6,030,000	2,412,000	60,000	4,680,000	2,948,000
Hay	3,193,000	2,919,000 [a]	21,787,000	460,000	552,000 [a]	3,588,000

[a] Tons instead of bushels.

[b] Given as wheat only, not differentiated into spring and winter.

1910; there were 27,262 farms reported as mortgaged in 1920; 28,813 in 1925. The acreage, production, and value of the principal crops in 1928 were as shown in the accompanying table.

Manufactures. The census of manufactures for 1927 reported 472 manufacturing establishments with 5551 wage earners who received $6,785,893 in wages and with products valued at $83,001,163. Butter making was the most important industry with a product valued at $15,868,381 in 1927.

Education. Educational progress in South Dakota has been persistently carried on. Not only has the number of teachers increased at a more rapid rate than in many States, but large sums were spent in a State-wide building programme for fine rural and city schools. Teaching requirements were considerably raised and general teaching conditions vastly improved. Among the specific accomplishments was the establishment of a high-school division with a director in charge. In 1919 there were only 112 accredited high schools in the State; in 1923 there were 249, with much more rigid requirements. Another feature was the establishment of Americanization work. The total enrollment in the evening schools after the introduction of that work exceeded 3000. Home economics and agricultural courses were established in high schools under the Smith-Hughes Act, and the rehabilitation of disabled civilians was also undertaken. A "better-school drive" in 1919 produced excellent results, including the erection of dozens of fine consolidated schools and hundreds of modern one-teacher schools. The Legislature passed a law providing State aid to consolidated standard and rural schools, and State inspection of rural and consolidated schools was also established. A new compulsory-attendance law was enacted, and legislation provided for State supervision of its enforcement, as a result of which the average attendance per rural pupil enrolled increased from 102 to 127 days per year. The law provided for at least an eight-month term in every school in the State. The total enrollment below the grade of high school in 1912 was 90,389; in 1925–26 it was 138,166. In the high schools in 1925–26, there were 26,385 pupils enrolled. Total expenditures for schools in 1925–26 were: current, $13,504,426; outlays, $1,624,834. The percentage of illiteracy in the State decreased from 3.7 in 1910 to 2.2 in 1920; in the native white population, it remained at 0.4 per cent; among the foreign-born white, it decreased from 5 to 4.9 per cent; among the colored, from 6.8 to 6.7 per cent.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of the governmental departments, $9,110,066 (of which $1,818,212 was aid to local education); for conducting public-service enterprises, $543,382; for interest on debt, $3,104,714; for permanent improvements, $3,629,526; total, $16,387,688 (of which $4,016,341 was for highways, $1,169,244 being for maintenance and $2,847,097 for construction). Revenues were $16,338,291. Of this, property and special taxes formed 30.4 per cent; departmental earnings and charges for officials' services, 7.5 per cent; sales of licenses and taxation of gasoline, 25.5 per cent. Property valuation was $1,805,466,033; State taxation thereon, $4,807,950. The net State funded debt on June 30, 1927, was $15,014,772.

Political and Other Events. The influence of the Nonpartisan League was for a time considerable in the State, although less than in North Dakota. The Republicans in 1914 reëlected Governor Byrne, but Senator Crawford was defeated for reëlection by E. S. Johnson, Democrat. In 1916 Peter Norbeck, Republican candidate, was elected governor. For President, in 1916 Hughes received 64,261 votes; Wilson, 59,191. Governor Norbeck was reëlected in 1918. In this year, the Nonpartisan League cast over 25,000 votes for a candidate for governor. Thomas Sterling, Republican, was elected to the Senate . In 1920 the Republican candidate for governor, W. H. McMaster, was elected, and Peter Norbeck, former governor, was elected to the Senate. In the presidential voting, Harding received 109,874 votes; Cox, 35,938. T. P. Christiansen, the Farmer-Labor and Nonpartisan candidate for the Presidency, received over 34,000 votes. Governor McMaster was reëlected in 1922. The State was seriously affected during this year by a bituminous coal strike and by a strike of railroad shopmen, which continued from July 1 until the autumn. As a result, elevators and granaries were for a long period congested with crops, while the impossibility of moving the crops broke down the market to such an extent that much of the produce was sold at a loss. The vote for President in 1924 was: Coolidge, 101,299; LaFollette, 75,355; Davis, 27,214. Carl Gunderson, Republican, was elected governor. He sought to check the rural credit system under which the State had lent over $40,000,000, but lost the support of his own party. W. J. Bulow, Democrat and supporter of the State's bank guarantee system, was elected governor in 1926. The Rural Credit Board in 1928 reported defaults on $16,000,000 of its loans and a capital deficit of $5,344,000, and levied a special tax to meet the situation. Bulow was reëlected in 1928; the vote for President was: Hoover, 157,603; Smith, 102,660.

Legislation. The Legislature of 1915 passed a bill abolishing the death penalty. The Supreme Court of the State in this year declared the so-called "blue sky" law of the State unconstitutional. In 1917 a budget system was created. A new primary law was enacted and a prohibition law was passed. The Legislature also passed a workmen's-compensation law and amended the banking laws of the State. The Legislature of 1919 passed measures forbidding the display of the red flag. It also passed a measure providing for a land-settlement commission to encourage and to assist former soldiers and sailors to build homes and to own farms. Provision was made in 1921 for the loan of money for urban home building under the Rural Credits Board. Amendments providing for a State bank and State hydroelectric development were submitted to the people, and were defeated in the election of 1922. The Legislature of 1923 passed a measure prohibiting expenditures in excess of appropriations. It also made provision for a constitutional convention, passed a uniform flag act, and enacted a measure to facilitate the coöperative marketing of agricultural products. Departments of Finance and of Agriculture were created in 1925 and regulations were made for an executive budget.

SOUTH DAKOTA, University of. A coeducational State institution of higher learning at Vermillion, S. D., founded in 1882. During the period of 1914–28, student enrollment increased from 421 to 1227, the faculty from 50 to 135, and the library from 20,500 to 65,000 volumes. During the same period, the women's building, engineering shops and observatory, the chemistry building, the stadium, and administrative building were completed. Departments in journalism and commerce were opened in 1915. Productive funds amounted to approximately $500,000 in 1928 and the annual income to $75,306.02. Robert L. Slagle, Ph.D., LL.D., president, died in 1929.

SOUTH DAKOTA STATE COLLEGE. A coeducational State institution at Brookings, S. D., founded in 1882. The enrollment in the autumn of 1928 was 1214; the faculty numbered 158. Productive funds of the college for 1928 amounted to $749,268.31. The Coolidge Sylvan Theatre and the Lincoln Memorial Library were dedicated in September, 1927, by President Calvin Coolidge. In 1928 the library contained 35,000 bound volumes and 12,000 pamphlets. President, Charles W. Pugsley, D.Agr.

SOUTHERN CALIFORNIA, University of. An institution of higher learning for men and women at Los Angeles, Calif., founded in 1879. The student enrollment increased from 2649 in 1913–14 to 15,084 in 1927–28, including summer-session enrollment and extension classes, the enrollment in the summer session of 1928 being 4948. The teaching staff increased correspondingly from 207 to 500 members, the productive funds from $412,548 to $1,200,000, and total yearly income from $106,766 to $1,408,777. The school of commerce and business administration was organized in 1920, and in the first three years of its existence increased more than 200 per cent in enrollment; an extension division was organized in 1922, and in the following year, the school of social welfare under the direction of Dr. Emory S. Bogardus. Metropolitan College was organized in 1924, giving educational opportunities to 2680 people. One building of the science unit, for the college of pharmacy and department of chemistry, was erected in 1924, and construction begun on a residence hall for women, which was completed in the following year, when a law building, and a school of architecture building were also under construction; a student-union building was erected on the campus during 1926–27 and Bridge Hall and a new addition to the science building in 1927–28. President, Rufus B. von Kleinsmid, LL.D., Sc.D., J.D.

SOUTH POLE. See Polar Research.

SOUTHWEST AFRICA PROTECTORATE. Formerly German Southwest Africa, but since 1920 a mandate territory of the British Empire administered by the Union of South Africa. It has an area of 311,820 square miles, and an estimated native population of 234,790. The European population, according to the 1926 census, was 24,115. The capital, Windhoek, had 4602 Europeans and 10,489 natives. Diamond mining, exploited by British capital, continues the most important activity and was the largest factor in the protectorate's foreign trade. In 1927, 723,877 carats of diamonds, valued at £1,620,862, were produced. Other exports are live stock, copper ore, vanadium, lead, and tin. In 1913, exports were valued at £3,446,220; in 1919, £1,679,534; in 1920, £5,401,385 (of which £4,265,294 was diamonds); in 1927, £3,475,561. Leading imports in 1927 were foodstuffs, apparel, cotton goods, mineral oils, etc. Under the Germans, in 1913, imports were valued at £2,171,230; in 1919 they were valued at £1,135,116; in 1920, £2,180,183; in 1927, £2,490,816. In 1928 there were 1361 miles of railway of 3-foot 6-inch gauge and 409 miles of 2-foot gauge. The most important port, Walvis Bay, was opened up when the British built a 22-mile line from Walvis Bay to Swakopmund, the western terminus of the territory's most important railway. The Union of South Africa was linked to the protectorate when a line was built for military purposes from Prieska to Kalkfontein.

In October, 1915, after the military forces had occupied the country, a civil administration was established, though martial law was maintained until 1921. Germany, in the Treaty of Versailles, renounced her sovereignty, with the result that Southwest Africa was assigned to the Union of South Africa as a mandate territory in May, 1919. The mandate was approved by the League of Nations Council on Dec. 17, 1920. The governor general delegated his powers to a local administrator who was to be assisted by a nominated council of nine made up of four Germans, four South Africans, and one official. For the fiscal year 1927–28, revenues amounted to £691,190 (in 1917–18 they were £650,000). The principal source of revenue was the tax on diamonds, while £160,000 is paid annually as revenue from customs by the Union Customs Department. The expenditure in 1927–28 was £963,935, including £269,607 loan expenditure. The laws of the Union are gradually being introduced into the country. See German Southwest Africa.

SOVIET RUSSIA. See Russia.

SOVIETS, All-Russian Congress of. See Communism. Also Russia, under *History*.

SOVIET SOCIALIST REPUBLICS, Union of. See Russia.

SOWERBY, Leo (1895–). An American composer, born at Grand Rapids, Mich. He received his entire musical education in Chicago, studying with C. F. Lampert, P. Grainger (piano), E. Delamarter (organ) and A. O. Anderson (composition). In 1918–21 he taught theory at the American Conservatory there, and was also organist at the South Congregational Church and critic for the *Inter-Ocean*. In 1921 he was awarded a special fellowship by the American Academy in Rome, where he spent the following two years. He appeared as soloist in his own works. As a composer, he is a decided futurist, although he himself claims affinity with the neo-classicists (Franck-d'Indy). His works comprise: a symphony; a symphonic sketch, *The Sorrow of Mydath*; an overture, *Comes Autumn Time*; *Suite in the Old Style*; *Rhapsody on British Folk-Tunes*; *The Ballad of King Estmere*, for two pianos and orchestra; an orchestral suite, *From the Northland*; a violin concerto, a 'cello concerto, and a piano concerto; a quintet for wind instruments; besides piano pieces and choruses.

SPACE, SPACE-LATTICE. See Physics.

SPA CONFERENCE. See Peace Conference and Treaties; Reparations.

SPAETH, J(ohn) Duncan (Ernst) (1868–). An American philologist. He was born in Philadelphia, Pa., and studied at the University of Pennsylvania and at Leipzig, then in Italy and France. He was professor of English at several colleges and, after 1911, was professor at Princeton. He is author of *Christian Theology in Browning's Poetry* (1916) and *Old English Poetry* (1921); and editor, with Henry S. Pancoast, of *Early English Poetry* (1921). During the World War, he was educational director of two army camps and edited *Camp Reader for American Soldiers*, adopted by the War Department for the American Expeditionary Forces.

SPAIN. A constitutional monarchy of southwestern Europe. Continental Spain has an area of 190,050 square miles; Greater Spain (including the Balearic and Canary Islands and the Spanish possessions in the north and on west coast of Africa) has 194,800 square miles. Population in 1910 was 19,950,817; in 1920, 21,347,335; in 1927 (estimated), 22,444,156; average annual increase, 0.65 per cent. The density of population in 1920 was 109.5 per square mile; maximum density in Province of Biscay, 490.1 per square mile; minimum density in Province of Soria, 38 per square mile. In 1927 it was estimated at 115.2 per square mile. Principal cities with population in 1927 were: Madrid, 808,366; Barcelona, 760,348; Valencia, 267,346; Seville, 215,107; Malaga, 158,733; Saragossa, 153,681; Murcia, 152,945. The movement of population in 1926 was: births, 657,229; deaths, 421,762; marriages, 159,848. Emigration, after the World War, took on large proportions once more, 101,980 Spaniards quitting the country in 1919; 185,918 in 1920; 92,504 in 1921; 93,591 in 1922; and 76,883 in 1927, as compared with 129,576 in 1914. Their destinations were for the most part the Argentine, Cuba, Brazil, Uruguay, and Mexico. It should be noted, however, that these emigrations were largely seasonal, covering the period of the harvest only, and that most of the emigrants returned immediately after. In 1920, 45.46 per cent of the population was illiterate. Education in the primary grades has made slow progress, though institutions for higher education are fairly well attended. On Jan. 1, 1926, there were 28,870 primary schools in Spain. In 1929, 60 secondary schools had 74,273 pupils, and the 11 universities in the country with the university section of Canary Islands, 31,562 students. In 1927 the total expenditure on education and the fine arts was 166,141,510 pesetas, as compared with 62,584,378 in 1914.

Industry. Agriculture is the mainstay of the country. Areas under cereal crops have increased little: wheat, 9,676,879 acres in 1914 and 10,566,985 in 1928; rye, 1,886,206 in 1914 and 1,839,770 in 1928; barley, 3,402,553 and 4,447,657. The acreage under vines remained about the same (3,452,670 in 1927), though production in gallons was 748,351,573 in 1927 to 432,617,000 in 1913. Similarly, the production of olive oil was 265,422 tons in 1913 and 230,112 metric tons in 1923. Other important products are rice, beans, peas, lentils, tares, vetches, flax, hemp, pulse, esparto, oranges, hazelnuts, onions, almonds.

The sugar industry received some attention, there being 26 cane-sugar factories and 48 beet-sugar factories in 1929. In 1913, 13,231 metric tons of cane sugar were produced, as compared with 8704 tons in 1926. Production of beet sugar was 95,986 tons in 1927. Pastoral activities are once more on the increase, sheep increasing in number from 14,500,000 in 1913 to 20,067,000 in 1925; goats, 3,394,000 to 4,749,000; horses, 540,000 to 697,678; mules and asses, 1,824,000 to 2,363,737; cattle, 2,878,000 to 3,794,000; hogs, 2,750,000 to 5,267,000. Some 505 factories prepare sardines and preserved fish for the home and export markets. During the World War, interest in mining was stimulated, but except for coal, soon flagged. All the principal minerals in 1926 showed smaller yields than those of 1912. Iron dropped from 9,139,000 tons to 3,195,019 tons in 1926. Total values of mineral products at the mine mouths were, for typical years: 1910, 453,000,000 pesetas; 1917, 1,323,000,000; 1927, 416,902,801. The War had a heightening influence on the manufactures of the country, which, because of the dearth of capital and Spain's inexperience, was also only temporary. There were 2,614,500 spindles in the cotton establishments in 1910 and only 2,000,000 in 1923; 274,800 spindles in the wool factories in 1923, as compared with 662,000 in 1910. Cork and paper production have increased slightly.

Trade. The years 1913 and 1914 saw an excess of imports over exports, but with the beginning of the war period and the heavy demands made on Spain for her products, the balance turned favorable and continued so through 1919. From thence on, imports once more exceeded exports. The figures for typical years in thousands of dollars at the prevailing rates of exchange are (excluding treasure):

	1913	1918	1921	1927
Imports	252,067	109,773	382,449	502,625
Exports	204,123	170,626	211,488	378,442

In July, 1929, a continued unfavorable balance of trade caused the Government to grant a state subsidy to grain producers and to announce the adoption of proposed enactment of decrees protecting and stimulating Spanish industries and exports. A general tariff revision, by which the importation of certain foreign merchandise would be restricted, was to be effected Oct. 1, 1929. Leading exports are, of course, alimentary substances, including grain, sugar, and wine, metals and their manufactures, wool, timber, and cotton. Imports are machinery, drugs, metals, foodstuffs, etc. In 1927 exports to the United States were valued at 211,958,000 pesetas and imports from the United States at 512,540,000 pesetas. In 1914, 18,915 vessels of 22,229,159 tons entered and 16,482 of 19,265,265 tons cleared Spanish ports. In 1918 the figures were: entered, 12,475 of 6,745,084 tons; cleared, 13,936 of 7,204,843 tons. In 1926 entered, 18,820 of 24,804,418 tons; cleared, 16,317 of 21,342,118 tons. The Spanish merchant marine consisted of 628 steamers of 844,322 tons and 236 sailing vessels of 32,000 tons in 1914; in 1927 there were 1763 steamers of 1,232,805 tons and 529 sailing vessels of 83,585 tons. There was therefore a substantial increase in spite of the war losses by submarine and mine.

Railways. In 1913 total length of railways open was 9310 miles; in 1927, 10,010 miles. The railway service was severely taxed during the World War because of the increased traffic caused by the cessation of the coasting trade. The continued depreciation of equipment, the higher wages, and only the slight rate increase of 15 per cent allowed, put the railroads in a sorry condition. It was incumbent on the Government to increase annually the state subsidies, so that 6,950,343 pesetas had to be paid over during 1925. In 1929 the railways were preparing to electrify 1372 miles of road, including the widening of some narrow-gauge line and the construction of two hydroelectric plants. In 1919 the first Spanish subway, that of the Madrid tubes covering a length of 3 miles, was opened.

Finance and Economic Conditions. The revenue in 1914 was 1,343,000,000 pesetas and the expenditure, 1,430,000,000. By 1925–26 the revenue had mounted to 3,335,790,000 pesetas (exclusive of loans) and the expenditure, to 3,525,081,000. Estimates for 1929 were: expenditure, 3,370,104,000 pesetas, and revenue, 3,399,-

770,000. The total funded public debt on Mar. 31, 1929, was 19,272,742,000 pesetas, of which 5.261,466,000 pesetas was internal. In 1914 there were 1,985,847,000 paper notes in circulation; by December, 1927, these had increased to 4,202,000,000. However, the metallic reserves of the Bank of Spain were 2,604,000,000 pesetas. The period of the War saw a quickening of interest in internal affairs and an increased prosperity. Many joint-stock companies, particularly during 1916–17, were formed for industrial enterprises and the Government aided by the creation of a commission for the promotion of industry. Also, the external loan placed abroad was taken up by Spaniards, so that the great majority of the bonds were held at home. The application to the domestic coal fields saw a doubling of pre-war production in anthracite and lignite, and though the coal was of an inferior quality, it served very well for the use of the electrified railways which were being extended. The demands for raw materials and foodstuffs from belligerents caused home stringencies and necessitated strict governmental regulation. From 1914 on, the Government applied itself to the regulation of cereal exports, the control of domestic prices, the removal of import duties from foodstuffs, the stimulation of agriculture by bounties, etc. In 1917 a general agricultural law was passed for the encouragement of the industry through the creation of a central agricultural loan bank. In 1918, after the failure of local boards of supply to control the traffic in provisions adequately, full powers were given to a commissary general. The rise of prices, the growing intransigency of labor, profiteering, etc., all contributed to a general industrial unrest that took on a revolutionary character and prepared the way for the *coup d'état* of General Primo de Rivera.

History. The outbreak of the World War divided Spanish opinion into two groups: the pro-French Spaniards, who were largely liberal in their tendencies, as well as anti-monarchial and anti-clerical; and the conservatives, who, because of French expansion in Morocco and the separation of Church and State in France, were pro-German in their sympathies. This cleavage and the fact that Spain could hardly gain anything from war led to the decision to remain neutral. The Cortes, meeting in October, 1914, endorsed the general policy, with the result that the country settled down, first to a state of uncertainty because of the fear of suspended food imports, and then to one of complacency as orders for materials began to pour in from France. A steady stream of metals, clothing, and pack-animals, crossing the frontier during the whole period 1914–18, brought in return, increased prosperity to certain classes. Shipbuilding flourished as well as trading with Allied ports. Naturally, many vessels were lost by torpedoing and mines. In 1915 the Dato ministry, in power since 1913, was succeeded by a cabinet made up of the liberal elements headed by Count Romanones. The new Government was generally characterized by a pro-Allied attitude, although it took no active steps to lead Germany to a war declaration. On Apr. 20, 1917, Count Romanones resigned, to be followed by Garcia Prieto, leader of another wing of the Liberals, who was more nearly neutral in his tone. The Liberal stay in power was, however, very brief. The demands for a more aggressive policy toward Germany, because of the intensification of its submarine campaign, and the unsuccessful attempt of the Spanish government to cause the dissolution of the military juntas which had rapidly spread among the infantry officers, hastened the crisis.

In June, 1917, Dato (Conservative) was once more called to head a cabinet, and he immediately acceded to the revolutionary demands of the military cliques. Their agitation, fed by the inefficiency of the bureaucracy, was to culminate in the events of 1923. Three movements were to march side by side in the subsequent years: the increasing distemper of the laboring classes, manifesting itself in industrial struggles of growing bitterness; the larger part in affairs that the military juntas assumed; and the regionalist movement, centring in Catalonia, whose purpose was a greater measure of local autonomy. From all this agitation, it was to be expected that the parties of the Left should adopt an uncompromising attitude. An extensive programme was announced, including greater decentralization, popular election of senators, elimination of the right of the Government to suspend the constitutional guarantees and to prorogue Parliament at will, annual meetings of Parliament, etc.

Labor troubles were frequent throughout 1917, and the demands of the Catalans took on more insistency. Most of the Catalan members of the Cortes met in an assembly at Barcelona on July 19, 1917, to press for reforms. The general strike that followed (July–August) and the forced resignation of the War Minister as a result of the intrigues of the military committee hastened the fall of the Government. Prieto again formed a cabinet of Maurists (extreme Conservatives), Liberals, and Catalanists. A general election took place early in 1918; the Government fell at the first meeting of the Cortes on March 18. The highhanded conduct of the War Department under La Cierva had precipitated the crisis. Only through the personal influence of the King could a new cabinet be formed. This was made up of the strongest men in public affairs, including Mauro, Dato, and Romanones, but it, too, fell (November 6). It was followed by a short-lived Prieto ministry which in turn was succeeded by a Romanones government on December 3.

The end of the War and the popularity of the democratic doctrines which reverberated around the world were reëchoed in Spain. The Ministry of Public Works announced an extensive programme of economic reconstruction. In December, 1918, a Catalan parliamentary delegation issued a manifesto demanding home rule. A general strike broke out in Barcelona early in 1919, hastened by syndicalist propaganda. The attempt to mobilize the strikers on the one hand, and the desire to propitiate them, on the other, by the appointment of liberal civil authorities at Barcelona, brought the civil and military officials into conflict. The Government therefore resigned and a cabinet formed by Maura (Apr. 15, 1919) effected a dissolution of the Cortes and a new general election; but Maura was compelled to retire soon after, and the following ministries could maintain only a brief tenure. The machinations of the juntas and the continued industrial conflicts made any permanent civil government an impossibility.

In November, 1919, the Spanish Employers' Association threatened a nation-wide lockout if the Government did not treat both the employers and the workmen more fairly. By January, 1920, a reign of terrorism prevailed. In April, 1920, Dato once more headed a ministry. His attempt to conciliate the extreme conservatives of his party, i.e., Maura and La Cierva, and the Liberals, by a programme of social reform including arbitration, insurance, and land measures, was unavailing, for as a result of the December elections, he was left without a majority in the Cortes. His endeavors to reconcile all Conservative elements were occupying him when he was assassinated on Mar. 8, 1921.

From 1921 on, the conduct of the war in Morocco became the leading question in Spain. The increasing taxation, the intolerable censorship, and the rumors of Moroccan disasters served to antagonize further all classes of opinion against the ruling political leaders. The Maura ministry, embarrassed by the juntas in its handling of the Moroccan War, attempted to force their dissolution and was compelled to resign when the King refused to sign the decree (Jan. 11, 1922). Maura was called back, to last only another two months, and was followed by a Liberal coalition under Guerra. The latter immediately became popular by restoring the constitutional guarantees, suspended three years earlier, and by moving against the military juntas. On Nov. 14, 1922, a decree was promulgated, ordering their abolition. A prolonged discussion over the responsibility for the disasters of 1921 in Morocco, an attempt to impeach the Allende-Salazar ministry under which they had taken place, and demands for such reform of the constitution as would end the suspension of the guarantees, caused the overthrow of the ministry. After great difficulty, a new Liberal government was formed under Prieto on December 7. In December, a sensation was caused when the former High Commissioner of Morocco, General Berenguer, assumed full responsibility and demanded a trial in order that the whole matter might be aired. His charges of inefficient equipment and a general lack of foresight on the part of the administration stirred a country which had already been aroused over the great loss of life and the expenditure of 500,000,000 pesetas. By the middle of 1923, parliamentary commissions investigating the conduct of the campaign were prepared to bring charges against the ministry and the high officers in command, as concessions to public opinion.

A parliamentary commission, the Committee of Twenty-One, under the chairmanship of General Picasso, was appointed to investigate the conduct of the administration. In the summer of 1922, this committee rendered the Picasso Report to the Council of Ministers, recommending death penalties for several generals and ministers, and suggesting a number of governmental reforms. The Report was suppressed and fear of a *coup d'état* led the Government to prorogue the Cortes.

From Mar. 22, 1918, to Sept. 13, 1923, 12 cabinets rose and fell. In the year ending September, 1923, strikes, riots, and reprisals in the Province of Barcelona alone resulted in the death of 337 workmen and employers. Catalan agitation increased with every passing year. On top of all this came the example of Mussolini's successful distatorship in Italy. The time for a military coup was therefore at hand as the year 1923 drew to a close. On September 13, Captain General Ferdinando Primo de Rivera, Military Governor of Barcelona, seized the civil administration of the city, and then proceeded to oust the entire ministry. It was evident at once that the revolution was not directed against the throne but against the prevailing political methods.

It eventually appeared that the coup was carried out in conjunction with the Crown. When the King arrived in Madrid shortly after the coup, he requested General Rivera to put himself at the head of a military directorate and form a government. Parliament was dissolved by decree on September 16; the ministerial departments were placed under the permanent undersecretaries; trial by jury was suspended, and a strict censorship imposed. The military directorate headed by General Rivera and made up of Generals Adolfo Espasno, Luis Navarro, Luis Hermoso, Dalmaeio Rodriguez, Antonio Mayenda, Gomez Jordana, Ruiz Portal, and Mario Muslera, with Admiral Marquis Mavez, exercised the real functions of government. First measures were characteristically severe. All local officials were dismissed and new elections ordered. Decrees were promulgated abolishing the salaries of life senators, amending judicial procedure, and establishing a commission for the review of railway administrative methods. The support of the middle classes was demanded under a veiled threat of compulsion. The result was the oversubscription on November 5 of 350,000,000 pesetas of treasury bonds. That the dictatorship did not contemplate a brief stay in power was indicated when Count Romanones and Don Alvarez, speakers, respectively, of the Senate and the late Chamber of Deputies, were removed from their posts for petitioning the King to convoke the new Cortes. The lot of the dictatorship was not an easy one. Hostility was evoked by the dissolution of the provincial legislatures, the exile of the popular Professor Unamuno to the Canary Islands, and the failure of the directorate to cope with the repeated Moroccan disasters, for Rivera was no more successful than had been his predecessors in fighting the Riff tribesmen.

Early in 1925, the novelist Blasco de Ibáñez assailed the dictatorship through an attack on the King. Ibáñez strewed his pamphlets over a number of towns from airplanes. It was the censorship, in particular, which made him and many other intellectuals impatient with the system. By way of removing some of the people's grievances, the Government, on May 17, 1925, abolished the martial law which had been in force since Sept. 15, 1923. On Aug. 20, 1925, a royal decree provided for an annual subsidy of 10,000,000 pesetas for shipping, and of 8,000,000 in addition for shipbuilding. Finally, on December 3, the military directory was superseded by a civil government, still under Rivera's presidency, but composed of a number of civilians, as well as generals. All its members belonged to the new political party which Rivera had formed, the Union Patriótica. Despite all this, however, there was a serious revolt in the artillery corps in 1926, because of the Government's policy of promoting men by favoritism rather than by seniority.

In June, 1926, there was also another of the many attempts to assassinate Rivera. The latter now proceeded to exercise his control over the press to such an extent that it reported Spanish victories in Morocco at the very time Abd-el-Krim was winning his greatest battles. As a further bait to Nationalists, Rivera, on Sept. 11, 1926, gave the required notice that Spain would withdraw from the League of Nations in two years, because her demand for a permanent seat in the Council was refused. Perhaps because of these shams, and also because of a policy of intimidation adopted by the Government (martial law was reëstablished Sept. 5, 1926), a plebiscite of Sept. 11, 12, and 13, 1926, upheld the dictatorship by a majority of several millions, the total votes cast in its favor being reported as 6,989,043. Rivera's popularity increased still further when, on July 12, 1927, Spanish Morocco was again "pacified," with the invaluable aid of the French. Spain had spent $800,000,000 in Morocco in 18 years, and for a decade the average annual loss of lives had been 13,000 soldiers.

Martial law was again done away with, on Jan. 1, 1927, and on September 12, a National Advisory Assembly was convoked to sit in place of the Parliament that had been dissolved on Sept. 16, 1923. This Advisory Assembly met for the first time on Oct. 10, 1927. The make-up of the Advisory Assembly, as modified by a royal decree of Dec. 5, 1928, was 400 members, nominated directly or indirectly by the Government, and holding office for three years. The general electorate, every man and woman of 23 or over, could only vote in some local elections and in special plebiscites. Moreover, as its name indicated, the Advisory Assembly had no real legislative powers, its sole functions being consultative. In 1928 the Assembly was directed to draft a new constitution to supersede the one of 1876 which was still in force—at least theoretically. On July 5, 1929, debates on a tentative draft, embodying the idea of a corporate state, were begun.

With the close of 1928, it seemed as though the Dictator might be in undisputed control. Even the Unión General de Trabajadores (National Labor Confederation) supported him, since several labor leaders had been given public service positions; but on Jan. 29, 1929, another revolt broke out in the artillery corps, in Ciudad Real, over the questions of unfair advancement and the restoration of the constitutional monarchy. As a result, the corps was dissolved and the leader of the revolt, ex-Minister Sanchez Guerra, imprisoned on a war ship. The artillery schools were closed, too, but the parents of children whose careers were thus ended were subsidized by the Government. Before long, however, the corps was ordered reëstablished, and most of the schools reopened.

On March 9, a general strike of university students broke out because of the alleged favored treatment accorded some of the students of the closed artillery school at Segovia, to the disadvantage of the engineering students at Madrid. The Government proceeded to close five universities and dismissed many of the professors. Although most of the schools were again opened in short order, a decree of March 16 closed the University of Madrid until Oct. 30, 1930, because of a street fight between students and police. Soon the same decree was applied to the universities at Valladolid and Salamanca because the students there had gone on sympathy strikes for their Madrid colleagues. On May 29, 1929, however, all universities were reopened.

Despite this prevalence of disorders and revolts, Rivera announced his determination to continue in control. On Mar. 6, 1929, he had declared, however, that if he were living in March, 1931, he would then be ready to abandon his functions. By that time, he felt the country would be in a "proper state for the best citizens to maintain the upper hand over the politicians." In April, 1929, nearly every important bank, business firm, and industry was reported to have signed a statement pledging adherence to the Dictator's régime.

Catalan Question. The Catalan question, which had agitated Spain to a greater or lesser degree for 50 years, came to a head, as indicated above, in the years 1917–19. It embraced two aspects: a weak separatist movement for independence, and a stronger and more popular movement for regionalism or home rule. At first, purely sentimental and literary, the movement for home rule had taken on a political and economic character. The Catalan language was revived, and the particularistic tone of the agitation became more pronounced. An assembly met in Barcelona in 1917 in defiance of the Government and voted resolutions asking for drastic reforms in the constitution. In spite of the arrest of the members attending, the agitation continued. In 1918 a parliamentary delegation of Catalans presented to the government a full statement of demands. This included delimitation of Catalan territory, to take in the existing four Catalan provinces; definition of the respective limits of the powers of the central government and those of the Catalan and the calling of a Catalan constituent assembly; political, economic, and financial autonomy through the organization of a Catalan government with two chambers; regional control of taxes on mines, forests, railways, and water courses; a court of arbitration for the settlement of disputes between the central and regional authorities. An attempt was made to place this manifesto before President Wilson and the Peace Conference, but the nationwide hostility which it aroused, together with the threats of the military to apply force and of the middle class to declare an economic boycott, softened the ardor of the intransigents. Incidentally, a large mass of the supporters of the movement fell away when the workers lost interest and became absorbed in the trade-union movement. Yet the undercurrent continued to be felt from time to time. From 1921 to 1924, it appeared from the disorders and propaganda prevalent that the movement had lost none of its vitality. Even the decree of Sept. 18, 1923, which inveighed against regionalism had no real effect.

Naturally, the flamboyant nationalism which the dictatorship represented did not look kindly upon the movement. The Catalans, moreover, were openly hostile to the directorate, going so far, in April, 1924, as to appeal to the League of Nations for intervention. In 1925 there were two attempts to assassinate Rivera and one to blow up a royal train near Barcelona. All three of these attempts were traced to Catalan influences. Then, on Nov. 2, 1926, by arresting several Catalan leaders, the French police frustrated a Separatist plot to set up an independent Catalonia by an invasion from across the French border. Rivera managed to secure the support of the manufacturing interests of the Catalan provinces for a while when he suppressed the Catalan labor movement and pronounced himself in favor of a high tariff; but by 1928 and 1929, this group, too, was dissatisfied with the Dictator's attacks upon Catalan cultural sentiments and with his failure to grant them any further concessions. On Sept. 13, 1928, a plot to overthrow the Dictator was uncovered in Barcelona. Effective repressive methods prevented much vocal propaganda, but in 1929 both separatism and regionalism were stronger than ever.

Foreign Affairs. Domestic concerns during 1914–18 distracted attention from foreign affairs. The result was that the tone of the negotiations carried on with Germany over submarine sinkings never became obstreperous. In 1918 an agreement was reached with Germany for a ton-for-ton indemnity to cover all losses. In 1919 Count Romanones attended the Peace Conference and succeeded in obtaining for Spain a place in the Council of the League of Nations. All talk of a Franco-Spanish alliance, which was current rumor in 1919–20 and was quickened by Count Romanones's presence at the Peace Conference and the King's visit to Paris in 1919, came to naught because of the Spanish pretensions in Tangiers. Spain's desire to assume an important place in foreign affairs and in the Mediterranean in particular was not to be frustrated, for with the assumption of the reins of government by the Directorate, pourparlers were at once commenced with Italy. In November, 1923, the King and Queen, accompanied by General Rivera, were entertained by Italian royalty. A commercial treaty was at once effected, and it appeared certain that Mussolini and Rivera meant to hasten a rapprochement of the two Powers for the maintenance of an equilibrium in the Mediterranean.

Meanwhile, negotiations were under way for commercial treaties with France, Germany, Switzerland, Portugal, and the United States. Considerable hard feeling was engendered by the fact that France in 1920 increased all tariffs considerably. The matter was debated in 1921–22 and seemed on the way to solution in 1923, when the Government was authorized to negotiate a treaty, but the *coup d'état* ended all discussions for the time. The same was true of the German and United States treaties which lapsed in 1922 and 1923, respectively. The Dictator's economic nationalism made it difficult for him to come to satisfactory terms with a number of the Powers. High tariffs and retaliatory measures embittered relations. In one case, when Germany made the importation of Spanish grapes prohibitive, several Spanish provinces suffered severely; but by 1927 agreements had been reached with nearly all countries. Then, on May 1, 1927, the American Chamber of Commerce in Spain protested that recent modifications of the Spanish commercial treaties with Great Britain and France virtually removed the United States from the class of most-favored nations. It was not long, however, before a compromise agreement was attained.

On July 13, 1926, a Franco-Spanish agreement over Morocco was signed, and exactly seven days later, the Spanish Cabinet ratified an agreement permitting the United States to search Spanish vessels for contraband liquor within one hour's steaming distance of the American coast. Aug. 7, 1926, saw the signing of an Italo-Spanish Treaty of Friendship and Conciliation in which each party undertook to remain neutral in case the other were attacked by a third party. This was generally taken to mean that Spain and Italy were adopting a common policy in the Mediterranean, to the possible disadvantage of France. Among the arbitration treaties signed by Spain were one with Chile on May, 1927; one with Belgium on July 17, 1927; and one with Sweden on Apr. 27, 1928. On Mar. 22, 1928, Spain announced her desire to remain in the League of Nations. On July 10, 1929, a treaty of arbitration of commercial disputes was signed with France. In 1929 King Alfonso opened two Spanish world expositions, one at Barcelona, and one at Seville.

For Spain's part in the Tangier discussions, see TANGIER CONTROVERSY. See also MOROCCO; ITALY; NAVIES OF THE WORLD.

SPANISH LITERATURE. Spanish literature in the nineteenth century had a veritable renaissance in the drama, the novel, and in lyric poetry, three fields in which Spain had been supreme in the heyday of her Golden Age. To these, she added an excellent school of criticism. In all four of these forms of literary activity, Spain has continued to shine thus far in the twentieth century. The "generation of 1898" was the name applied to the forward-looking group which, while preserving all that was best in their native inheritance, wished to profit by all that was best beyond the borders of their own land. Keen observers saw the lessons to be learned from foreign experience, and patriotic hearts and minds adapted those lessons to the native needs, so that Spanish literature of the twentieth century has been racially Spanish and typical.

In the novel, two old favorites went into new fields: Blasco Ibáñez (died 1928) wrote a series of novels about the War, one of which, *Los Cuatro Ginetes del Apocalipsis,* is remarkable for its grasp of the extent of the racial problems involved; and Pío Baroja wrote a series of novels that tend to show the development of liberal ideas in Spain in the nineteenth century. These have been compared, *mutatis mutandis,* with the *Episodios Nacionales* of Pérez Galdós.

The novel appears in several attractive fields—the historical novel, the regional novel, the realistic novel, the latter sometimes showing keen analysis of modern problems. Ramón María del Valle-Inclán wrote about 30 *cuentos,* and three historical novels dealing with the Carlist War in Galicia. Alejandro Pérez Lugín (died 1926) made a great furore with his *La Casa de la Troya* (Fastenrath Prize), which portrays the life of Santiago de Compostela. His subsequent novels, *Currito de la Cruz* and *La Corredoira y la Rua,* also deal with Galicia, as do those of Francisco Camba, whose *Revolución de Laíño* won the Fastenrath Prize (1922). Mauricio López Roberts won the Fastenrath Prize (1917) with his *El Verdadero Hogar;* his *El Ave Blanca* (1922) deals attractively with a strange Basque legend. Guillermo Díaz-Caneja won the Fastenrath Prize (1918) with his *El Sobre en Blanco,* while his later novel, *La Virgen Paleta,* was considered his most beautiful work up to that time. Without intending to be so, he is a moralist. The Pueyo Prize (1922) was awarded to M. D. Benavides, whose *Lamentación* revealed a young author of great promise. Ricardo León was esteemed by many as being stylistically the author most nearly entitled to be considered the successor of Juan Valera. In subject matter and in manner of treatment, he continued the traditions of Alarcón and Pereda. His *El Amor de los Amores* is a kind of reversal of *Pepita Jiménez.* Among his latest novels are *Amor de Caridad, Cuentos de Antaño y de Hogaño, Humos de Rey, El hombre nuevo* (a real event in 1925), and *Juaja* (1928). Beatriz Galindo (Sra. Isabel O. de Palencia) wrote one of the most effective books of the year 1923, *El Sembrador Sembró su Semilla . . . ,* a fascinating novel and a medically sound study of eugenics. Concha Espina de la Serna, after winning the Fastenrath Prize for 1914 with her *La Esfinge Maragata,* was forging rapidly to the front, with *La Rosa de los Vientos, Ruecas de Marfil, El Metal de los Muertos, Despertar para Morir, Dulce Nombre,* *El Caliz Rojo, Altar mayor,* and *Las niñas desaparecidas* (1927). In 1923 the Royal Spanish Academy awarded her the Castillo de Chirel Prize for her *Tierras del Aquilón,* and she was already being spoken of for the Nobel Prize. Azorín's *Doña Inés* (1925) is meritorious; and Palacio Valdés's *Cármenes de Granada* (1928) immediately exhausted a first edition of 20,000 copies.

During the period under consideration, poetry gave us not only the editions of the complete works of such poets as José María Gabriel y Galán, Vicente Medina, and Antonio Machado y Ruiz, but new works of very real worth and inspiration, which drink deep from the fountain of the national life. Francisco Villaespesa gave us *Andalucía, La Maja de Goya,* and *Paz.* J. M. Bello's *Cantigas de Juglaría* exhibits a surprising variety of rhymes and meters; and the polished verse and beautiful thoughts of E. Carballo's *Cancionero de Amor* met with favor. The *Ruta de Ensueño* (1917) of F. Pérez Menéndez Maturana was deemed better than any of his previous work. The *Poemas* (1918) of A. Torre-Ruiz caused him to be hailed as a new poet of real inspiration. Juan de Contreras, Marqués de Lozoya, showed himself to be a graceful versifier with a real inspiration in *Poemas de Añoranzas* (1915), *Sonetos Espirituales* (1918), and *Poemas Castellanos* (1920), the last of which, treating of Segovian legends, won the Fastenrath Prize. The great poetic event of 1922 was the discovery of a real poet in the person of an authentic shepherd of Castile, Julián Sánchez Prieto, whose book *En el Chozo* was written in the fields among his sheep. The outstanding poetic event of 1927 was E. Marquina's writing of the poem for the national hymn which is to be sung to the *Marcha Real.*

The drama flourished as one would expect, and some of the best work was done in verse, verse whose charm yields in no respect to the verse of earlier periods. Francisco Villaespesa produced *La Leona de Castilla* (1915), *Abenhumeya, El Rey Galaor, La Maja de Goya,* and *Judith,* the last a Biblical subject which has been fairly popular in Spanish literature. Eduardo Marquina gave us *El Gran Capitán, La Morisca, La Extraña* (1921), *El Pavo Real* (the most beautiful production of the year 1922, and dealing with an exquisitely dainty legend of British India), *Una Noche de Verano en Venecia* (1923), a happy combination of profound love and sound thinking, set to verse that needs no musical accompaniment; *Don Luis Mejia* (1925, a play in verse, written in collaboration with Hernández Catá), *Fruto bendito,* and especially *La ermita, la fuente y el rio* (both 1927). Antonio Rey Soto, a churchman, ranks well as a poetic dramatist, as shown by his *Amor que Vence al Amor* (1917) and his mystic tragedy *Cuento del Lar* (1918). Next to Eduardo Marquina, the most graceful dramatic poet probably is Luis Fernández Ardavín, whose works *La Dama del Armiño* (1921), *El Doncel Romántico* (1922), *Romance de Doña Blanca* (1923), *El deseo,* and *La nave sin timón* (both 1925), were all very well received. In the nonpoetic drama, there is also much excellent work to record. Despite his great age, Benito Pérez Galdós (died 1920) won a triumph with his tragi-comedy, *Santa Juana de Castilla* (1918), as had the almost equally aged Catalan dramatist, Angel Guimerá, with his peace play, *Jesús que Vuelve* in 1917. Julián Sánchez Prieto (see above) had a riotous success with *¡Al escampio!* (1926); and Ignacio Sánchez Mejías (a beginner of great promise) gave the clearest note of originality for the year 1928 with *Sinrazón.*

The Alvarez Quintero brothers have continued to keep the Spanish stage supplied with their clean, witty, light comedies and with occasional pieces of a more serious nature, such as *Malva loca* (crowned by the Academy), *La Calumniada, Ramo de Locura, La Prisa,* and *Cristalina,* all of which, without losing any of the usual charm of the authors, deal with serious questions. Two other authors of note belong to this lighter school, Carlos Arniches (whose *La Tragedia de Marichu* and *La Mala Hora* were very successful) and Pedro Múñoz Seca, who keeps his public in gales of laughter by his unexpected quips and flashes of repartee (for example, in *El Conflicto de Mercedes*), but who can also write for children, as shown by his engaging *La Muerte del Dragón.*

There still remain four great names connected with the drama of the twentieth century: Jacinto Benavente, from the nature of his work, has been called the Spanish Shakespeare. After 1916 (when he produced *La Ciudad Alegre y Confiada,* which is an exquisite allegory treating the question of national civic preparedness, as against personal selfishness), he gave us *La Inmaculada de Dolores, Mefistófela, Los Cachorros, La Ley de los Hijos, La Vestal de Occidente,* and *Por ser con Todos Leal ser para Todos Traidor.* He was awarded the Nobel Prize for 1922. Later successes were *Los nuevos yernos* (1925); *La Mariposa que voló sobre el mar* (1926); and *El demonio fué antes ángel* (1928). Manuel Linares Rivas won a succession of triumphs with his careful studies of vital problems—*Cobardías* (1918, attacking all kinds of moral cowardice), *El Caballero Lobo* (1919); *Almas Brujas, Lo Pasado, Como Dios nos Hizo, Frente a la Vida* (problem of educating middle-class girls to economic efficiency, so as to avoid necessity of loveless marriages); and his success of 1923, *La Mala Ley,* which is a piercing study of a bad inheritance law. In the later years, Gregorio Martínez Sierra was devoting a great deal of his time and talent (and he was ably seconded therein by his talented wife) to staging with exquisite taste the plays of others (e.g., *El Pavo Real* and *Una Noche de Verano en Venecia,* by Marquina, and *El Conflicto de Mercedes,* by Múñoz Seca); but that did not prevent him from doing some creative work, such as *El Corazón Ciego, Don Juan de España* (a new treatment of an old legend), and *El Grillo del Hogar,* which is a dramatization, with delicate touches, of Dicken's *Cricket on the Hearth.* J. López Pinillos, who wrote under the pen name of "Parmeno," worked indefatigably during his last years, as witness *Los Senderos del Mal,* and *Esclavitud* (Piquer Prize for 1918), *El Condenado, La Red* (1919, Academy Prize in 1921), *Como el Humo, La Tierra,* and *El Caudal de los Hijos* (all produced in 1921, all handling serious problems and the last one treating honor as a spiritual inheritance that parents must hand down unsullied to their children); he died in 1922, leaving behind him two works for posthumous production: *Los Malcasados* and *Embrujamiento,* which latter was a tremendous success.

The school of criticism following in the footsteps of Clarín, Menéndez y Pelayo, and Valera shows such names as Azorín, Blanca de los Ríos de Lampérez, Carmen de Burgos, E. Díez Canedo, Miguel de Unamuno, Ramón Pérez de Ayala, Ricardo León, Luis Astrana Marín, and the two special followers of Menéndez y Pelayo: Ramón Menéndez Pidal and Adolfo Bonilla y San Martín (died 1926), each of whom has in turn developed a following.

SPARTACISTS. See COMMUNISM; GERMANY.

SPAULDING, EDWARD GLEASON (1873–). An American philosopher, born at Burlington, Vt., and educated at the University of Vermont and at Bonn in Germany. He taught philosophy in the College of the City of New York from 1900 to 1914 when he became professor of philosophy at Princeton University. For several years, he lectured at Woods Hole, Mass. He collaborated with six others in *The New Realism* (1912) also wrote *The New Rationalism* in (1918), and *What Am I?*, essays (1928). He served in the Engineers and the Chemical Warfare Service of the U. S. Army during the World War.

SPECTROHELIOGRAPH. See ASTRONOMY.

SPECTROSCOPY. See ASTRONOMY; PHYSICS.

SPENCER, ARTHUR COE (1871–). An American geologist, born at Carmel, N. Y. He studied at the Case School of Applied Science, and in 1896 received his Ph.D. at Johns Hopkins. Later, entering the service of the United States Geological Survey as assistant geologist, he attained the rank of geologist in 1902. He studied the general geology and ore deposits of Virginia, Colorado, Wyoming, Alaska, and Cuba, and more particularly the zinc and iron deposits in the pre-Cambrian rocks of New Jersey, as well as those of Texas, including the iron ores, and the Triassic iron ores of Pennsylvania.

SPENCER, ROBERT (1879–). An American landscape painter, born at Harvard, Nebr., and trained at the National Academy of Design school in New York and at the New York School of Art. He studied under Chase, DuMond, Henri, Garber, Francis Jones, and F. Luis Mora. Among his numerous awards were the George Innes Gold Medal of the National Academy of Design (1914), the gold medal of the Boston Art Club (1915), the gold medal of the Panama-Pacific Exposition (1915), and the second Altman Prize, National Academy of Design (1920 and 1921). His paintings are permanently hung in the Metropolitan Museum of Art in New York City and in the most important collections of the United States, including those of Chicago, Washington, Pittsburgh, Detroit, and Buffalo. He became a National Academician in 1920.

SPENDER, JOHN ALFRED (1862–). A British journalist and author, who was born at Bath and educated at Bath College and Balliol College, Oxford. He edited the *Eastern Morning News* at Hull from 1886 to 1890, when he joined the staff of the *Pall Mall Gazette*, later going to the *Westminster Gazette* of which he was editor from 1896 to 1922. He was a member of the special mission to Egypt in 1919–20, and visited the United States, where he delivered lectures. He wrote *The State and Pensions in Old Age*; *The New Fiction*; *A Modern Journal*; *Comments of Bagshot*; *The Foundation of British Policy*; *The Indian Scene*; *The Life of Sir Henry Campbell-Bannerman*; *Public Life* (1925); *The Changing East* (1926); *Life, Journalism and Politics* (1927); and *Through English Eyes* (1928), in which the author gives his impressions of America.

SPENGLER, shpĕng′lẽr, OSWALD (1880–). A German scholar and writer on philosophical topics. He received international notoriety through the publication of his *Untergang des Abendlandes, Umrisse einer Morphologie der Weltgeschichte* (2 vols., 1920–22). In this work he attempted to trace a philosophy of history and to predict, on the basis of the post-bellum disorganization of Europe, the eclipse of Western civilization. His other works include a study of the philosophy of Heraclitus (1904) and a sociological tract, *Preussentum und Sozialismus* (1922). Among his other works are *Pessimismus* (1921); *Neubau des deutschen Reiches* (1924); and *Politische Pflichten der Jugend.* The two volumes of his *Untergang des Abendlandes* were translated into English under the title *The Decline of the West*, vol. i, "Form and Actuality" (1926), and vol. ii, "Perspectives of World History" (1928).

SPERRY, ELMER AMBROSE (1860–). An American scientist and electrical engineer (see VOL. XXI). In 1926 he retired from the presidency of the Sperry Gyroscope Company, becoming chairman of the board. Since 1915 he has been a member of the Naval Consulting Board (chairman of committees on aëronautics, mines and torpedoes, and aids to navigation). He was awarded the John Fritz Medal in 1927.

SPINDEN, HERBERT JOSEPH (1879–). An American anthropologist who was born in Huron, S. D. He did field work for the Peabody Museum of Harvard University in the Western States, Mexico, Central America, etc., and was an assistant curator of the American Museum of Natural History in New York, 1909–21. Since 1921 he has been curator of Mexican archæology and ethnology at the Peabody Museum, Cambridge, Mass. He conducted an archæological expedition to Venezuela, which was financed by the Museum of Natural History, in 1915, and published *Ancient Civilizations of Mexico and Central America* (1917); *Yellow Fever First and Last* (1921); *Civilization of the Wet Tropics* (1922); *The Reduction of Mayan Dates* (1924).

SPIRE, ANDRÉ (1868–). A French writer of Jewish extraction, the leader of a group of Franco-Jewish poets and writers in Paris, who wanted to carry forward the Jewish tradition regardless of language. Spire's published works include: *Et j'ai voulu paix; Fournisseurs*; *Le secret* (war poems); *Versets: Et vous riez*; *poèmes juifs* (1908); *Quelques juifs*, critical essays (1913); *Les juifs et la guerre* (1917); *Poèmes juifs* (1919); and *Tentations*, poems (1920). As a poet, Spire reflected a restless and powerful lyricism.

SPIRITUALIST ASSOCIATION, NATIONAL. An association incorporated in 1893 for the union of local spiritualist societies of the United States into an organization of mutual help and coöperation in charitable, educational, religious, and missionary activities relating to the objects and phenomena of spiritualism. Annual conventions are held in which matters relating to spiritualism are discussed. By 1929 there were 22 State associations, as well as local societies and churches. The number of churches grew from 343 in 1916 to 543 in 1926; the membership from 23,197 to 41,233; and the Sunday schools from 75 to 86. The activities of the association are carried on through four departments, the Progressive Lyceums (Sunday schools); the Bureau of Phenomenal Evidence; the Bureau of Propaganda; and the Bureau of Education. The organization conducts the Morris Pratt Institute, Whitewater, Wis., and issues the periodicals, *Progressive Thinker*, *Banner of Life*, *Reason*, and the *National Spiritualist.* Officers in 1928 were: President, Joseph P. Whitwell, St. Paul, Minn.; secretary, the Rev. Harry F. Strack, Washington, D. C.; treasurer, F. W. Constantine, Buffalo, N. Y.

SPITZBERGEN. See SVALBARD.

SPITZKA, EDWARD ANTHONY (1876–1922). An American physician, anatomist, and psychiatrist, son of Edward C. Spitzka. Born in New York City, he was educated at the College of the City of New York and received his M.D. degree from Columbia University in 1902. His early years after graduation were devoted to anatomy and especially to brain study. He was connected with the anatomical department of Jefferson Medical College after 1904 and was director of the Daniel Baugh Institute of Anatomy from 1911 to 1914, when he removed to New York to enter upon the practice of neurology and psychiatry. He was for many years identified with brain study in general, with especial reference to comparative anatomy of the brain, including research into the brains of distinguished and abnormal individuals, such as Czolgosz, the assassin. He studied especially the action of high-voltage currents on the brain, the effects of electrocution, of reanimation after electric shock, etc., and wrote many papers on these and allied subjects. During the World War, he was a lieutenant colonel of the Medical Corps of the U. S. Army. After 1921 he was chief of the medical rating section of the U. S. Veterans Bureau. His only large contribution was an American edition of *Gray's Anatomy* with notes (1908).

SPLEEN. DISEASES OF THE. See ANÆMIA.

SPOKANE, spō'kăn. A manufacturing city of Washington. The population increased from 104,402 in 1910 to 104,437 in 1920 and to 109,100 in 1928, by estimate of the U. S. Bureau of the Census. The population of the metropolitan area in 1928 was 155,120. A zoning ordinance, dividing the city into six use districts with height and area restrictions, was adopted in 1928. Building construction has been active, reaching a peak in 1928 with the issuance of 2281 building permits, valued at $5,725,232. Among the notable buildings newly erected are the Paulsen Medical and Dental Building, Montgomery-Ward Company Building, Roosevelt Apartment House, and the Episcopal Cathedral of St. John the Evangelist. Between 1917 and 1927, 180 new industries located in the city, according to a survey of the Manufacturers' Association. In 1928, 15,332 persons were employed by 492 industrial establishments in the metropolitan area and received $22,250,000 in wages; the value of products manufactured was $60,000,000. The municipal airport, located 3 miles east of the city on the Spokane River, was the scene of the 1927 national air races. In 1928 there were 43 public grade schools, 3 junior high schools, and 3 high schools, with an enrollment of 31,396 pupils. The clearings of Spokane's 12 National and State banks in 1928 amounted to $700,491,595. The Federal Farm Loan Bank for the Pacific Northwest area, a branch of the Federal Reserve Bank of the twelfth district, and the Intermediate Credit Bank also are located in Spokane. The assessed valuation of property in 1928 was $86,622,459; the net debt was $4,688,714.

SPORTS. Separate articles on the major sports will be found under such titles as ATHLETICS, TRACK AND FIELD, BASEBALL, FOOTBALL, GOLF, OLYMPIC GAMES, TENNIS, etc.

SPRINGFIELD. A manufacturing city of Massachusetts. The population rose from 88,926 in 1910 to 129,614 in 1920 and to 149,800 in 1928 by estimate of the U. S. Bureau of the Census. A zoning ordinance, dividing the city into distinct use districts, was adopted in 1921. In 1922 the Hampden County Memorial Bridge across the Connecticut River, dedicated to the memory of the county's World War veterans, was erected at a cost of $6,635,000. In 1925 the North End Bridge was erected on the site of a wooden structure (destroyed by fire) at a cost of $990,171. The Shriners' Hospital for Crippled Children for the New England district was located at Springfield in 1925, and the following year the construction of the new $5,000,000 Union Station was completed. In 1929 Springfield enlarged its municipal water-supply system by the construction of Cobble Mountain Dam on Little River above Westfield. This dam, which was built by the hyrdaulic-fill method, rose 245 feet above its foundations and had a total volume of 1,800,000 cubic yards. The main outlet was a 7000-foot tunnel which also was to furnish water to a hydroelectric plant located on the Little River, The annual Eastern States Agricultural and Industrial Exposition was established at Springfield in 1916. In 1927, 16,782 persons were employed by approximately 320 industrial establishments and received $22,011,898 in wages; the value of products manufactured was $103,921,502. Springfield ranks third in financial importance among the cities of New England, having 3 national banks, 5 trust companies, and 3 savings banks; it is also the headquarters of the Federal Land Bank of the first district. Bank clearings in 1928 amounted to $296,082,000. In 1928, 1198 building permits representing a value of $5,976,799 were issued. The assessed valuation of property in 1928, according to local estimate, was $315,663,180; the net debt in 1927 was $14,860,000.

SPROUL, ROBERT GORDON (1891–). An American University president. He was born at San Francisco, Calif., and graduated at the University of California. Since 1920 he has been comptroller and secretary of the regents of the University of California, and since 1925, vice president. He has been chosen to succeed Dr. W. W. Campbell as president on July 31, 1930. In 1921–23 he served as a member of the California State Commission on Agricultural Education.

SPROUL, WILLIAM CAMERON (1870–1928). An American public official, born at Octoraro, Pa. He was graduated from Swarthmore College in 1891 and for several years was engaged in farming. He afterward became president of the *Daily Times* and *Morning Republican,* of Chester, Pa., and he organized several important iron and steel plants and developed numerous railroad, mining, traction, and power enterprises in West Virginia. In 1896 he was elected to the Pennsylvania Senate as a Republican. He was five times reëlected. In 1919 he was elected governor of Pennsylvania, serving until 1923, and taking special interest in the development of highways. At the National Republican Convention of 1920, he received the entire vote of his State for the presidential nomination, through seven ballots. Governor Sproul built and endowed the Sproul Observatory at Swarthmore College. He received the degree of LL.D. from nine colleges and universities, including Swarthmore and the University of Pennsylvania.

SPROULE, William (1848–). An American railway president. He began in the railroad business with the Southern Pacific in 1882, and after holding various positions in the freight department of the Pacific system, became general traffic manager in 1898. In 1910 he became the president of Wells Fargo & Co. and from September, 1911, to July, 1918, he was director and president of the Southern Pacific Company. During the World War, he was put in charge of Western railways. This work occupied him until December, 1919. In 1920 he resumed the office of director and president of the Southern Pacific Company.

SPURR, Josiah Edward (1870–). An American geologist, born at Gloucester, Mass. He was graduated from Harvard University and also studied in Berlin. After a year's experience as mining engineer and geologist to the Sultan of Turkey, he became geologist of the United States Geological Survey (1902–06). During 1906–11, he was in consulting practice and in the latter year became vice president and consulting engineer of the Tonopah Mining Company of Nevada. During the World War, he served on the committee of mineral imports with the United States Shipping and the War Trade boards, after which he was chief engineer of War Minerals Investigations for the United States Bureau of Mines. From 1919 to 1927, he was editor-in-chief of the *Engineering and Mining Journal.* In 1921 he was president of the Mining and Metallurgical Society of America. He is the editor of *Political and Commercial Geology* (1921) and the author of *The Iron-Bearing Rocks of the Mesabi Range in Minnesota* (1894); *Through the Yukon Gold Diggings* (1900); *Geology Applied to Mining* (1904); *The Ore Magmas* (1923).

SQUIER, George Owen (1865–). An American military engineer, born at Dryden, Mich. He studied at the United States Military Academy and entered the Army as second lieutenant of the 3d Artillery, continuing in the military service until his retirement on Dec. 23, 1923. Meanwhile, having shown a decided interest in electromagnetic phenomena, especially as applied to its uses in telegraphy and telephony, he studied at The Johns Hopkins University. Among his military assignments were an appointment as instructor of electricity and mines at the United States Artillery School at Fort Monroe (1895–98); command of the United States cable-ship *Burnside* during the laying of the Philippine cable-telegraph system (1900–02); service as chief signal officer, department of California (1902), as chief of signal corps with rank of brigadier general (1917); and charge of army air service with rank of major general (1916–18). General Squier's own researches and inventions included studies on the sine-waves systems of telegraphy, multiplex telephony and telegraphy over open bare wires laid in the earth or air, tree telephony and telegraphy, and the absorption of electromagnetic waves by living organisms.

His attainments were generally recognized and he was awarded the John Scott Gold Medal (1896), the Elliott Cresson Gold Medal (1912) of the Franklin Institute, and membership in the National Academy of Sciences. For his services in the World War, he received the Distinguished Service Medal from the United States and was made a Knight Commander of St. Michael and St. George by Great Britain. He has written a number of books on aëronautics, including *Military Aëronautics* (1908) and *Aëronautics in the United States* (1918).

SQUIRE, J(ohn) C(ollings) (1884–). A British journalist and author, founder and editor of the London *Mercury,* who was born in Plymouth, and educated at Blundell's and St. John's College, Cambridge. He was literary editor (1913) and acting editor (1917–18) of the *New Statesman.* A brilliant literary critic, parodist, and journalist, he was also a poet and dreamer. His writings include *Imaginary Speeches* (1912); *Steps to Parnassus* (1913); *The Survival of the Fittest* (1916); *Tricks of the Trade* (1917); *Poems: First Series* (1918); *Books in General,* three series (1918–20–21); *Life and Letters* (1920); *Collected Parodies* (1921); *Poems: Second Series* (1922); *Essays at Large* (1922); *Books Reviewed* (1922); *Essays on Poetry* (1924); *Grub Street Nights,* stories (1924); *The Comic Muse* (1925); *Poems in One Volume* (1926); and *Life at the Mermaid* (1927). He edited *English Men of Letters* and compiled the *Cambridge Book of Lesser Poets* (1927).

STAFF, General. See Armies and Army Organization.

STALIN, stā'lĭn, Josif Vissarionovich (Dzhugashvili) (1879–). General secretary of the executive committee of the Russian Communist Party and Lenin's successor as the supreme power in Soviet Russia. Born in Georgia in the Caucasus, he joined the Social Democratic Party in 1896 and for his political activities was banished a number of times to Siberia, first in 1904. He was liberated from prison following the Menshevik Revolution of February, 1917, was one of Lenin's closest associates in the November revolution, and served as People's Commissary for Workers' and Peasants' Inspection (1919–20), and as a member of the Revolutionary Military Council of the Republic (1920–23). As secretary of the Executive Committee of the Communist Party, he gradually established himself in a dominant position by eliminating his rivals. Trotsky, his principal opponent, and 98 other members of the opposition were expelled from the Communist Party in 1927, and in 1928 many of them, including Trotsky, were banished to distant parts of the Soviet territory. In the latter year, Stalin adopted a policy calling for the systematic industrialization of the rural districts intended to eliminate the "kulaks" (well-to-do peasants) and other elements favorable to the extension of capitalism. In 1929 his effort to force a system of highly mechanized state farms upon the individualistic peasant class had provoked strong opposition. It was predicted that Stalin's continuance in power and the success of the Communist experiment in Russia depended upon the outcome of the struggle.

STALLINGS, Laurence (1894–). An American literary critic and playwright. He was born at Macon, Ga., and after graduating at Wake Forest (N. C.) College, did newspaper work on the Atlanta *Journal* and the New York *World.* In the World War, he served as captain in the 5th Marines, 2d Division, U. S. Army. He is the author of a novel, *Plumes* (1924), and collaborated with Maxwell Anderson in writing the plays, *What Price Glory?* (produced, 1924); *The Buccaneer* (1925); *First Flight* (1925); *Deep River* (1926); and the motion pictures, *The Big Parade* and *Old Ironsides.*

STAMBULISKY, Alexander (1879–1923). A Bulgarian statesman, born at Slavovitsa, Bulgaria, and educated, at Sofia and Halle. He became a journalist and in 1902 edited a newspaper of the Agrarian League, later becoming a member of the Bulgarian Assembly, and acquiring great influence in the Agrarian Party. He strongly opposed most of King Ferdinand's policies, and for this, and for his public statement that if King Ferdinand led the country into war again he would lose his throne, Stambulisky was sentenced to prison for life. He was released in 1918 when the Allies took Sofia. In the elections of Aug. 7, 1919, the Agrarians made great gains, and in October, Stambulisky became Premier. In the March, 1920, elections, further gains encouraged him to put into effect his plans for solving the economic and financial problems of the country. On Oct. 11, 1921, the trial, inspired by Stambulisky, of the ministers charged with responsilibity for Bulgaria's participation in the World War as Germany's ally was started, and dragged through most of 1922, resulting in the conviction of 22 ministers. In 1922 he retained power by making many arrests, and when, in the next year, he announced that the constitution would be revised in such a way as to curtail royal privileges, the leaders of all the other parties were aroused and combined with the army and the King to overthrow the Government. On June 9, its members in Sofia were arrested, but Stambulisky escaped by flight, at first being accompanied by a guard of 2000 men, but later being obliged to proceed almost alone. He was shot and killed as he was crossing an open field on June 15, 1923. See BULGARIA.

STAMP, SIR JOSIAH (CHARLES) (1880–). A British economist and statistician who was educated at London University. He was in the Civil Service from 1896 to 1919, serving as assistant secretary to the Board of Trade after 1916. He received a B.Sc. (1911) and a D.Sc. (1916) from London University, where he was Newmarket lecturer in statistics from 1919 to 1921, and again in 1923. He was examiner for, and on the boards of, several universities, Guy Medalist of the Royal Association (1919), on the North Ireland Finance Arbitration Committee (1923–24), a British member of the commissions that drew up the Dawes Plan in 1924 and the Young Plan in 1929, and on the court of inquiry into the coal-mining-industry dispute (1925). He received honorary degrees from Cambridge, Oxford, Harvard, and London universities, was knighted in 1920, made a Knight Grand Cross of the Order of the British Empire in 1924, and a fellow of the British Academy in 1926. He was chairman of the London, Midland & Scottish Railway, and also a director in other large companies. His writings include *The Application of Official Statistics to Economic Problems* (1916); *The Fundamental Principles of Taxation in the Light of Modern Developments* (1921); *Studies in Current Problems in Government and Finance* (1924); *The Christian Ethic as an Economic Factor* (1926); *On Stimulus* (1927); *Modern Economic Factors* (1928).

STANDARDIZATION OF FARM PRODUCTS. See AGRICULTURE; CORN; OATS.

STANDARDIZATION OF LUMBER. See FORESTRY.

STANDARDS. See COTTON.

STANFORD-BINET SCALE. See MENTAL MEASUREMENT.

STANFORD UNIVERSITY. A nonsectarian coeducational institution at Stanford University, Calif., founded in 1891. The university grew with great rapidity during the period 1914–28, both in the size of the student body and in its physical equipment and resources. The enrollment rose from 1879 in the former year to 3478 in the latter; the faculty from 229 to 506 members; and the library from 239,122 to 490,000 volumes. Herbert Hoover presented to the university in 1919 a collection of material on the World War, including the official records of the American Relief Association, the Commission for Relief in Belgium, and other great relief organizations headed by him; to these were added government documents and publications and archives and collections made for the Food Research Institute. The Hoover War Libary, as it is called, contained over 125,000 titles. The Food Research Institute was founded at Stanford in 1920–21 on endowment from the Carnegie Corporation in New York City of approximately $700,000 to be given in annual installments over a period of 10 years. Its purpose was the intensive scientific study of the problems of the production, distribution, and consumption of food from the wide national and international viewpoint.

Three new schools and three departments were added and the system of undergraduate instruction was organized. The school of biology was organized in 1922–23 from the departments of anatomy, bacteriology, and experimental pathology, biochemistry, botany, entomology, palæontology, psychology, physiology, and zoölogy, and the Food Research Institute and the Hopkins Marine Station were opened in the same year. The school of education was established in 1917 and the school of nursing in 1922. The department of mining and metallurgy was separated from the department of geology and mining, and the department of political science was established in 1918–19. The departments of Greek and Latin were combined in 1922 to form the department of classical literature.

Many buildings were erected during the period, including the Thomas Welton Stanford Art Gallery, the building on the site of the Hopkins Marine Station, and the Stanford Hospital, costing $500,000, in 1917; a laboratory building for aircraft investigation, and Roble Hall, a dormitory for women, in 1918; a library with capacity for about 700,000 volumes forming the central structure of a new quadrangle, in 1919; the stadium, in 1921; the Stanford Union and the basketball pavilion in 1922; and in 1923 a series of dining halls for Encina Hall, and two dormitories for men, Toyon Hall, and Branner Hall, which was erected by the board of athletic control from the earnings of the stadium. In 1919 the Stanford Home for Convalescent Children was installed in the old Stanford residence and an endowment of $100,000 was subscribed in memory of Mrs. Stanford. Through the gift of $40,000 from Mrs. Henry Crocker, another unit of 20 beds was opened in 1924. President, Ray Lyman Wilbur, M.D., Sc.D., LL.D., resigned in 1929 to become Secretary of the Interior in President Hoover's cabinet.

STANGE, shtäng'ē, CARL (1870–). A German Protestant theologian and author (see VOL. XXI). Among his later works are *Der Weg zu Gott* (1915); *Wunder- und Heiligengeschichten* (1917); *Die Religion als Erfahrung* (1919); *Luther und das Sittliche Ideal* (1919); *Zum Verständniss des Christentums* (1920); *Die Ethik Kants* (1920); *Hauptprobleme der Ethik* (1922); *Christliche und philosophische Weltan-*

schauung (1923); *Jesus der Heiland* (1924); *Die Unsterblichkeit der Seele* (1925); *Unser Glaube* (1926); and *Dogmatik* (1927).

STARLING, ERNEST HENRY (1866–1927). A British physiologist. He was born at Bombay, India, was sent to King's College School, London, and afterward studied at Guy's Hospital and in Heidelberg. His collaboration with Bayliss, the great English physiologist of the time, resulted in discoveries relating to the electrical phenomena of the heart, the action of the nerves on the heart, the regulation of the circulation, and the movements of the intestines. In the World War, Dr. Starling was chemical adviser of the Saloniki forces. His works include *Elements of Human Physiology* (8th ed., 1908); *The Fluids of the Body* (1909); *The Feeding of Nations* (1919); *The Action of Alcohol on Man* (1923); and *Principles of Human Physiology* (1925).

STARR, FREDERICK (1858–). An American anthropologist (see VOL. XXI). He retired from his University of Chicago professorship in 1923, as well as from his curatorship in the Walker Museum. He edited many scientific works and is the author of *Mexico and the United States* (1914); *Dictionary of the Choctaw Language* (1917); *An Early Account of the Choctaw Indian* (1918); *The First Man* (1919); *The Origin of Religion* (1919); *Korean Buddhism* (1919); *Fujiyama, the Sacred Mountain of Japan* (1924).

STARS. See ASTRONOMY.

STATE FINANCES. The financial condition of each State of the United States is detailed separately in the articles on the respective States. That of the State governments as a whole may be summarized in such a manner as to show the trend of State-government taxation, expenditure, and borrowing. The figures presented below, assembled by the Federal Department of Commerce, relate to State governments only and not to the public bodies governing subdivisions, such as counties, towns, cities, or tax-levying districts. The total expenditures of all the 48 States in the fiscal year 1927 (ending commonly June 30, but in many cases on other dates) were $1,726,989,016. They were more than three times as high as the corresponding total for the fiscal year 1917, which was $517,503,220.

A number of reasons coincided to occasion the increase in State expenditure that took place in the course of the 10 intervening years. Of these, the most obvious was the increase in population, which, although it could not be substantiated until the occasion of another Federal census, was estimated by the Census Bureau to have amounted to 17,840,000 persons, the estimated population of 1917 having been approximately 102,173,000 for the continental United States, and that of 1927, 120,013,000. The rise in the general price level, already in progress in 1917, had then hardly exerted its effect on the costs of governmental activities. As it did so later on, the expenditure upon salaries and wages, purchases, and public buildings and works increased, independent of any increase in the amounts of these things that the States required.

A third element in the causation of increasing State expenditure was the tendency to expand State functions and services. This was particularly noticeable in the matter of road building and in that of assistance to public-school education as conducted by State subdivisions. To some extent, a postponement of State public work in the period of economic unsettlement from 1914 to 1920 and a subsequent acceleration of such work, under the spur of need to make up for lost time, had a part in swelling State expenditures after 1917.

The group of expenditures classified as payments for maintenance and operation of State departments formed the chief part of State expenditure in 1927. It aggregated $1,120,004,895, and attained the rate of $9.55 per capita of the population. The corresponding rate for 1917 had been but $4.19. Thus, with allowance made for a greater population, this class of expenditure increased by 128 per cent. Only a minor part of this rise was attributable to the rise in the level of prices. These, indeed, were at approximately the same level in 1917 as in 1927, but the rise in public salaries after 1917 and, to some extent, the cost of State purchases ran behind the rise in the general price level. An important element in the higher figure for 1927 was the item of States' contributions to local public-school education. This item amounted to $292,148,156 in 1927, which was more than one-fourth of the departmental operating and maintenance expense.

The other chief groups of State expenditures in 1927 were: outlays for permanent improvements, $518,787,568; interest on debt, $78,721,778; and payments for maintenance and operation of public-service enterprises, $9,474,775. The greatest of these, the group of outlay for permanent improvements, was composed, to the extent of 77.9 per cent, of outlays for highway construction. The expansion of the activity of the State governments as builders and improvers of highways was the foremost of the numerous factors in the rise of State government expenditure. It was occasioned by the general spread of the use of motor vehicles and the consequent popular demand for improved highway facilities. Maintenance of highways formed another important element in the aggregate of expenditure.

Of the divisions of the total of expenditure for operation and maintenance of State departments, that of expenditure for education made up 39.9 per cent of the total; charities, hospitals, and corrections, 17.3 per cent; highways, 15.2 per cent; general government, 8.9 per cent; protection of person and property, 5.7 per cent; development and conservation of natural resources, 5.8 per cent; health and sanitation, 2.5 per cent; recreation, 0.4 per cent; and miscellaneous expenditures, including soldiers'-bonus payments in 14 States, 4.4 per cent.

The 48 States received in 1927 revenues to the total of $1,758,381,361. The total of their revenues thus exceeded the total of their expenditures of all sorts by $31,392,245; nevertheless, in a number of the States, the outlay for permanent improvements caused expenditure to exceed revenue. For the States as a whole, the aggregate revenue of 1927 exceeded by $550,179,913 the expenditures, exclusive of permanent-improvement outlay. With regard to the types of State revenue, the most noteworthy development in the period from 1917 to 1927 was the increase in the collections from licenses, which included not only corporation and business licenses but automobile licenses and the tax upon sales of gasoline. The receipts of the States from this group of taxes in 1927 were $679,324,123; of this amount, the receipts from automobile licenses supplied $248,846,402 and the gasoline-sale taxes furnished $165,543,999.

STATE FINANCES FOR 1916, 1922, AND 1927

From the U. S. Bureau of the Census

State	Year	Total Rcceipts	Total Expenditures	Net Debt	Per Capita
For all States	1916	$ 783,775,905	$ 780,550,560	$ 459,661,269	$ 4.59
	1922	1,159,445,130	1,280,237,898	879,075,619	8.12
	1927	1,758,381,361	1,726,989,016	1,444,927,194	12.32
Alabama	1916	11,229,066	11,028,578	13,563,937	5.91
	1922	15,382,249	16,773,944	14,494,198	6.05
	1927	21,999,125	29,944,408	41,554,136	16.34
Arizona	1916	3,715,998	3,475,417	844,158	3.36
	1922	9,427,044	8,206,435	(Sinking fund assets exceed funded and floating debt.)	
	1927	7,710,146	7,543,829	433,267	0.96
Arkansas	1916	4,857,418	4,919,167	1,238,879	0.72
	1922	7,499,970	6,968,667	2,530,062	1.41
	1927	20,311,611	20,694,152	3,017,087	1.58
California	1916	53,444,236	50,830,629	33,375,559	11.53
	1922	59,620,129	69,311,533	76,243,994	20.93
	1927	88,944,960	81,530,946	105,876,476	24.20
Colorado	1916	10,205,038	10,117,055	3,753,226	4.02
	1922	13,858,357	16,269,101	9,508,529	9.75
	1927	16,348,420	16,147,194	11,413,844	10.64
Connecticut	1916	13,340,761	12,257,454	13,064,100	10.72
	1922	21,815,841	20,050,565	6,045,358	4.21
	1927	32,658,116	29,889,918	3,078,148	1.90
Delaware	1916	1,440,533	1,362,769	796,194	3.76
	1922	4,854,791	5,683,129	5,798,370	25.39
	1927	7,786,110	7,152,796	8,878,372	36.84
Florida	1916	3,844,604	4,092,623	601,567	0.69
	1922	10,548,273	11,448,418	485,085	0.47
	1927	27,390,541	37,818,796	11,844,340 [a]	8.84 [b]
Georgia	1916	13,318,510	13,187,541	6,322,202	2.24
	1922	17,316,714	15,864,279	5,381,702	1.81
	1927	29,262,206	33,430,127	9,249,316	2.92
Idaho	1916	3,789,023	3,915,046	1,711,537	4.20
	1922	5,767,233	5,301,916	5,515,766	12.08
	1927	8,160,495	8,632,247	4,783,106	9.01
Illinois	1916	24,442,206	24,974,127	2,066,920	6.34
	1922	45,041,665	52,118,260	12,737,468	1.91
	1927	79,483,126	70,789,639	140,158,985	19.33
Indiana	1916	15,333,355	14,826,858	767,531	0.27
	1922	25,588,250	24,157,674	425,615	0.14
	1927	43,078,196	40,118,382	1,649,500	0.52
Iowa	1916	13,544,484	13,622,490	....	...
	1922	31,907,084	32,392,946	185,000	0.08
	1927	37,540,663	36,903,254	20,195,085	8.33
Kansas	1916	11,428,589	11,070,652	....	...
	1922	12,380,184	11,529,645	....	...
	1927	27,086,679	25,015,825	24,836,544	13.62
Kentucky	1916	14,047,997	13,827,737	2,607,021	1.10
	1922	17,916,665	12,887,368	2,447,309	1.01
	1927	30,719,702	29,732,590	2,503,153	0.99
Louisiana	1916	10,722,581	10,412,455	13,479,470	7.48
	1922	20,087,477	20,295,482	13,678,819	7.45
	1927	28,126,095	29,426,135	16,459,287	8.51
Maine	1916	9,016,596	8,666,050	2,637,591	3.44
	1922	13,076,072	15,696,788	12,653,743	16.36
	1927	17,419,442	20,109,606	21,567,699	27.27
Maryland	1916	15,025,146	15,519,078	16,575,297	12.29
	1922	18,463,312	17,912,835	21,928,588	14.76
	1927	24,439,916	24,803,869	23,872,776	14.99
Massachusetts	1916	54,966,665	51,739,460	86,042,691	23.52
	1922	51,339,317	42,967,490	75,968,247	19.12
	1927	60,146,822	49,574,577	22,103,085	5.21
Michigan	1916	36,875,278	33,839,333	6,914,614	2.28
	1922	61,738,256	92,538,443	49,205,551	12.80
	1927	77,455,784	78,021,199	74,909,093	16.86
Minnesota	1916	26,370,145	26,845,930	1,515,800	0.68
	1922	42,262,517	41,823,616	19,475,800	7.96
	1927	63,766,540	53,135,776	11,715,328	4.39
Mississippi	1916	6,013,694	6,414,751	5,126,542	2.67
	1922	11,150,513	14,057,383	12,342,561	6.89
	1927	16,394,641	18,581,584	17,142,853	9.57
Missouri	1916	11,803,505	12,694,102	7,032,839	2.07
	1922	26,870,572	42,232,270	30,307,839	8.83
	1927	42,771,958	46,791,418	69,958,464	19.93
Montana	1916	13,825,167	14,075,218	1,186,416	2.67
	1922	8,457,638	8,281,224	4,312,551	7.29
	1927	8,779,813	8,195,926	4,751,148	8.66
Nebraska	1916	8,277,261	7,818,660	....	...
	1922	14,944,186	12,667,948	....	...
	1927	17,286,726	20,221,243	2,921,532 [a]	2.10 [b]
Nevada	1916	1,923,377	1,813,909	680,000	6.62
	1922	3,237,516	3,208,969	1,602,000	20.70
	1927	4,062,117	3,830,599	1,650,376	21.32
New Hampshire	1916	3,783,135	3.977,575	1,951,137	4.43
	1922	6,537,382	5,196,100	3,017,809	6.77
	1927	7,783,195	7,808,235	1,817,720	4.00
New Jersey	1916	24,304,053	22,431,268	116,000	0.04
	1922	42,000,608	55,525,897	16,348,603	4.98
	1927	76,045,226	71,990,484	63,274,551	17.03
New Mexico	1916	5,364,934	4,602,492	2,561,565	6.47
	1922	5,954,809	6.554.988	4,560,668	12.37
	1927	6,998.951	8,146,096	3,321,279	8.52
New York	1916	114,702,602	121,864,197	148,740,465	14.81
	1922	134,681.260	141,871,167	186,515,461	17.52
	1927	215,473.758	205,364,331	244,294,698	21.50

(*Concluded on p. 1498.*)

STATE FINANCES FOR 1916, 1922, AND 1927 (*Concluded*)

State	Year	Total Receipts	Total Expenditures	Net Debt	Per Capita
North Carolina	1916	7,695,456	7,858,743	8,883,544	3.75
	1927	35,826,832	25,364,112	33,325,898	12.59
	1922	13,164,249	46,779,210	147,981,294	51.44
North Dakota	1916	10,479,612	9,558,727	511,160	0.70
	1922	8,751,592	11,894,102	5,614,230	8.49
	1927	19,428,280	19,087,801	4,519,097	7.05
Ohio	1916	23,709,230	25,214,972	5,341,429	1.04
	1922	53,688,447	67,681,926	29,583,581	4.96
	1927	53,627,085	53,842,162	19,127,835	2.87
Oklahoma	1916	25,479,809	24,255,894	6,446,890	2.99
	1922	14,973,656	15,095,030	3,526,121	1.68
	1927	31,676,172	28,138,755	3,074,803	1.30
Oregon	1916	6,686,579	6,408,308	....	...
	1922	19,447,935	28,563,652	38,927,223	48.12
	1927	22,954,701	22,069,594	36,155,029	40.76
Pennsylvania	1916	38,524,289	41,354,099	472,639	0.07
	1922	86,447,839	88,794,424	48,993,640	5.45
	1927	130,938,414	117,113,898	92,400,007	9.56
Rhode Island	1916	4,285,803	4,348,131	6,390,951	10.60
	1922	7,392,814	7,343,800	9,338,359	15.05
	1927	10,574,427	10,966,432	18,385,137	26.15
South Carolina	1916	5,230,863	5,118,178	5,386,729	3.35
	1922	8,398,811	7,039,493	5,225,476	3.03
	1927	17,464,224	23,036,358	29,566,742	16.03
South Dakota	1916	6,402,987	6,141,044	....	....
	1922	11,058,909	18,074,858	14,420,602	22.27
	1927	16,338,291	16,387,688	15,014,772	21.67
Tennessee	1916	18,663,932	18,804,555	15,863,535	6.98
	1922	15,464,758	15,130,292	17,553,509	7.41
	1927	26,534,880	27,940,223	17,222,176	6.96
Texas	1916	22,746,723	23,843,152	4,547,694	1.05
	1922	14,858,571	45,842,985	4,102,200	0.85
	1927	78,687,485	70,774,362	4,364,488	0.81
Utah	1916	6,532,583	7,105,334	2,691,206	6.35
	1922	8,531,166	8,933,404	9,020,000	19.26
	1927	11,062,291	10,435,867	6,594,750	12.73
Vermont	1916	5,530,106	5,456,425	611,400	1.68
	1922	5,053,236	5,627,900	2,111,532	5.99
	1927	7,209,368	7,052,796	1,693,532	4.81
Virginia	1916	14,316,915	13,852,503	23,772,497	10.98
	1922	26,501,327	25,132,233	21,205,303	8.96
	1927	38,995,736	37,285,251	26,637,392	10.52
Washington	1916	15,231,624	14,203,784	1,209,337	0.83
	1922	22,484,807	22,214,909	12,260,432	8.72
	1927	35,622,467	34,754,829	12,911,977	8.25
West Virginia	1916	11,239,593	10,530,537	....	....
	1922	12,347,621	11,968,895	24,180,665	15.97
	1927	20,758,241	27,427,233	51,536,254	30.62
Wisconsin	1916	18,031,202	18,250,397	2,151,000	0.86
	1922	37,554,933	34,802.118	2,163,700	0.80
	1927	46,427,823	44,849,937	1,663,700	0.57
Wyoming	1916	2,032,642	2,023,156	108,000	0.63
	1922	6,598,575	4,990,174	3,776,452	18.37
	1927	8,823,564	7,701,439	1,612,833	6.72

[a] Gross debt.
[b] Gross debt per capita.

General property taxation, although diminished or even extinguished in some of the States, contributed a large part of the receipts of the States as a whole; the total from this source in 1927 was $370,434,735. The property tax and the group known as special taxes furnished 38.3 per cent of the States' revenue in 1927. Their total was 121.4 per cent greater for 1926 than for 1917 and was 4.4 per cent greater in 1927 than in 1926; their per-capita ratio was $5.73 for 1927, as against $2.86 in 1917. Of the special taxes, the inheritance dues furnished the most important element, aggregating $105,947,031 for 1927; 45 States levied a tax of this description. Another important special tax, the income tax, levied in 12 States, yielded an aggregate of $54,959,392.

The total of the States' net indebtedness continued to increase in 1927, despite the fact that States' revenues on the whole tended slightly to exceed their expenditures. The net indebtedness, i.e., funded or fixed debt less sinking fund assets, attained for all the States at the end of the fiscal year 1927, $1,444,927,194; it was $459,661,269 in 1916. It averaged, for 1927, $12.32 per capita, as against $4.30, for 1917. The 1927 assessed valuation of the property in the 48 States reached the total of $146,432,287,461. The 1928 general property tax levies of the several States upon this total amounted to $366,789,406. All the States save three (Pennsylvania, North Carolina, and California) made such levies.

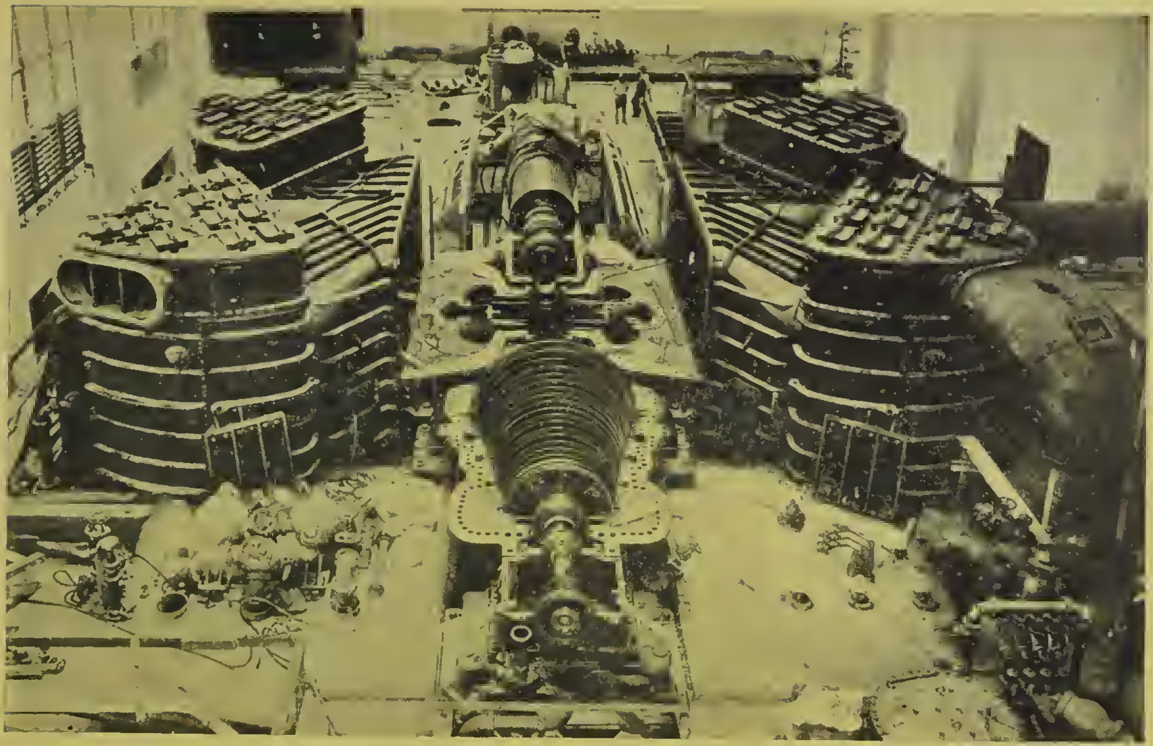
STATE SOVEREIGNTY. See LAW, PROGRESS OF THE, *Police Power.*

STEAM. See BOILERS.

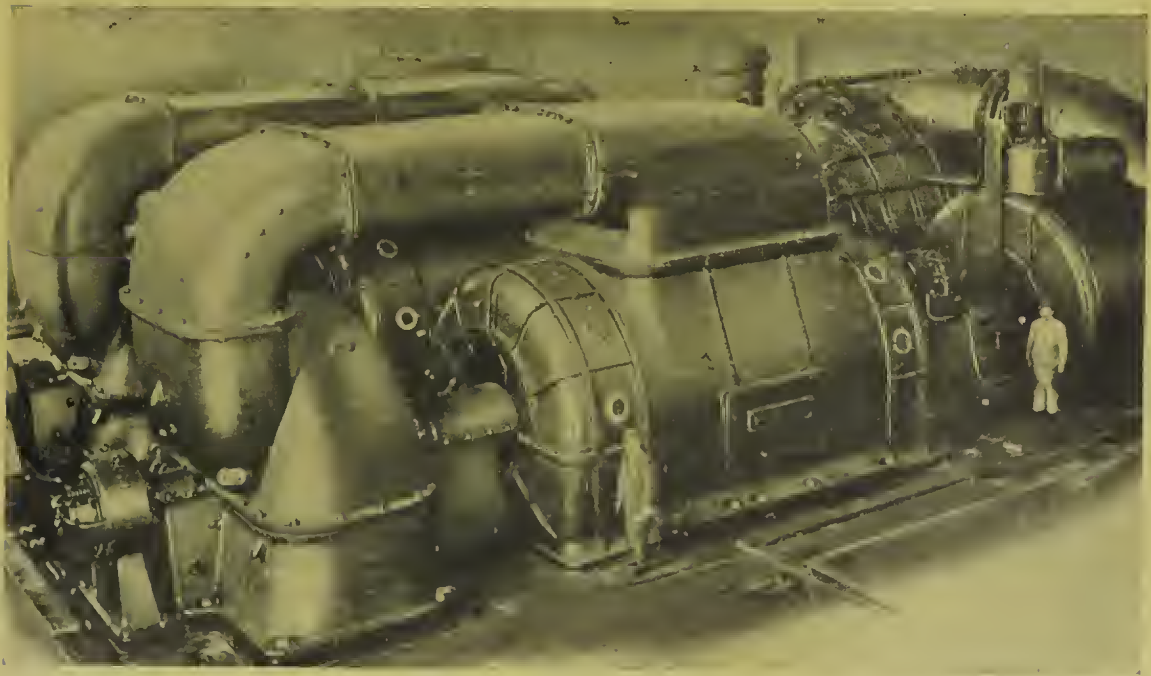
STEAM AUTOMOBILES. See MOTOR VEHICLES.

STEAM ENGINES AND STEAM TURBINES. For large power and central-stations work (except a number of small central stations and municipal plants that employ Diesel engines) the steam turbine has almost completely superseded the reciprocating steam engine. A few of the latter are occasionally installed in rolling mills and for driving large compressors, the maximum size of such engines being approximately 5000 horse power. Also, for installation in hotels, office buildings, and public buildings, reciprocating engines of the uniflow type, in sizes under 1000 horse power, continue to be used quite extensively. Industrial plants, on the other hand, seem to favor the turbine, because of its adaptability to operating at high back pressure, to bleeding steam for process, and to operation at mixed pressure.

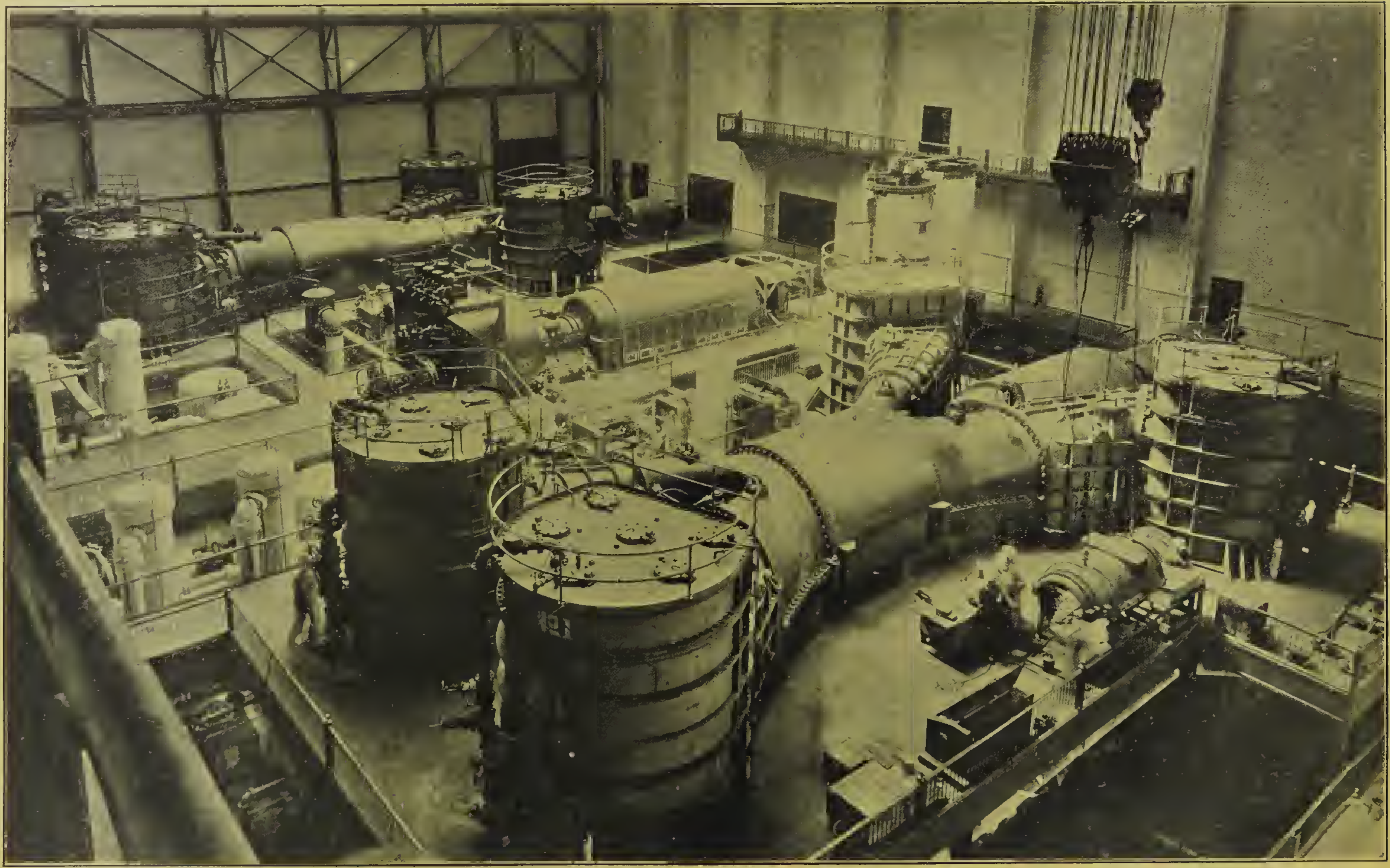
There are, of course, exceptions to the general practice in industrial plants and some engines



TURBINE-GENERATOR OF SOUTHERN CALIFORNIA EDISON COMPANY
TURBINE-GENERATOR SET OF 94,000 KILOWATTS CAPACITY BUILT BY GENERAL ELECTRIC CO. AND SHOWN PARTLY INSTALLED AT THE LONG BEACH STATION



THE 160,000-KILOWATT CROSS-COMPOUND TURBINE-GENERATOR PUT INTO SERVICE IN HELL GATE STATION OF UNITED ELECTRIC LIGHT & POWER CO., NEW YORK, LATE IN 1928



A 208,000-KILOWATT UNIT AT THE STATE-LINE GENERATING STATION NEAR CHICAGO

This unit consists of a high-pressure and two low-pressure elements, the latter served by eight vertical condensers. When placed in operation in 1929, it was the largest steam turbine in the world.

are being employed. One noticeable exception is the Philip Carey plant near Cincinnati which employs a steam pressure of 1800 pounds per square inch and which will have two engine-driven units of approximately 7000 horse power each. These engines are being built (Jan. 1, 1929) in Germany from American designs. These engines will exhaust steam to process at 60 pounds per square inch. Owing to the higher Rankine-cycle efficiency of the steam engine at these extremely high pressures, many engineers are of the opinion that the steam engine will be more extensively used in this range if more industrial plants go to such pressures.

The uniflow type of steam engine in its present form was perfected in Germany and introduced into the United States in 1914, although the uniflow principle dates back to an American engineer, by the name of Perkins, who lived in England and built engines of this type as early as 1825. The uniflow (meaning uni-directional flow) engine is distinguished by a cylinder with a central exhaust port and a long piston. Admission ports are in either end of the cylinder and the steam flow is toward the central exhaust port. Thus, the relatively cool exhaust steam does not sweep by the hot heads on the exhaust stroke and cylinder condensation is largely eliminated. This accounts for the high steam economy of this type of engine.

Steam turbine-generating units are now built in all sizes up to 208,000 kilowatts capacity. They include a 165,000-kw., cross-compound, three-cylinder machine at Philo, Ohio; a 165,000, cross-compound, two-cylinder turbine for Hell Gate Station in New York; a 160,000, cross-compound, two-cylinder unit for the same station; a 160,000 tandem-compound with double-flow low-pressure element for East River Station, New York; a 110,000-kw., two-cylinder, cross-compound at Hudson Avenue, Brooklyn, N. Y.; a 104,000-kw., three-cylinder, cross-compound at Crawford Avenue, Chicago; and a 94,000-kw. at Long Beach, Calif. The largest single-cylinder machine is a 75,000-kw., 1800-r.p.m. unit built for Cahokia, St. Louis, and the largest 25-cycle, single-cylinder machine has recently been placed in operation at the Charles R. Huntley Station, Buffalo. The 208,000-kw., three-cylinder machine for State Line Station, Chicago, is now in service. Ultimate plans call for five such units.

Worthy of special note is the 160,000-kw. tandem machine installed in 1928 at East River Station, New York City, inasmuch as the single generator has two separate windings in alternate slots, each having a capacity of 80,000 kw. These windings are not connected electrically, but tie in with adjacent bus sections. By this arrangement, half the load could be obtained from one of the windings should the other be out of commission. On the steam end, the high-pressure element has eighteen stages and the low-pressure six. The operating conditions are 375 pounds pressure, 700° F. total temperature, and three-point extraction.

From the foregoing, it would appear that the present limits are about 75,000 kilowatts for single-cylinder machines, 160,000 kilowatts for the tandem-compound, and 208,000 kilowatts for cross-compound units. None of the large turbines mentioned is intended to operate at more than 600 pounds, or 750° F. In the opinion of one builder, 700 pounds is the practical limit for single-cylinder units and for all pressures over this, multiple-cylinder units, with reheating, are recommended. Furthermore, 775° F. temperature seems about the limit so far sanctioned for large single-cylinder machines. Abroad, the 80,000-kw. is about the largest turbine unit employed.

The present accepted practice in central-station work is to bleed steam at several successive stages in the turbine to heat boiler feed water. Formerly, it was the practice to utilize exhaust steam from the turbines driving auxiliaries to heat feed water, but with the increased use of motor-driven auxiliaries, the other method was adopted. It is known as the regenerative cycle and results in increased plant efficiency.

Practically all central-station turbines are of the straight condensing type, with the exception of some of the 1200-lb. units that exhaust to the lower pressure turbines at around 375 pounds. On the other hand, industrial-plant turbines are of four types—(1) straight condensing turbines; (2) back-pressure turbines, which exhaust to process or heating systems; (3) mixed-pressure turbines, which receive live steam at boiler pressure and supplement this with steam from process at some lower pressure; and (4) bleeder turbines which operate under either condensing or back pressure and from which some steam at one or more intermediate pressures is bled for process.

Most steam turbines are of the axial-flow type. That is, the steam flows through successive stages parallel with the turbine shaft. A quite different type is the Ljungstrum, brought out some years ago in Sweden, which is of the radial-flow type. In this, the steam flows through successive stages from the centre to the periphery of the machine. Instead of alternate rows of moving and stationary blades, as in the axial-flow turbine, the alternate sets of blades in the Ljungstrum turbine revolve in opposite directions. This necessitates two shafts and double generators. Exceptionally high efficiencies are claimed for this turbine and a considerable number (mostly in smaller sizes, the largest being 17,000 kilowatts) are in successful operation in Europe. In 1929 none is in operation in the United States.

STEAMSHIP. See SHIPPING; SHIPBUILDING; etc.

STEBBINS, JOEL (1878–). An American astronomer, born at Omaha, Nebr. He studied at the University of Nebraska, and while holding a fellowship at Lick Observatory, received his Ph.D. from the University of California in 1903. He went to the University of Illinois as instructor in 1903 and became professor of astronomy and director of the observatory. In 1922 he accepted a similar position at the Washburn Observatory, University of Wisconsin. He made a specialty of stellar photometry. The American Academy of Arts and Sciences honored him with the Rumford medals in 1913 and he received the Draper Medal of the National Academy of Sciences in 1915. Dr. Stebbins served on the Lick Observatory eclipse expedition to Labrador in 1905 and also with the similar expedition to Wyoming in 1918.

STEELE, RUFUS (MILAS) (1877–). An American author, born at Hope, Ark., and educated at Pacific Methodist College, Santa Rosa, Calif. He edited various newspapers on the Pacific coast and was Sunday editor of the San Francisco *Call* and the San Francisco *Chronicle*. During the World War, he was appointed editor of the division of films of the United States Committee on Public Information (1918–19). He has written many motion-picture scenarios and has been associated in producing the pictures. He wrote *The City That Is* (1909); *The Fall of Ug—A Masque of Fear,* produced in the Bohemian Grove in California (1913); *Rule G* (1915); *Aces for Industry* (1919); *What's Right with the Movies?* (1925); *What's Right with Florida?* (1925).

STEELE, Wilbur Daniel (1886–). An American author, born at Greensboro, N. C., and educated at the University of Denver, the Museum of Fine Arts in Boston, and the Académie Julien in Paris. He published many short stories in magazines, and in 1914 *Storm* appeared, followed by *Land's End* in 1918. The O. Henry Award Committee awarded him the second prize in 1919 for *They Know Not What They Do,* and in 1921 he received a special award from the same committee for "maintaining highest level of merit for three years among American short-story writers." In 1925 he received the first award in the Harper short-story contest for the story, *When Hell Froze,* and in the following year the first prize from the O. Henry Award Committee for the story, *Bubbles.* He wrote *Meat,* a novel, (1928).

STEEL-MAITLAND, Rt. Hon. Sir Arthur Herbert Drummond Ramsay, First Baronet (1876–). An English government official, educated at Rugby and Balliol College, Oxford, and a fellow of All Souls College (1900). He was elected to Parliament as a Conservative in 1910 and became chairman of the Unionist Party (1911), Parliamentary Under-Secretary for the Colonies (1915–17), and from 1917 to 1919, Joint Parliamentary Under-Secretary of State for Foreign Affairs, and Parliamentary Secretary to the Board of Trade. He was made a baronet in 1917, a privy councilor in 1924, and was Minister of Labor (1924–29).

STEFANSSON, Vilhjalmur (1879–). A Canadian Arctic explorer (see Vol. XXI). In 1914 he made a 600-mile sled journey over broken and moving ice from Martin Point, Alaska, to Banks Island, and in 1915 discovered new land north of Prince Patrick Island. The next year, he discovered new islands west of Heiberg Island, and in 1917 found that the polar ocean is shallow in the region northwest of Cape Isachsen. In 1929 Stefansson delivered before the Lowell Institute of Boston a course of lectures on the Arctic regions. He wrote: *The Friendly Arctic* (1921); *Go North, Young Man* (1922); *The Northward Course of Empire* (1922); *Hunters of the Great North* (1922); *The Adventure of Wrangel Island* (1925); *The Standardization of Error* (1927).

STEIN, stīn, Sir (Mark) Aurel (1862–). A British Orientalist and archæologist (see Vol. XXI), officer on special duty at the Indian Archæological Survey, and a fellow of the British Academy. During 1913–16 he made geographical and archæological explorations in central Asia and western China, being awarded the gold medals of the French and Swedish Geographical Societies. In 1926–28 he worked in Baluchistan and Upper Swat, receiving the Petrie Medal (1928). His later publications were *The Thousand Buddhas* (1921); *Serindia* (1921), and *Memoir on Maps of Chinese Turkestan and Kansu* (1923). F. H. Andrews wrote and illustrated *Ancient Chinese Figured Silks,* excavated by Sir Aurel Stein in central Asia (1920); H. M. Boyer, E. J. Rapson, and E. Senart edited and transcribed and published, as *Kharosthi Inscriptions,* those discovered by Sir Aurel Stein in Chinese Turkestan (parts 1 and 2, 1920–27); and Sir George A. Grierson edited and translated, as *Hatim's Tales,* stories which had been recorded by Sir Aurel Stein (1923).

STEINACH, Eugen (1862–). An Austrian physiologist who became famous in connection with the possibility of rejuvenating elderly animals and men through grafting the sexual glands of young animals and latterly through simple division or ligation of the efferent duct. Born at Hohen Ems, Vorarlberg, Steinach was educated at the University of Vienna (M.D. 1886) and in 1895 was appointed professor of physiology in the German University of Prague. He fitted up a laboratory for the study of comparative physiology—the first of its type in the German-speaking countries. Building on a foundation laid by the labors of two French scientists, Ancel and Bouin, he performed many experiments on rats with extraordinary results. When made professor of physiology in Vienna, he was placed at the head of a special biological research institute and continued his labors. Steinach himself is not a surgeon, and gland operations on men were performed by Viennese surgeons who also reported the cases. Steinach's most important work is his small manual dealing with experiments on rats only, *Verjungung durch Experimentelle Neubelebung der Aelternden Pubertätsdrüsen* (1920). Books on Steinach's work have been written by several authors. See Secretions, Internal.

STEINER, shtīn′ēr, Edward Alfred (1866–). An American sociologist born in Czechoslovakia. He was educated in the public schools of Vienna and at Heidelberg University. He also took postgraduate courses at other German universities and at Oberlin College. In 1891, he was ordained to the Congregational ministry and was pastor of several churches in Ohio and Minnesota. In 1903 he became professor of applied Christianity at Grinnell College, Iowa. Professor Steiner wrote: *Tolstoy the Man* (1903); *On the Trail of the Immigrant* (1906); *Against the Current* (1910); *From Alien to Citizen* (1914); *Nationalizing America* (1916); *Old Trails and New Borders* (1921); *The Eternal Hunger* (1925).

STEINER, Rudolph (1861–1915). An Austro-German social philosopher, born at Krajevic, Jugoslavia. He was a commentator and editor of Goethe and an enthusiast for Hindu philosophy and mysticism. He became the German exponent of what is popularly known as theosophy but what he preferred to call anthroposophy. He founded several centres for the spread of this learning, of which the most important is the Goetheanum in South Germany, and a periodical, *Lucifer-Gnosis.* His followers were subject to mild persecution. After the World War, Steiner was one of the leaders of the democratic intellectuals. He preached international reconciliation and the renunciation on Germany's part of any attempt at world dominion. Steiner's works included: *Goethe als Vater einer Neuen Aesthetik* (1889); *Goethes Weltanschauung* (1897); *Haeckel und Seine Gegner* (1908); *Welt und Lebensanschauung der 19en Jahrunderts* (1900); *Theosophie* (1904); *Die Kernpunkte der Sozialen Frage in den Lebensnotwendigkeiten der Gegenwart und Zukunft* (1921); *Die Hetze gegen das Goethe-*

anum (1921). Other works in English translation are *Christianity as Mystical Fact and the Mysteries of Antiquity* (1914); *The East in the Light of the West* (1922). His last works are *Friedrich Nietzsche-ein Kämpfer gegen seine Zeit* (1926) and *Goethes Geistesart in ihrer Offenbarung durch seinen Faust und durch das Märchen von der Schlange und der Lilie* (1926). Two volumes of *Mystery Plays* were published in English (1920).

STEINMAN, David Barnard (1886–). An American civil engineer, born in New York City. He studied at the College of the City of New York and at Columbia University. During 1910–14, he was professor of civil engineering at the University of Idaho, then had charge of the department of civil and mechanical engineering at the College of the City of New York (1917–20). In 1921 he identified himself with consulting practice in New York City, and made a specialty of constructing bridges. Among his notable works are the continuous bridge of 1550 feet at Sciotoville, Ohio, the Hell Gate arch bridge over the East River, New York City, the suspension bridge at Florianopolis, Brazil, and the Carquinez Strait (cantilever) bridge in California. He was also the engineer in charge of the Detroit-Windsor suspension bridge. He was awarded the gold medal (1920) of the American Society of Civil Engineers. In addition to numerous articles contributed to the journals of his profession, he is the author of *Suspension Bridges and Cantilevers* (1911); *Theory of Arches and Suspension Bridges* (1914); *Plain and Reinforced Concrete Arches* (1915); *Design and Construction of Suspension Bridges* (1922).

STEINMETZ, Charles Proteus (1865–1923). An American electrical engineer (see Vol. XXI). Among his later publications were *America and the New Epoch* (1916); *Theory and Calculation of Electric Circuits* (1917); *Theory and Calculation of Electrical Apparatus* (1917). Consult *Charles Proteus Steinmetz* (1924) and *Magician of Science* (1926), by J. W. Hammond; and *Loki: The Life of Charles Proteus Steinmetz,* by Jonathan Norton Leonard (1929).

STEKEL, Wilhelm (1868–). An Austrian psychiatrist and psychoanalyst, one of the best known of Freud's disciples. Born at Bojan, Bukowina, he received his medical degree from the University of Vienna. Since 1908, he has shown intense literary activity and has subjected over 10,000 individuals to psychoanalysis. Of his numerous writings, the majority have been translated into English, although with more or less change in title. Most of the following are numbers in a series of volumes: *Nervöse Aengstzustände und ihre Behandlung* (1908); *Die Sprache der Träume* (1911); *Die Träume der Dichter* (1912); *Der Will zum Schlaf* (1915); *Onanie und Homosexualität* (1917); *Die Geschlechtskälte der Frau* (1920); *Die Impotenz des Mannes* (1920); *Psychosexuelle Infantilismus* (1922). These volumes are part of a great system which deals with all disorders of affective and impulsive life.

STELLAR EVOLUTION. See Astronomy; Physics.

STEPHENS, stē'venz, James (1882–). An Irish poet and novelist (see Vol. XXI). His later writings include: *The Rocky Road to Dublin* (1915); *Songs from the Clay* (1915); *Reincarnation* (1918); *Deirdre* (1923); *In the Land of Youth* (1924); *A Poetry Recital* (1925); *Collected Poems* (1926), and *Etched in Moonlight* (1928).

STEREOCHEMISTRY. See Chemistry.

STERN, stĕrn, L. William (1871–). A German psychologist (see Vol. XXI). His work after the World War was devoted chiefly to mental testing and to the psychology and philosophy of personality. Both of these interests, though largely ignored by the Wundtian psychology of an earlier generation, were quite popular in post-war Germany. Stern's works after 1914 include: *Vorgedanke zu Weltanschauung* (1915); *Die Psychologie und das Personalismus* (1917); *Grundgedanke der Personalistische Philosophie* (1918); *Die Intelligenz der Kinder und Jugendliche* (1920).

STERNE, Elaine (Mrs. George D. Carrington (1894–). An American photoplay writer, born in New York City, and educated at Columbia University. She wrote more than 60 photoplays, among them the Sunny Jim series and *The Gang.* Her photoplay, *The Sins of the Mothers,* brought her a prize of $1000 in 1914, and *Without Hope,* a second prize of $500. In the Collier short-story contest of 1914, she won a prize of $250. She is the author of: *Sunny Jim* (1916); *The Road of Ambition,* a novel (1917); and *Over the Seas for Uncle Sam* (1918).

STEVENS, Edward Fletcher (1860–). An American architect, born at Dunstable, Mass. He studied design at the Massachusetts Institute of Technology and in several offices in Boston and New York. After practicing in Rome for several years, he became a member of the firm of Stevens and Lee of Boston and Toronto. He planned over one hundred hospitals and institutions in various cities and designed also overseas hospitals during the World War. He was the author of *The American Hospital of the Twentieth Century* (rev. ed., 1921).

STEVENS, Gorham Phillips (1876–). An American architect, born on Staten Island. He studied architecture at the Massachusetts Institute of Technology and in Europe. After a year's service with McKim, Mead & White, he was Carnegie fellow in architecture at the American School of Classical Studies in Athens (1903–05). From 1912 to 1918, he was director of the School of Fine Arts at the American Academy in Rome and from 1918 to 1921, he was professor in charge. He was a member of many societies, and the author of *Life of Charles F. McKim,* and of contributions on Greek architecture to various scientific journals.

STEVENS INSTITUTE OF TECHNOLOGY. A nonsectarian institution for men at Castle Point, Hoboken, N. J., founded in 1870. The enrollment of the institute increased from 453 in 1915 to 614 in 1922 and dropped to 476 by 1928. Throughout this period, the members of the faculty increased from 37 to 51 and the library from 11,000 to about 19,000 volumes, all on technical subjects. A United States Steam Engineering School was established in 1918; the department of electrical engineering was moved in 1921 to the larger of two barracks buildings bought from the government, and the space so vacated in the main laboratory building was given to the department of physics; comprehensive examinations in elementary and advanced mathematics were made requirements for entrance for applicants offering certificate credits for admission. A gymnasium was built, and two acres adjoining the main building, bought in 1915, making in all about 22 acres of land including the original "Stevens Castle." A gift of $35,000 to found a chair of economics of engineering, in memory of former president Alexander C. Humphreys, was announced in 1928. Productive funds in that year amounted to $2,764,000. President, Harvey Nathaniel Davis.

STEVENSON, James, First Baron of Holmbury (1873–1926). A British industrialist and founder of the Stevenson rubber control plan. He was born at Kilmarnock, and educated at the academy there, became a traveling salesman, and then rose to be managing director of John Walker & Sons, Ltd., distillers at Kilmarnock. He became prominent during the World War, when he served in the Ministry of Munitions in various capacities. Subsequently he was a member of numerous government boards and committees. As chairman of the rubber investigation committee, he formulated the plan, in effect from 1922 to 1928, which limited the production of rubber and the amount exported from British centres of production, thus raising the price. In 1917 he was made a baronet, in 1922 a Knight Grand Cross of St. Michael and St. George, and in 1925 a baron. France made him a Commander of the Legion of Honor.

STEWART, Donald Ogden (1894–). An American humorist, born at Columbus, Ohio, and educated at Yale University. According to his own story, he was so well equipped for a business career that he turned to literature, and wrote: *Parody Outline of History; Perfect Behavior* (1922); *Aunt Polly's Story of Mankind* (1923); *Mr. and Mrs. Haddock Abroad* (1924); *The Crazy Fool* (1925); *Mr. and Mrs. Haddock in Paris, France* (1926); *Father Williams,* novel (1928). During the World War, he served as chief quartermaster in the United States Navy.

STEWART, Sir James Purves (1869–). A British physician and neurologist, born in Edinburgh and educated at the universities of Edinburgh and Jena. His *Treatises on Nervous Diseases* (6th ed., 1924) has been translated into French, Spanish, German, and Arabic. He also published (with Evans) *Nerve Injuries and Their Treatment* and in 1927 *Intracranial Tumors.* He was knighted in 1921.

STEWART, Julius L. (1855–1919). An American painter, born in Philadelphia. He studied under Gérome and Madrazo in Paris, where he lived the greater part of his life. He was known as a figure and genre painter, his style being decidedly French in finish, but his characterizations of American types were excellent, particularly his studies of members of the American colony in Paris.

STEYFFERT, Leopold Gould (1887–). An American portrait painter. He was born at California, Mo., and was a pupil of Chase, becoming an associate of the National Academy of Design in 1916. He received the Altman Prize of the National Academy in 1918, the Palmer Gold Medal in 1923, the Logan Medal in 1924, the Hearst Medal in 1924, the Stotesbury Prize of the Pennsylvania Academy of Fine Arts in 1926. In 1925 he became a member of the National Academy. See Painting, under *United States.*

STIDGER, William Leroy (1885–). An American clergyman and author, born at Moundsville, W. Va., and educated at Brown University and Boston University. He was ordained in the Methodist Episcopal ministry in 1914 and preached in San Francisco (1914–16) and in San José (1916–19). He served during the World War as a truck driver in France for the Y. M. C. A. He was pastor of St. Mark's Church, Detroit, 1920–25, and since 1925 has been pastor of Linwood Boulevard Church at Kansas City. His writings include: *Giant Hours with Poet Preachers* (1918); *Soldier Silhouettes* (1919); *Star Dust from the Dugouts* (1919); *Outdoor Men and Minds* (1920); *Standing Room Only* (1921); *Flash Lights of the Seven Seas* (1921); *Flames of Faith* (1922); *There are Sermons in Books* (1922); *Henry Ford, the Man and His Motives* (1923); *The Symphonic Sermon* (1923); *Finding God in Books* (1924); *Spiritual Messages from Fiction and Drama* (1927).

STILL, George Frederic (1868–). A British physician and pediatrist, born at Holloway, London, and educated in arts at Caius College, Cambridge, and in medicine at Guy's Hospital, London. He is professor of diseases of children at King's College, London, author of a textbook on this subject, and is widely known for his discovery of the malady known as "Still's disease."

STILLMAN, John Maxson (1850–1923). An American chemist, born in New York City. After graduating from the University of California, he studied at Strassburg and Würzburg, and later received his Ph.D. degree in California. He was instructor in chemistry at the University of California (1876–82) and a commercial chemist (1882–91). In 1891, he became a member of the first faculty of Stanford University, and in 1913 was made vice president, an appointment which he held until his retirement under the age limit as emeritus in 1917. His original investigations included researches in both organic chemistry and mineral chemistry, but his most important work was on the history of chemistry and included a life of *Paracelsus as Physician, Chemist, and Reformer* (1920), and a manuscript volume, *The Story of Early Chemistry* (1924).

STIMSON, Henry Lewis (1867–). An American lawyer, cabinet officer, and administrator (see Vol. XXI). During the World War, he served as lieutenant colonel of the 305th Field Artillery and as colonel of the 31st Field Artillery, part of the time in France. Later, he was made a brigadier general in the Officers' Reserve Corps. In 1927 he was sent to Nicaragua as the special representative of President Coolidge and formulated a plan for the pacification of the country which was agreed to by both major parties of Nicaragua and successfully carried out through a general election held under American supervision. In the winter of 1926–27, he had visited the Philippines at the request of his close friend, Governor General Wood, and had studied the situation there as an unofficial adviser to General Wood. With his comprehensive knowledge of the Philippines, he was chosen to succeed General Wood upon the latter's death in 1927. As Governor General, he approved the Belo measure, passed by the Philippine Legislature, which increased the departmental autonomy of Filipino administrators while strengthening the Governor General's inspection and advisory powers. The coöperation of the Legislature thus secured was further strengthened by his selection of a cabinet from the majority party of the Legislature and his appointment of a Council of State, composed of all members of the cabinet and other native leaders. His administration was marked by the virtual disappearance of the independence agitation and by the passage of measures by the Legislature encouraging the investment of American capital for the economic development of the islands.

In March, 1929, President Hoover appointed Colonel Stimson Secretary of State. In this capacity he supervised the navel disarmament negotiations with Great Britain and the other naval powers which continued throughout that year. In 1929 he received the honorary LL.D. degree from Yale and New York universities. He wrote *American Policy in Nicaragua* (1927).

STINNES, Hugo (1870–1924). A German industrialist and financier, born at Mülheim, Germany. At 19 years of age, he entered the mining company owned by his father in Westphalia, where he remained two years. He then organized his own company, called Hugo Stinnes, Ltd., the whole original share capital being 50,000 marks (about $12,000). His first important success was the creating of the German-Luxemburger Mining and Foundry Corporation —the first exemplification of his famous "vertical trust" building. The company owned its own coal, its own ore, and its foundries for the manufacture of its product through all its stages. He extended his holdings to ships and became the most important shipping man in Germany. He organized great companies for making iron and steel, he bought forests, chateaus, hotels, railroads. He owned the largest oil concession in the Argentine, the great electrical plants that are the power centre of Rhenish-Westphalian industry, lime kilns, tanneries, sugar refineries, moving-picture concerns, and vast lands in South America. When the World War came, Stinnes grasped the tremendous opportunity to add to his power. He was partially responsible for the ruthless industrial exploitation of occupied Belgium. He supplied war materials of all kinds. Then he began to make his influence felt in the political field. He was elected to the Reichstag in 1920, and about the same time bought many of the leading German newspapers, and large interests in paper-manufacturing establishments. In 1921 he was busy with a scheme for a supertrust that would control every industry in Germany and regulate production, transportation, and the supply of the German markets, as well as those of the whole world. His financial manœuvres were made possible only by the steady depreciation of the German currency, which he aided by preventing the stabilization of the German mark and repeatedly borrowing money only to pay it back in inflated paper. Many books were written about him, among them *Kurt Heinig's Stinnes und seine 600,000 Arbeiter* (1921); Johann Rump's *Der Kaufmann von Mühlheim*, a novel about his life, published anonymously (1922), and he is also included in Maximilian Harden's *Köpfe* (1910–1924).

STIRLING, Matthew Williams (1896–). An American anthropologist. He was born at Salinas, Calif., and graduated at the University of California (1920). In 1921 he was appointed assistant curator of the Bureau of Ethnology, National Museum, Washington, D. C. He studied Indian burial grounds in North Dakota and Indian mounds near St. Petersburg, Fla. He also explored archæological caves in Southern France and Northern Spain. He was in charge of an expedition to New Guinea for the study of pygmies in 1926. In the World War, he was an ensign in the U. S. Navy. He became chief of the Bureau of Ethnology in 1928.

STOCKER, Harry Emilius (1876–). An American clergyman and author, born at Nazareth, Pa., and educated at the Moravian College at Bethlehem, Pa. Ordained in the Moravian ministry in 1902, he held several pastorates, taught in the Moravian College in Bethlehem for a year, and then became pastor of the First Church in New York City in 1919. He has been a member of the administrative committee of the Federal Council of Churches and held offices in many Moravian church organizations. His writings include: *History of the White River Indian Mission in Indiana* (1917); *Moravian Customs and Other Matters of Interest* (1918); *History of the Moravian Church in New York City* (1922); *Home Mission History of the Moravian Church* (1923).

STOCKHOLM. The capital of Sweden. The population, according to the census of 1920, was 419,440; it was estimated to be 464,699 in 1928. The most characteristic feature of Stockholm's recent progress is the development of a distinctly national type of architecture. This type, combining rugged strength with modern engineering progress, is reflected especially in the public buildings: the City Hall, the City Law Courts, the magnificent Royal Technical College buildings, the Engelbrekt Church which dominates one of Stockholm's finest residential sections, the stadium erected for the Olympiad of 1912, and the Concert Hall which adheres to classical traditions. The City Hall, which was erected between 1911 and 1923 at a cost of $4,000,000, was dedicated on the 400th anniversary of the beginning of the reign of Gustavus Vasa, Sweden's first hereditary ruler. The hall is a vast rectangular structure built of native brick and crowned by a lofty square tower; beneath the cornice is a frieze ornamented with gilt reliefs of persons eminent in Swedish history. The hall incloses two courts: the larger (Citizens' Court) is open; the smaller (Blue Room) is covered and is used for official banquets and similar civic affairs. Since the city is constantly expanding on the mainland, it has been found necessary to erect two bridges across the North Stream at an estimated cost of 20,000,000 crowns ($5,300,000). One of these will carry street-car lines so as partly to eliminate traffic congestion in the older section of the city. Stockholm's unique out-door museum is located in Skansen, one of the city's large natural parks. Its old farmhouses, mediæval wooden churches, and other buildings depict much of Sweden's life in the past and the present. The idea of this museum was conceived about 50 years ago by the well-known art lover and antiquarian, Arthur Hazelius, who desired to preserve for posterity the customs of the Swedish people. Stockholm's harbor is the largest in Sweden for import trade. In 1928, 374 vessels of 402,324 gross tons were entered and cleared. The new Free Port, which is located a few miles from the town, has proved an important asset to Baltic shipping trade. The Stockholm aërodrome is located at Lindarängen.

STODDARD, (Theodore) Lothrop (1883–). An American author, born at Brookline, Mass., and educated at Harvard University. He was admitted to the bar in Massachusetts in 1908. His writings include: *The French Revolution in San Domingo* (1914); *Present-Day Europe—Its National States of Mind* (1917); *The Stakes of the War* (1918); *Harper's Pictorial Library of the World War*, vol. vi; *The*

World at War (1919); *The Rising Tide of Color Against White World-Supremacy* (1920); *The New World of Islam* (1921); *The Revolt against Civilization* (1922); *Racial Realities in Europe* (1924); *Social Classes in Post-War Europe* (1925); *Scientific Humanism* (1926); *Reforging America* (1927); *The Story of Youth* (1928).

STOESSEL, Albert Frederick (1894–). An American violinist and conductor, born at St. Louis, Mo. From 1910–1913, he studied the violin under W. Hess and E. Wirth at the Hochschule für Musik in Berlin, where he made his début in 1913. After the outbreak of the World War, he returned to the United States, making his American début with the St. Louis Symphony Orchestra (1915). In 1917 he enlisted in the U. S. Army and was appointed director of the School for Bandmasters. After his return in 1919, he became assistant conductor of the New York Oratorio Society, and in 1921 was elected regular conductor. In 1923 he was appointed head of the newly established Department of Music at New York University. In 1925 he was elected conductor of the Worcester Festival, and in 1928 also of the Westchester County Festival. His compositions include a string quintet; smaller pieces for violin and piano, and *Suite Antique,* for orchestra.

STOKES, Adrian (1887–1927). A British physician and pathologist, born in Lausanne, Switzerland. He received his medical degree from Dublin University in 1911 and carried on extensive researches in pathology there until the outbreak of the World War, when he joined the Royal Army Medical Corps. A discovery made by him that infectious jaundice is conveyed by rats gave him an international reputation. In 1922 he was appointed professor of pathology in the University of London. He had already visited Africa in 1920, as a member of the Rockefeller Commission, and in 1927 after an outbreak of yellow fever there, he was requested to rejoin the staff. He began experiments with chimpanzees in order to throw light on the mode of transmission and was making good headway when he himself was fatally stricken with the disease.

STOKES, Anson Phelps (1874–). An American educationist, born at New Brighton, Staten Island, N. Y. He was graduated from Yale in 1896 and from the Episcopal Theological Seminary in 1900. After spending several years in travel, he was appointed secretary of Yale University in 1899, where he remained until 1921. He was ordained in the Protestant Episcopal Church in 1900 and from that year to 1918 was assistant minister of St. Paul's Church, New Haven. He was appointed a canon of Washington Cathedral in 1924. From 1917 to 1919, he was chairman of the trustees of the American University Union in Europe, and was secretary and chairman of the educational commission of the Phelps Stokes Foundation. He organized the Army Educational Commission and was founder of the National Commission for Mental Hygiene. He was decorated by several foreign governments for his work. He is the author of: *Memorials of Eminent Yale Men; What Jesus Christ Thought of Himself; Historic Universities in a Democracy; A Visit to Yale in China; Yale and New Haven*

STONE. Subsequent to the World War, the production of stone in the United States has shown a steady expansion. The high rate of activity in the building trade and in railroad and highway construction and repair has had a direct influence on increasing the production of stone.

In 1927 about 136,345,260 short tons of stone, valued at $198,661,622, were produced in the United States. The 1927 output established a new record by a considerable margin as the previous record year had been in 1926, when 124,496,360 short tons valued at $188,308,590 were produced. The distribution of the various kinds of stone produced in 1927, as regards quantity and value, is shown in the accompanying tabulation. Crushed stone, which represents the greater part of the output, is used largely as railway ballast, road "metal," and for concrete. Building stone includes granite, sandstone, and marble. During recent years, there has been a tendency to use flagstone more and more for decorative purposes.

Though the consumption of stone has shown a healthy growth in recent years, competition has increased and there has been a tendency toward lower prices. Many of the larger stone producers are meeting this condition by increasing the economy and efficiency of their productive operations. Pennsylvania is the leading State from the standpoint of stone production. Other important producing States are Ohio, Michigan, New York, and California.

STONE SOLD IN THE UNITED STATES IN 1927
(From *Rock Products*)

	Short Tons	Value
Crushed stone	94,948,770	$97,474,267
Building stone	2,485,120	40,595,127
Monumental stone	358,130	14,993,091
Paving blocks	366,740	3,583,400
Curbing	378,230	4,939,716
Flagging	55,160	573,736
Rubble	809,020	988,108
Rip rap	4,618,500	4,716,731
Flux stone	21,660,070	15,985,525
Refractory stone	1,362,920	1,710,708
Agric. limestone	2,206,470	3,360,704
Manufacturing industries	5,352,130	4,735,114
Other uses	1,738,000	4,995,395
Total	136,345,260	$198,661,622

STONE, Harlan Fiske (1872–). An American jurist (see Vol. XXI). From 1910 to 1924, he was dean of the school of law at Columbia University. He was a member of the Legislative Drafting Research Fund and frequently acted as adviser before legislative committees in both the State and National governments. Amherst College conferred a degree (LL.D.) upon him in 1913. He was appointed, by President Coolidge, in March, 1924, Attorney General of the United States to succeed H. M. Daugherty and was made associate justice of the Supreme Court of the United States again by President Coolidge's appointment, in 1925.

STONE AGE. See Anthropology.

STORAGE BATTERIES. See Motor Vehicles.

STORRS, Lucius Seymour (1869–). An American railway official, born at Buffalo, N. Y., and educated at the University of Nebraska. After holding various important positions with several railway organizations, he became the vice president of the New York, New Haven & Hartford Railroad in 1914. He was president of the American Electric Railway Association in 1917 and managing director since 1925.

STOVALL, Pleasant Alexander (1857–). An American diplomat, born at Augusta, Ga., and educated at the University of Georgia. He edited the Athens *Georgian,* Augusta *Chron-*

icle, and Savannah *Press*, and became the owner of the last-named. He was elected to the Georgia House of Representatives in 1902 and again in 1912–13. He was United States minister to Switzerland, 1913–20. In 1891 he wrote a *Life of Robert Toombs*.

STRACHEY, strā′chĭ, (GILES) LYTTON (1880–). A British biographer. He was educated at Trinity College, Cambridge, and became a critic whose special field was French literature. He published *Landmarks in French Literature* (1912). Then he became interested in real instead of fictitious characters, first in Voltaire and other Frenchmen, and then in the characters of the Victorian era in England. In *Eminent Victorians* (1918), he developed a new and fresh manner of treating the lives of the eminent dead, which was continued with more assurance in *Queen Victoria* (1921). His later works are *Books and Characters, French and English* (1922); *Pope*, the Leslie Stephen lecture at Cambridge (1925); and *Elizabeth and Essex* (1928), another brilliant account of an English queen and her circle.

STRACHEY, JOHN ST. LOE (1860–1927). A British journalist (see VOL. XXI). In December, 1925, he retired from his editorship of the *Spectator* because of ill health, but continued to be an intermittent contributor. He was a frequent visitor to Canada and the United States, and received an honorary Litt.D. from Columbia in 1925. His later publications include *The Adventure of Living* (1922); *Economies of the Hour* (1923); *The Referendum* (1923); *The River of Life* (1924); *The Madonna of the Barricades* (1925); and *American Soundings* (1926).

STRAITS SETTLEMENTS. A British colony comprising the island of Singapore, the island of Penang (with the land settlements of Province Wellesley), and Malacca, on the western coast of the Malay Peninsula. Total area, 1600 square miles; total population in 1911, 714,069. In 1921 the population was 883,769, divided as follows: Singapore, 425,912; Penang, 304,835; Malacca, 153,522. Males numbered 557,838; females, 324,101. In 1918 there were in the Settlements 274,574 Malays, 432,764 Chinese, and 94,213 British Indians. Immigrants in 1927 were 359,262 Chinese and 156,132 Indians. The population in 1927 was estimated at 1,059,968, including 10,305 Europeans and Americans.

Industry and Trade. The increasing attention which the natives gave to rubber cultivation to the exclusion of food crops, particularly rice, led to the dependence on imports for consumption needs. Difficulties ensued when the United States restricted its importation of rubber in 1918 and when neighboring countries, because of crop shortages, failed to send sufficient quantities of rice. Other industries declining in the face of the growing rubber culture were coconut, clove, nutmeg, and gambier. The leading activity continues to be commerce, for the Settlements are one of the most important transshipment and trading points in the world. Imports and exports for typical years, inclusive of treasure and trade with Federated Malay States, were: for 1913, £55,936,472 and £45,375,132; for 1920, £148,187,421 and £119,471,984; for 1921, £68,126,020 and £58,025,105; for 1927, £146,512,588 and £126,880,783. Fifty per cent of the total trade came from or went to the British Empire. Principal imports in 1927 were rice and other grains, tin ore, cotton goods, tobacco, cigars and cigarettes, fish, sugar, petroleum, and coal. Principal exports were rubber and gums, tin, copra, spices and pepper, tapioca, pineapples, and rattans. In 1913 shipping entered and cleared, exclusive of native craft, was 27,125,000 tons, of which 15,251,000 were British. In 1927, 39,693,766 tons entered and cleared the ports of the territory. In 1923 a causeway was completed across the Johore Straits to connect Singapore with the mainland. This made through train service between Bangkok, Siam, and Singapore possible.

The port of Singapore has been constantly increasing in importance in recent years. In 1923 entrances and clearances amounted to 12,479 vessels of 20,512,572 tons, an amount which in 1928 had increased to 19,410 vessels of 29,389,813 tons. The commerce of 1928 consisted of 19,410 merchant vessels of 29,389,813 tons; 42,303 native craft of 1,676,989 tons; and 124 men-of-war, etc., of 426,252 tons. Great Britain naturally ranked first in merchant tonnage with 12,286,244 tons, followed by the Netherlands with 6,435,707 tons, and Japan with 3,841,421 tons. New deep-water wharves were being planned as it was believed that Singapore would soon occupy an important position among the world's greatest shipping ports.

Government finances showed increases over the period. Revenues for 1913 and 1927 were £1,446,403 and £4,386,909; expenditures, £1,221,338 and £4,579,548. The budget for 1928 called for revenues of 32,916,545 Straits dollars and expenditures of 38,950,949 Straits dollars. The debt totaled, on Dec. 31, 1927, £25,653,975. An important source of revenue is the government monopoly of opium. The governor of the Settlements is also high commissioner for the Federated Malay States, as well as for Brunei, and is the British agent for North Borneo and Sarawak. See FEDERATED MALAY STATES.

British North Borneo. A British protectorate on the island of Borneo under the jurisdiction of the British North Borneo Company and for which the Governor of the Straits Settlements acts as British agent, as he does also for Sarawak. Area, 31,106 square miles; population (1921), 257,804, mainly Mohammedan settlers and native aborigines. Europeans numbered 533; Chinese, 37,856. Revenues for 1913 were £210,197 and for 1927, £454,588; expenditures for the same years were £259,494 and £256,440. Imports for the years 1913, 1920, and 1927 were £634,538, £1,284,438, and £1,224,705. Exports for the same years were £863,115, £1,405,771, and £1,978,596. Rubber, tobacco, and timber, shipped to Singapore and Hongkong, are the most important exports. Opium, an official monopoly, is one of the leading sources of revenue. There is no public debt.

Brunei, brōō-nī′. A British protectorate southwest of British North Borneo. It has close commercial relations with the Straits Settlements but is administered by a British resident acting for the Sultan Ahmed Tajudin Akhazul Khairi Wad-din, a minor who succeeded to the throne in 1924. Area, 2500 square miles; population (1921), 25,454, of whom 35 were Europeans and 1434 Chinese. Exports are cutch (mangrove extract), coal, rubber, and sago. Oil was discovered, but not in paying quantities. There is a wireless station at Brunei, the chief town.

Sarawak, sä-rä′wäk. A British protectorate southwest of Brunei. The Governor of the Straits Settlements serves as British agent. Area, 42,000 square miles; population (estimated), 600,000. Imports in 1927, £25,664,546 Straits dollars; exports, 49,786,143 Straits dollars. Chief exports are sago, pepper, rubber, liquid fuel, and gold. Trade is with Singapore. Revenues in 1927 were 6,243,065 Straits dollars (from customs, opium, gambling, arrack, and pawn-farm taxes); expenditures, 5,764,318 Straits dollars.

STRASSBURG, shträs′bo͞ork. An important commercial centre of France and former capital of the Province of Alsace, now chief town of the Department of the Bas-Rhin, and 502 kilometers (311.9 miles) from Paris. See ALSACE LORRAINE. The population, according to the census of 1926, was 174,492. The port of Strassburg has been autonomous since 1924, when the French National Assembly approved the bill granting this privilege and the execution of important constructional works. These comprised the construction of a canal 90 meters broad parallel to the Rhine River and connected with the existing installation, a petroleum dock or basin communicating directly with the Rhine, six inner docks along the canal frontage, and extensive railway connections. The estimated cost was nearly 250,000,000 francs. Before the War, the Swiss had built an inland port at Basel in anticipation of the improvement, below that town, of the channel of the Rhine, which is normally navigable only during the summer season by barges of small draught. Swiss and German opinion favored the improvement of the river either by regulation and deepening or by canalization. The French, however, pressed strongly for the construction of a lateral canal and by Clause 358 of the Treaty of Versailles were authorized to build such a canal alongside the Rhine between Basel and Strassburg and to draw water from the river for the production of electric power. The French claim was upheld by the Central Commission of the Rhine appointed in 1925, which approved the construction of the canal with the understanding that it must be as navigable and as free as the river itself. In 1927, the first section of the canal, that between Basel and Kembs, was begun by France and was expected to be completed in 1932. The canal and its locks will accommodate Rhine barges of more than 1200 tons. Vessels using the port of Strassburg in 1926 included more than 3000 barges with a capacity of more than 750 tons and nearly 250 tugs of from 500 to 2000 horse power. The traffic of the port totaled 3,200,000 metric tons, the principal commodities being coal, grain, potash, ores, and oil. Imports accounted for almost two-thirds of the tonnage.

In 1926 the restoration of the famous steeple of the Cathedral of Strassburg which had been in process for nearly 20 years, was successfully completed. The wooden piles upon which the steeple rested for nearly six centuries have been supplanted by a foundation of reënforced concrete. The municipality contributed approximately 1,700,000 francs to the fund, and after the city became French again, the Government of France gave 2,000,000 francs to carry on the work. The city's Historical Museum is housed in the Grande Boucherie, its collection including documents and objects relating to the history of Strassburg from the Middle Ages to the entry of the French troops in November, 1918. The Imperial Palace in the German-built quarter is destined to be converted into a museum, and the former Hall of the Provincial Diet is occupied by the conservatory of music.

STRATEGY AND TACTICS, MILITARY. Military strategy is the science and art of projecting and directing important military movements and operations with the object of securing advantageous positions of supply, attack, defense, or retreat, and deals in general with large forces not engaged in battle. Military tactics is the science and art of leading and manœuvring troops on the battlefield or its immediate vicinity. The goal of both is the same, the defeat of the enemy by the delivery of the most powerful blow possible at his weakest point, or, when acting on the defense, to prevent or successfully resist such an attempt by the enemy.

Changes in Tactics Developed in the War. The basic principles of strategy were little affected by the test of the World War. Although on a far greater scale than ever before, the mobilization of the armies and their movements into position for attack or defense did not differ essentially from the methods that had been employed in previous wars. The tactics employed, however, underwent some modification, owing to the increase in fire power of weapons in use at the outbreak of the War, and the introduction of new weapons and other novel war material.

In early days, before the invention of firearms, shock action was almost entirely depended upon for the decision, which required tactics utilizing the troops in masses or columns. The introduction of firearms and their gradual improvement resulted in fire power and movement becoming the predominant factors, and brought about deployment of troops on a wide front in order to secure them. Experience teaches that under present conditions neither shock action nor fire power alone can win, the two must be used in combination, and modern tactics endeavor to provide means whereby fire power may be utilized to open the way for shock action to strike the decisive blow. This blow should be directed at the enemy's weakest point, if it can be determined in the initial deployment, otherwise a mobile force must be held in readiness to launch an attack against the weak point when it is revealed.

During the first phase of the World War, before the lines became stabilized, the tactics used in combat were those which had been inculcated in peace-time training, the deployment of infantry being made with considerable strength in the skirmish line in order to secure fire superiority and the advance being made by successive rushes of assaulting units, the attack being supported by artillery fire. The increase in rapidity and precision of artillery fire and the effective use of machine guns caused a thinning of the assault line and the organization of the attacking force in greater depth, in order to minimize losses. This change in formation also gave greater power of manœuvre.

In defense the tactics were similarly modified. After the first phase, when the lines became stabilized on the Western front, both sides occupied nearly continuous front-line trenches extending from Switzerland to the Channel, strongly garrisoned, dependence being placed on the fire power of this line supported by an artillery barrage to repel the enemy's attack. The heavy losses and almost complete destruction of the front-line trenches due to the artillery preparatory fire of the attacking troops led to the adoption of a modified organization of the terrain whereby the front line was held weakly by outposts with a main line of resistance at the rear so located that the attacking forces would be more or less disrupted when it was reached and would be beyond effective support by their artillery and consequently more easily repulsed by counterattack.

Therefore, organization in depth was adopted for defense as well as for offense. The conditions which brought about these changes were those due to the introduction of new weapons and devices and a supply of ammunition in greater quantity than ever before.

Airplanes and tanks and the utilization of gas were the major influences, to which should be added improved machine guns, automatic rifles, light mortars and the 37-millimeter gun as integral parts of the fighting equipment of the infantry.

Airplanes. At the beginning of the War, airplanes were few in number and were used practically entirely for reconnaissance. Very rapidly, however, their use was extended to include observation and direction of artillery fire, location of front-line units, photographing the enemy positions and transmitting orders and, in certain cases, the carrying of supplies to isolated units. Then machine guns were mounted on them and combat planes were developed which fought aërial battles to decide the supremacy of the air and deny to the enemy the aërial observation which had become so important. It was also found that bombs could be dropped from them and that by such means strategic points in the enemy's rear could be effectively attacked. As these various uses developed to a greater and greater extent, it was even found practicable to attack the enemy troops on the battlefield with machine-gun fire and bombs. See Aëronautics.

The use of anti-aircraft guns and of machine guns to prevent observation and destroy the airplanes did not prove of great value. Very few airplanes were destroyed by such means, although well-directed fire forced the airplanes to heights where observation was imperfect, and it was found that the most effective way to keep the enemy airplanes in check was to fight them in the air by combat planes in superior force. The control of artillery fire by aërial observation was a tactical change of signal value.

Captive Balloons. These also were effectively used for observation and control of artillery fire, although, to avoid destruction by enemy artillery and airplanes, they had to be kept well in the rear. Under favorable weather conditions, however, observation was good and the advantages of a stationary position and direct wire communication were great.

Dirigibles. The great cost, long time of construction, large target offered, and special landing arrangements required prevented dirigibles from being successfully employed and having extended use during the War, even though they could carry large quantities of explosives and supplies. Their principal use and success was in naval warfare.

Tanks. Armored motor cars with machine guns mounted were developed before the War and under certain conditions were effective in reconnoissance and for courier service, but they could operate effectively only on roads in fair condition. The invention of the tank produced a machine that could operate across country, destroy wire entanglements, cross trenches, break down light walls and which, armed with one-pounders or machine guns, proved a very useful aid to the infantry in attack, heavy tanks usually preceding the infantry to open ways through obstacles and cover the infantry during the cleaning up of a captured position, light tanks usually accompanying the infantry to support them in their attack, and to destroy enemy machine-gun nests.

Gas. The introduction of gas also had an influence on tactics. The cloud attack in which gas was first used, and later the concentration of gas on certain areas by means of gas shells, assisted an attacking force by compelling the enemy to remain in shelters during the advance or fight when handicapped by wearing masks. Many kinds of gas were used during the War, from the early irritating and suffocating types, such as chlorine and phosgene, to lachrymal and blistering types, as benzyl bromide and mustard gas. The most effective were phosgene and mustard gas, although tear gas and other types were of value under certain conditions.

As a development from the introduction of gas came the use of smoke clouds to screen the advance of an attacking line or to cut off observation by the enemy. See Chemical Warfare.

Infantry Weapons. *The automatic rifle*, introduced during the War, provided means for maintaining the fire power of the thinner skirmish line and enabled concentrated fire to be delivered on appropriate targets. Its value in holding attacks, and in covering weak points in defensive positions, has been proved.

Machine Guns.—At the beginning of the War, machine guns had not been perfected, were comparatively few in number and the technique of their employment was in an experimental stage. At that time, the German army was greatly superior both in number of machine guns and in trained gunners. The improvements developed as the War progressed increased their reliability of functioning, and experience led to methods of use which rendered them tremendously effective both in offensive and defensive action, in the former case assisting the attacking skirmish line to achieve and maintain fire superiority, as well as at times supporting the advance by indirect barrage fire over the heads of the advancing troops, and in the latter case delaying and disrupting the attacking forces by concentrations from concealed positions and by flanking fire delivered along the belts of wire in front of strong points and centres of resistance. In open warfare, they proved most valuable in delaying rear-guard actions. In 1928 the number of machine guns in the machine-gun company of an infantry battalion was increased to 12. See Small Arms and Machine Guns.

Hand Grenades.—The position warfare, which lasted so long on the western front, called for weapons that could deliver high-angle fire in order to reach narrow trenches at short range. To fill this need, the hand grenade was developed, at first a crude can filled with explosive and fired by a time fuse. From this beginning came the offensive grenade, with a thin metal case whose fragments could not injure the thrower but which produced the desired effect on the enemy by the shock of the explosion; and the defensive grenade, thrown from a protected position, with a heavy metal case which, when the grenade burst, broke into fragments and added the effect of the flying pieces to the shock of the explosion. Later improvements resulted in grenades filled with various gases and chemicals for special uses. The invention of the method of discharging grenades by rifle fire from a cup placed on the muzzle of the rifle increased very greatly the range and accuracy of fire.

Trench Mortars and One-Pounder Guns.—Another weapon developed for high-angle fire was the trench mortar varying from the 3-inch light Stokes mortar capable for brief intervals of firing 40 or more 12-pound shells a minute up to 6-inch, 8-inch, and larger mortars firing heavier shells at a lesser rate of fire with greater range and more destructive effect. These mortars, especially the light ones, which could be fired from concealed positions close up to the skirmish line of an attacking force, proved very effective against machine-gun nests, and because of their high trajectory were useful in laying down fire on the reverse slope of a hill. The mortars and one-pounders were frequently used to support advancing infantry by direct overhead fire in much the same manner as machine guns.

The 37-mm. or one-pounder gun was introduced and also proved effective against machine-gun nests and, when supplied with special ammunition, was useful against light tanks.

Infantry Equipment.—In consequence of the successful development of the weapons above described, the equipment of a rifle squad in the United States Army in 1929 includes one automatic rifle and one grenade discharger. A howitzer company is assigned to each infantry regiment equipped with three light mortars and three 37-mm. guns.

Tactical Value of Tanks. The value of tanks as an auxiliary arm of the infantry was demonstrated during the War. In the organization of the United States Army in 1924, one light tank company was included as an integral part of an Infantry Division. In 1928 the company includes a headquarters platoon with nine tanks, and three platoons each with five tanks, 10 armed with 37-mm. guns and 14 with machine guns. Light tanks are transported on trucks as close as possible to the battle front.

Other Changes in Tactics. The changes in infantry tactics were accompanied by some changes in artillery tactics, indirect firing being developed to a high degree of perfection. The interdependence of the infantry and the artillery was emphasized and close liaison between the two arms was found most important. In order to conceal battery positions from aërial observation, effective methods of camouflage were developed. The rolling barrage to precede the leading infantry waves in an attack was perfected and was made possible by a supply of ammunition such as never had been available before.

In defensive positions, the importance of field guns which could be rapidly advanced to bring direct fire on tanks was recognized, as was the desirability of accompanying guns to advance with the infantry to assist in reducing enemy strong points too heavily fortified to be destroyed by the infantry weapons.

Cavalry tactics were hardly affected by the War, as the conditions of warfare after the Battle of the Marne did not permit the utilization of cavalry to any important degree. It seems apparent that the future use of cavalry will be in open warfare largely as a screen for the movements of the armies and for reconnoissance in conjunction with the air service. Cavalry papatrols can secure information by contact with enemy patrols and from captured prisoners which airplanes cannot obtain, while airplanes can quickly forward the information picked up by the cavalry as well as that which they obtain by direct observation and aërial photographs.

The tactical value of leadership and morale, of training and discipline, of accurate, well-aimed rifle and machine-gun fire, of team work by adjacent units and of effective and reliable intercommunication was impressively revealed in the War. See ARMIES AND ARMY ORGANIZATION; ARTILLERY; ORDNANCE; CHEMICAL WARFARE; WAR IN EUROPE; etc.

STRATIGRAPHIC GEOLOGY. See GEOLOGY.

STRATON, JOHN ROACH (1875–1929). An American clergyman, born at Evansville, Ind., and educated at Southern Baptist Theological Seminary at Louisville, Ky. After being ordained to the Baptist ministry in 1900, he held pastorates in Chicago and Baltimore, and in 1918 was called to Calvary Church in New York City. He engaged in numerous controversies over modernism in religion, vigorously upholding the fundamentalist view. His writings include: *The Menace of Immorality in Church and State* (1920); *The Heavenly Home* (1920); *The Gardens of Life* (1921); *Church vs. Stage* (1921); *Our Relapse Into Paganism* (1921); *Dance of Death* (1922); *The Old Gospel at the Heart of the Metropolis* (1925); *The Famous New York Fundamentalist-Modernist Debates* (1925); *The Fakes and Fancies of the Evolutionists* (1925); and *Fighting the Devil in Modern Babylon* (1929).

STRATTON, GEORGE MALCOLM (1865–). An American psychologist, born at Oakland, Calif., who was graduated at the University of California. He pursued graduate studies at Yale and Leipzig (Ph.D., 1896) and was assistant professor, associate professor, and director of the psychological laboratory at the University of California until 1904. For four years, he was professor of experimental psychology at Johns Hopkins, and since 1908 has held the chair of psychology at the University of California. In the World War, he served as head of the psychology section, Medical Research Laboratory of the Air Service at Mineola, L.I., with the rank of major. In 1908 he was president of the American Psychological Association. He was a member of the National Research Council (1921–24) and chairman of its Division of Anthropology and Psychology (1925–26). In 1928 he was elected a member of the National Academy of Sciences. He is advisory editor of the *Psychological Review* and the *American Journal of Psychology.* He wrote *Experimental Psychology and Its Bearing upon Culture* (1903); *Psychology of the Religious Life* (1911); *Theophrastus and the Greek Physiological Psychology before Aristotle* (1917); *Developing Mental Power* (1922); *Anger, Its Religious and Moral Significance* (1923), and contributions to journals upon perception of change, eye movements, the æsthetics of visual form, railway accidents and the color sense.

STRATTON, SAMUEL WESLEY (1861–). An American physicist and university president, born at Litchfield, Ill. He was graduated at the University of Illinois in 1884, where in 1886 he became instructor of mathematics and physics and in 1889 professor of physics and electrical engineering. He was later called to the University of Chicago where he was professor of physics from 1898 to 1901, when he organized the United States Bureau of Standards at Washington; he was director of the Bureau until 1923. In that year, he accepted the presidency of the Massachusetts Institute of Technology. He served during the Spanish-American War in the United States Navy with the rank of lieutenant. He was secretary of the committee for aëronautics and a member of the Executive Board of the National Research Council during the World War. The Elliott Cresson Medal of the Franklin Institute was conferred on him in 1912 and in 1917 he received the Public Welfare Medal of the National Academy of Sciences. Dr. Stratton became a member of the International Commission on Weights and Measures and in 1923 was a member of the United States Assay Commission.

STRAUSS, shtrous, RICHARD (1864–). A German composer (see VOL. XXI). During 1917–20 he was director of the Akademische Meisterschule für Komposition in Berlin. In 1919, without entirely severing his musical contacts with Berlin, he accepted the directorship of the Staatsoper in Vienna; but protracted absences on extended concert tours over all Europe, North America, and South America seriously interfered with his contractual duties and brought about general dissatisfaction. As a result, Strauss resigned in 1924 and did not conduct in Vienna again until 1926, when an agreement was reached that he was to direct only a limited number of performances as guest-conductor. After a triumphal tour of South America in 1920, he visited the United States the following year for the second time. With several of the great orchestras, he conducted his orchestral masterpieces, and with the assistance of other artists appeared as pianist in his own chamber music and songs. It is significant that, with the exception of the *Sinfonia domestica*, the programme offered only works written before 1900.

Although in recent years Strauss has been by no means inactive as a composer, he has produced nothing that reaches the level of his early masterpieces. Every work bears the impress of his powerful individuality, shows his marvelous mastery of all technical resources, but the irresistible melodious sweep, the flaming passion of the earlier works are missing. The case of Strauss stands absolutely without a parallel in the history of music in this respect, that a great career is cut short, not by death, but through lack of genuine inspiration. Even so, Strauss's place among the immortals is already assured. His great symphonic poems mark the culmination of programme music and have definitely decided in the affirmative the long debated question whether "programme music" can claim artistic equality with the older "absolute music." His achievements in the domain of the art song (*Kunstlied*) have secured for Strauss a place of honor among the immortal masters of song. Of his dramatic works, only one, *Der Rosenkavalier*, has maintained itself in the standard repertory.

The list of works given in the main article (VOL. XXI) is completed by the enumeration of the following: operas, *Ariadne auf Naxos* (2d version, Vienna, 1916; 3d version, Dresden, 1917), *Die Frau ohne Schatten* (Vienna, Oct. 10, 1919), *Intermezzo* (Dresden, Nov. 4, 1924), *Die ägyptische Helena* (Dresden, June 6, 1928; New York, Nov. 6, 1928); the ballets, *Schlagobers* (Vienna, 1924) and *Der silberne Schlüssel* (Pest, 1927); suite for orchestra, *Der Bürger als Edelmann; Parergon zur Sinfonia domestica*, a piano concerto for the one-armed pianist, Paul Wittgenstein; *Festhymnus; Hochzeitspräludium*, for the wedding of his son; *Drei Hymnen*, for solo voice and orchestra; *Die Tageszeiten*, for male chorus and orchestra, for the Schubert Centennial (Vienna, 1928). Two operas, *Feuersnot* and *Ariadne auf Naxos*, had their American premières in Philadelphia (Dec. 1, 1927, and Nov. 1, 1928, resp.). Consult H. T. Finck, *Richard Strauss: the Man and his Works* (Boston, 1917); R. Specht, *Richard Strauss und sein Werk* (2 vols., Leipzig, 1921); H. W. von Waltershausen, *Richard Strauss* (Munich, 1921); R. Muschler, *Richard Strauss* (Hildesheim, 1925).

STRAVINSKY, strȧ-vĭn′ski, IGOR (1882–). A Russian composer, one of the leaders of modernism (see VOL. XXI). In 1925 he visited the United States, appearing in performances of his own works as pianist and conductor, but failed to leave a lasting impression as his vogue apparently had declined. The three ballets, *L'Oiseau de Feu* (1910), *Petrushka* (1911), and *Sacre du Printemps* (1913), which created a sensation at the time and established the composer's place as the leader of the modernists, still remain his highest achievement. In these works, spectacular stage-effects and brilliant orchestration cleverly conceal from the average listener the appalling poverty of musical invention. The juxtaposition or superposition of individual tones, unrecognizable as melodic or harmonic combinations, seems to be determined by chance or caprice. As a matter of fact, these later works have been performed only by organizations devoted to the propagation of modernistic music. The compositions include *Renard*, a burlesque (1917); the ballets, *Les Noces* (1917), *Pulcinella* (1920), and *Apollo Musagetes* (1928); a one-act opera, *Mayra* (1921; which failed of success); *Concertino*, for string-quartet (1923); a piano concerto (1924); *Œdipus Rex*, a scenic oratorio (1927).

STREERUWITZ, ERNST (1874–). A Chancellor of Austria, born in Mies, now Czechoslovakia. He was trained for a military career but left the army and, after further study at the University of Vienna, entered business as a textile manufacturer. During the World War, he held administrative posts in Vienna and afterward became known as one of the leading industrialists of Austria. He was elected to Parliament as a Christian Socialist in 1923, and succeeded Monsignor Ignaz Seipel as Chancellor in May, 1929. He was forced to resign five months later (September 25) when the Austrian Fascists disapproved of his conciliatory policy toward the Socialistic government of Vienna.

STREET CLEANING. See ROADS AND PAVEMENTS.

STREET RAILWAYS. See MUNICIPAL OWNERSHIP; ELECTRIC RAILWAYS; RAPID TRANSIT.

STREETS. See ROADS AND PAVEMENTS.

STRESEMANN, GUSTAV (1878–1929). A German statesman, educated at the universities of Berlin and Leipzig. When he entered the Reichstag in 1907, he was general manager of an important union of manufacturers, and was identified with the great industrial leaders, such as Hugo Stinnes, who were the mainstay of the German People's Party. He was at one time chairman of the Foreign Relations Committee. In August, 1923, he was asked to form a ministry in which he was also Foreign Minister. During the time he was in office, the Bavarian revolt occurred, and there was much disorder throughout Germany. He announced that the distress of the German people might be alleviated by a cessation of resistance in the Ruhr and the return of the former Crown Prince. His views caused the downfall of his government in November, 1923, and Dr. Wilhelm Marx was asked to form a new cabinet. As Foreign Minister (1923–29) Dr. Stresemann reoriented Germany's foreign relations in a way that established his reputation as the country's leading post-war statesman. He effected the security pact with France, negotiated the Locarno Treaty, obtained the entry of Germany into the League of Nations on equal terms with the Allied nations, and in 1929 secured the promise of an early evacuation of Allied troops from the Rhine. He also played a leading part in the adoption of the Dawes Plan (1924), and in negotiations in 1929 for the substitution of the Young Plan for the Dawes Plan. In 1926 he was awarded the Nobel Peace Prize jointly with Aristide Briand. He died unexpectedly in Berlin Oct. 3, 1929, the morning after his intervention in the Reichstag had averted a Cabinet crisis over the unemployment-insurance law. See REPARATIONS; GERMANY, under *History*; LEAGUE OF NATIONS.

STREUVELS, STIJN (1872–). Pseudonym of Frank Lateur, a Flemish author, born in Heule, West Flanders. A baker at Avelghan until 1905, he wrote stories in the West Flanders dialect and is one of the most distinguished contemporary Low Dutch authors. His writings include: *Die Oogst* (1900); *Duimpjesbundel* (1902); *Openlucht* (1905); and *De Vlaschaard* (1908), translated into English as *The Path of Life* (1915); *Het glorierijke Licht* (1912); *De landsche woning in Vlaanderen*, a study of Flanders architecture (1913); and *In oorlogstijd, Augustus 1914–*, war narratives (1915).

STRIKES AND LOCKOUTS. A survey of labor disputes during the period since 1913 brings out two sharply contrasted periods: the war years, when efforts to promote patriotic coöperation between capital and labor reduced the number of strikes to a markedly low level; and the post-war period, when, with generally unsettled conditions and a diminshed effort for arbitration, the number of strikes and the number of persons affected rose quickly in many countries, to a hitherto unprecedented figure, only to fall off again after 1920. An interesting experiment during the period was the effort of the Australian states to prohibit strikes and lockouts, although the original act did not prove satisfactory and was replaced in 1918 by a new measure which made strikes illegal only in certain specified industries and public agencies and where walkouts occur within 14 days after notice of intention to strike. Another interesting movement was the step taken by employers in Germany and the Scandinavian countries to insure themselves against strikes, as an offset, they claimed, to the protection that the worker had in his strike benefits. See PICKETING; SABOTAGE; and INJUNCTION.

United States. As a result of the conservative character of American trade-unionism, the strike as an economic weapon played a comparatively minor rôle. While there were strikes, during the period, characterized by much bitterness and of a protracted character, it may be said generally that they were resorted to but slightly by American labor. The high-water mark was reached in 1917; since that year the recession has been steady and marked. The following table of indexes, based on 1916 as 100, compiled by the U. S. Bureau of Labor Statistics, shows the relative number of disputes from 1916 to 1927.

TABLE I

Year	Relative number of disputes	Year	Relative number of disputes
1916	100	1922	29
1917	117	1923	41
1918	88	1924	33
1919	96	1925	34
1920	90	1926	27
1921	63	1927	19
		1928	17

Table II shows the number of labor disputes by years and indicates whether or not the workers involved had trade-union affiliation.

TABLE II.—RELATION OF WORKERS TO LABOR UNIONS

Relation of workers to union	Number of disputes												
		1916	1917	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
Connected with unions	2,458	2,392	1,903	2,033	2,506	2,038	844	1,265	1,063	1,018	823	614	534
Not connected with unions	446	209	362	143	137	62	37	77	69	142	93	67	66
Organized after dispute began	71	55	26	30	8	5	5	18	14	16	19	16	4
Union and nonunion workers	....	....	....	....	....	....	12	29	31	38	15	5	4
Not reported	814	1,794	1,062	1,424	760	280	214	164	72	87	85	32	21
Total	3,789	4,450	3,353	3,630	3,411	2,385	1,112	1,553	1,249	1,301	1,035	734	629

What were the principal causes of dispute? For the period 1916–17, strikes and lockouts for wages only accounted for 27 per cent of the total; hours only accounted for 3 per cent; recognition of trade union only accounted for 16 per cent; wages and other causes accounted for 48 per cent; hours and other causes accounted for 11 per cent; recognition and other causes accounted for 23 per cent.

Table III shows the number of disputes for which the number of employees was reported. It is significant to note the decline after 1919 and the particularly small number of strikes in the year 1927, as compared with 1919.

TABLE III.—NUMBER OF DISPUTES FOR WHICH NUMBER OF EMPLOYEES IS REPORTED, AND TOTAL AND AVERAGE NUMBER INVOLVED

Year	Disputes in which number of employees is reported		
	Number of disputes	Number of employees	Average number of employees per dispute
1916	2,667	1,599,917	600
1917	2,325	1,227,254	528
1918	2,151	1,239,989	576
1919	2,665	4,160,348	1,561
1920	2,226	1,463,054	657
1921	1,785	1,099,247	616
1922	899	1,612,562	1,794
1923	1,199	756,584	631
1924	898	654,641	729
1925	1,012	428,416	423
1926	783	329,592	421
1927	734	349,434	476
1928	629	357,145	568

Table IV presents the results of the disputes ending in each year and Table V gives the duration of these disputes.

TABLE IV.—RESULTS OF DISPUTES ENDING IN EACH YEAR

Result	Number of disputes ending in—												
	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
In favor of employers	748	395	465	687	677	701	248	368	283	253	226	169	272
In favor of employees	749	631	627	627	472	256	259	403	354	349	288	235	197
Compromise	777	720	691	797	448	291	105	168	138	138	147	129	160
Employees returned pending arbitration	73	137	204	50	61	80	16	46	45	51	36	29	3
Jurisdictional and probes	....	....	....	....	....	....	...	....	...	...	...	...	14
Not reported	101	191	211	59	214	198	113	160	139	198	83	77	10[a]
Total	2,448	2,074	2,198	2,220	1,872	1,526	741	1,145	959	989	780	639	656

[a] Results of seven strikes undetermined.

TABLE V.—NUMBER OF DISPUTES FOR WHICH DURATION IS KNOWN, AND TOTAL AND AVERAGE DURATION

Year in which disputes ended	Number of disputes for which duration is reported	Total duration (days)	Average duration (days)
1916	2,116	49,680	23
1917	1,435	26,981	19
1918	1,709	29,895	17
1919	1,855	62,930	34
1920	1,321	51,893	39
1921	1,258	64,231	51
1922	580	21,436	37
1923	968	23,177	24
1924	957	28,588	30
1925	879	23,809	27
1926	738	18,805	25
1927	669	15,865	24
1928	656	17,997	27

An account of the more important strikes during the period under review follows. A strike marked by much violence occurred in 1913–14 among the Colorado coal miners, giving rise to several sanguinary conflicts and the burning of a tent colony in which 2 women and 11 children were suffocated. While the objects of this strike—better working conditions, 8-hour day, higher wages, and recognition of the union—were not gained after more than a year of struggle, a Federal investigation of the situation uncovered conditions at the mines which were obviously in need of remedy and the operators were threatened with Federal intervention if outbreaks continued to occur. In the same year, there were serious disorders in connection with a strike among the coal miners of West Virginia and the silk workers of Paterson. During the period immediately preceding the entrance of the United States into the War, strikes became numerous, partly because the workers sought to secure for themselves a share of the large war profits, in part because it seemed opportune to demand the betterment of conditions and, perhaps to some small extent, because of the activities of foreign agents. In 1916 four railroad brotherhoods and the railway representatives came to a deadlock. In the arbitrations that followed, President Wilson's plan, which was accepted by the men, was rejected by the railroads, this situation bringing about the passage of the Adamson Law, fixing the legal standard of a day's work at eight hours, and forcing the railroads to acceptance. During the War, in an organized effort to substitute mediation for the strike and lockout, thus obviating loss of time in that emergency, a Committee on Labor of the Advisory Commission of the Council of National Defense was formed in 1917, with Samuel Gompers, president of the American Federation of Labor, as chairman, and with subcommittees on various phases of the question, such as wages and hours, mediation and conciliation, welfare work, cost of living, and domestic economy. The Labor Adjustment Committee, consisting of three representatives each of the Government, employers, and employees, was created, and immediately made itself felt in preventing threatened strikes in the West coast shipyards and among the East coast longshoremen; it finally effected a settlement of the strike in the copper mines of the Southwest. In connection with the latter strike, a wholesale, unauthorized deportation of miners—some of them members of the I.W.W. (q.v.)—from Jerome and Bisbee, Ariz., caused a great stir. About this time, a general disorganization of the lumber industry in the Northwest, by strikes, gained for the workers the 8-hour day. An outbreak among machinists engaged on war work at Bridgeport was, in spite of concessions to the workers, finally quieted only by an ultimatum threatening blacklisting of the men from all war work. This period, which had been one of comparative quietude, was broken by the Armistice.

In 1919 in Seattle, 25,000 shipyard workers went out, bringing on a general strike in that city which affected about 60,000 workmen. It was unsuccessful. When the Boston policemen in that year went out on strike to secure recognition of their union, their posts were filled by other men. Another unsuccessful attempt to compel recognition of a union was that of the steel workers, about 300,000 of whom walked out in September, 1919. Judge Gary refused to confer with the union leaders on the grounds that they were not representative of a large number of the workers. Federal troops were finally called in before the men returned to work. In New York City in 1919, there were actors' and longshoremen's strikes, and a printers' lockout. In that year, a strike among bituminous coal miners, affecting about 425,000 men, was called off after two weeks, and the difficulties settled after six weeks upon the terms proposed by President Wilson. There were 125 unauthorized strikes in 1919, affecting 1,053,256 men. Of the 4,154,733 workers who were involved in all strike movements in that year (1919), not less than 400,000 were in the clothing trades, 178,000 in textile work in New Jersey and New England, 330,000 in shipyards, 430,000 in the building trades.

The year 1922 was marked by a serious strike, which tied up practically the entire coal industry. For the first time, anthracite and bituminous mines were simultaneously affected. The walkout, following attempts to reduce wages, began on March 31. The bituminous strike ended August 15; the anthracite miners did not return until the beginning of September (see COAL). In August, 610,000 men were out. There was an outbreak of violence at Herrin, Ill., following the shooting of two union pickets by armed guards; 19 nonunion miners were killed and 30 wounded by an armed mob. Both bituminous and anthracite strikes were terminated by an extension of previous contracts from Mar. 31, 1922, to a date in 1923, and by agreements for further conference.

As a result of this situation, and fulfilling one of the conditions on which the men went back to work, in September, 1922, Congress created the United States Coal Commission for the purpose of investigating all phases of the production, transportation, and distribution of coal, and relationships between operator and worker, with a view to recommending remedial legislation. This year was notable also for the nation-wide strike among railway shopmen, involving 400,000 men and seriously tying up the entire transportation system. A strike of 155,000 anthracite miners in Pennsylvania in 1923 lasted only 10 days, the workers gaining a 10 per cent increase of wages but being denied the check-off and the closed shop. The pressmen's strike in New York City, September 18–26 of that year, was significant from the point of view of union discipline: the local union having defied the main authority body, its charter was canceled and the international organization supplied pressmen to fill the strikers' places.

One of the most serious strikes in the labor annals of the United States started on Sept. 1, 1925, when 158,000 coal miners in the anthracite fields downed tools. The strike area covered 500 square miles lying in Pennsylvania and West Virginia and the strike shut down 828 mines and 272 colleries owned by 135 companies. As a result of the strike, the price of anthracite mounted from $14 to $30 a ton by Jan. 1, 1926. Not until Feb. 18, 1926, did a settlement come and then it ended in a compromise over the issues involved (recognition of the union, wage increases, a 5-day week, spread over the work period). In 1926 the important strikes were largely left-wing in character. The textile strike of Passaic in 1926 was lead by a Communist and involved 11,700 workers. After lasting for almost a year, the strike was settled with the withdrawal of the Communist organizer, Albert Weisbord, and with the organization of the strikers into a craft union under the jurisdiction of the American Federation of Labor. The workers, however, were compelled to accept the 10 per cent wage cut that had been one of the leading reasons for the calling of the strike. In New York City in the same year, the furriers and the cloak- and suit-makers struck as a result of a struggle between the lefts and the rights for the control of their unions. The lefts for the time being succeeded in capturing the furriers' union after a particularly bitter struggle and won their outstanding demand for the 5-day week; but in the cloak- and suitmakers' strike, which involved 40,000 persons and lasted for half a year, the lefts were defeated and the International Union succeeded in disbanding the joint board in control. The strike almost ended in the breakup of the union. The bitterest strike in recent American labor history ended in July, 1928, when the bituminous mine workers returned to the mines with all their demands lost and the union practically wrecked. The strike had started in April, 1927, to enforce the Jacksonville scale of wages which the operatives were seeking to abandon in the central competitive field because of overproduction and the ruinous competition of the nonunion mines of West Virginia. Some 200,000 men, on the call of the United Mine Workers, downed tools in the States of Illinois, Indiana, Iowa, and Ohio, and in western Pennsylvania. In the midsummer of 1927, the miners of Indiana, Illinois, and Iowa had returned to the mines on the basis of the Jacksonville scale, leaving the miners in Ohio and Pennsylvania to carry on their losing struggle. The strike was sanguinary and was characterized by a good deal of violence and bad blood. While the cause of the miners evoked much popular sympathy and even the United States Senate showed its approval of their position, it became evident as the year 1927 was drawing to a close that nothing could save the strikers. A minority group in the union tried to continue the strike, but to no avail. On July 18, 1928, the United Mine Workers gave its consent to the district unions to effect what agreements they could on the basis of the abandonment of the Jacksonville scale. In 1922 the United States Mine Workers had 500,000 members; it was computed that in 1928, at the end of the strike, only 100,000 members were left. How disastrously the strike had ended may be seen from the fact that the miners of Illinois were compelled to accept a wage scale of $6.10 (they had won the Jacksonville scale of $7.50 in 1927), the Pennsylvania miners had to accept a scale of $5, as did also the Ohio miners. The miners were completely under the thumbs of the operators with the spread of the open shop and the presence of a surplus of 100,000 miners in the industry.

On Apr. 16, 1928, the cotton textile operatives of New Bedford, Mass., called a general strike in reply to an announced wage reduction of 10 per cent. The workers refused to postpone their strike vote when the manufacturers promised to put off the wage cut and 25,000 operatives went out in 25 plants. Only one-third of the strikers were reported to be unionized. After a terrible struggle of 25 weeks, on October 6, the unions voted to return to the shops with a wage cut of 5 per cent but the promise of a 30 days' notice of future wage reductions.

In 1929 a series of strikes broke out in the textile-mill districts of Tennessee, North Carolina, and South Carolina as a result of the efforts of the A. F. of L. and Communist organizers to bring about better living conditions in the South's new industrial areas. Many of these strikes, particularly in Gastonia and Marion, N. C., were accompanied by bloodshed. The strikes were generally unsuccessful. Public opinion, however, was aroused against the cruel "sweating" of men and women in these new mill towns.

Canada. The labor history of Canada indicated a state of industrial peace very similar to that existing in the United States. For example, in 1927 the time lost in strikes and lockouts was less than in any year after 1915 and the number of employees involved was less than in any year since 1916. No single strike in 1927 involved more than 5000 employees nor did any strike lose more than 50,000 working days. In 1927 there were 79 strikes in progress in which 22,683 workers were involved and in which 165,288 days were lost. This state of affairs may be compared with the year 1919 (the stormiest since 1913), when 298 strikes involved 138,988 workers and in which the total number of days lost was 3,942,189. For 1913 the figures had been 113 strikes, 39,536 workers, and 1,287,678 days lost.

See GREAT BRITAIN and GERMANY, under *History*, for accounts of the great strikes in these countries during the post-war period. The English general strike as a result of the strike of the coal miners, is treated in detail.

STRONG, BENJAMIN (1872–1928). An American banker, who was born at Fishkill-on-Hudson, N. Y., and attended public schools at Montclair, N. J. After serving as a bank clerk in New York

City for several years, he was made secretary of the Atlantic and of the Metropolitan Trust companies. In 1904 he became secretary of the Banker's Trust Company, later, vice president, and in 1914, president. He was the first governor of the Federal Reserve Bank of New York, holding that office from November, 1914, to his death in 1928. As chairman of the open-market-investment committee, he was influential in formulating the Federal Reserve policy during the trying years of the World War and after. Federal Reserve loans that he had an important part in initiating helped greatly to stabilize financial conditions in Poland, Germany, England, Belgium, France, and Italy. He was made a member of the French Legion of Honor in 1919 and was awarded the highest rank in the Order of Polonia Restituta in 1927.

STRONG, William Walker (1883–). An American physicist, born at Good Hope, Pa. He studied at Dickinson College and at Johns Hopkins. He was a Carnegie assistant in physics at Johns Hopkins and during 1911–13, professor of electric theory at the University of Pittsburgh. In 1913 he became president of the Scientific Instrument and Electric Machine Company. During the World War, he developed a gas mask, and in 1921, discovered the effect of magnetic psychoanalysis. In addition to many papers contributed to scientific journals, he wrote *The Absorption Spectra of Solutions* (2 vols., 1910–1911); *The New Science of Fundamental Physics* (1918); *The New Philosophy of Modern Science* (1920); and *Immortality in the Light of Modern Thought* (1923).

STRUCTURAL GEOLOGY. See Geology.

STRUCTURALISM. See Consciousness and the Unconscious.

STRUMPELL, shtrum'pel, Adolf (1853–1925). A German physician, who specialized in internal medicine and neurology. In 1883 he wrote the first edition of a textbook on general medicine, *Lehrbuch d. spez. Pathologie und Therapie,* which up to 1926 had passed through not less than 25 German editions and had been translated into French, English, Russian, and Turkish. He also published, not long before his death, *Leitfaden für die Untersuchung und Diagnostik der wichtigsten Nervenkrankheiten* (1924); and an autobiographical work, *Aus dem Leben eines Deutschen Kliniker* (1925).

STRZYGOWSKI, Josef (1862–). An Austrian art historian, who was educated at the universities of Vienna, Berlin, and Munich. He was director of the first Art Historical Institute at the University of Vienna and was an honorary member of the British Society for the Promotion of Hellenic Studies and of the Royal Institute of British Architects. His works include *Orient oder Rom* (1901); *Altai-iran* (1917); *Die Baukunst die Armenier und Europa* (1920); *Krisis d. Geisteswissenschafter* (1923); *D. Norden i. d. Bildenden Kunst Westeuropas* (1926); *Forschung und Erziehung* (1928); *Die Altslavische Kunst* (1928). Also the English works, *Origin of Christian Church Art* (1923); *Early Church Art in Northern Europe* (1927).

STUART-JONES, Henry (1867–). A British classicist (see Vol. XXI). He was a member of the Council of the British Academy (1918–21) and of the Hebdomadal Council at Oxford (1920–27). From 1920 to 1927, he was a fellow of Brasenose College and Camden professor of ancient history at Oxford. Since 1927 he has been principal of the University College of Wales at Aberystwyth. His later works include *Fresh Light on Roman Bureaucracy* (1920); chapters in *The Legacy of Rome* (1923); and the *Cambridge Ancient History.*

STUCK, Franz von (1863–1928). A German painter (see Vol. XXI), who was born in Munich, and studied at the Academy there. His allegorical figures and groups are characterized by great dramatic power. He was professor at the Academy of Munich, member of the Munich, Berlin, and Vienna Secession, the Academies of Dresden, Milan, Antwerp, and Stockholm, and the Société de Peinture et de Sculpture of Paris.

STURTEVANT, Alfred Henry (1891–). An American zoölogist, born at Jacksonville, Ill. He was educated at Columbia University. In 1915 he became research associate of the Carnegie Institution of Washington. He collaborated with Morgan in extensive researches on genetics, especially of the fruit fly, and published a number of papers dealing with the taxonomy and genetics of this insect. He was joint author (with Muller, Bridges, and Morgan) of *The Mechanism of Mendelian Heredity* (2d ed., 1923).

STYRIA, stĭr'ĭ-ȧ. A province of the Republic of Austria. Its area in 1910 was 8658.4 square miles; in 1923, 6323 square miles. Its population in 1910 was 1,444,157; in 1923, 978,845. See Austrian Republic.

SUBLIMATION. See Consciousness and the Unconscious.

SUBMARINE CHASER. See Vessels, Naval.

SUBMARINES AND THEIR WAR ACTIVITIES. The use of the submarine boat as a commerce destroyer was not a part of Germany's original plans for the War. The U-boats which had been completed and tested before the outbreak of the War were so unsatisfactory that Admiral von Tirpitz, the German naval chief, was highly skeptical as to their usefulness. Their first cruises against the British forces, in which 2 out of 10 were lost without inflicting any damage on their adversaries, seemed to confirm his views. Few new boats were ordered, and no special effort was made to hasten their construction; but on Sept. 22, 1914, Lieutenant Weddigen in the *U-9* sank in one hour a whole division of three 12,000-ton armored cruisers (*Aboukir, Hogue,* and *Cressy*), with a loss of 1400 men. The effect of this achievement was instantaneous, both in England and Germany. The British Navy had made no definite plans to combat submarine activity. Extremists like Admiral Sir Percy Scott declared that no adequate measures were possible; extremists of the opposite view considered the submarine too ineffective to require such plans. Von Tirpitz was converted at once; not only was he converted, but he soon became the leading advocate of submarines in Germany. New boats in great numbers were ordered, and the earlier ones were taken in hand to remove their defects, as far as that could be done.

While this work was going on, the idea of using submarines against shipping was quickly conceived and developed. It was estimated that by Feb. 1, 1915, the repairs to the old boats would be completed and a number of the smaller new ones would be ready for service. On February 4, the Germans declared that the waters surrounding Great Britain and Ireland would be a war zone in which enemy merchant ships would be destroyed, and that it would not always be possible to avoid danger to passengers and crew and even to neutral ships. Owing to a sharp protest from the United States, the declaration was modified in regard to neutral ships, their neutral character to be judged by all circumstances and not simply by the flag carried. As thus changed, it was put into effect on February 18.

After the sinking of a number of cargo and fishing vessels, the British passenger steamer *Falaba*, bound to Sierra Leone, was torpedoed on March 27 with the loss of 100 lives. On May 7, before the storm of protests which this evoked had died down, the great passenger liner *Lusitania* was torpedoed without warning and sank in 20 minutes with a loss of life at first reported as 1396 but afterward thought to be about 1200. Nearly 300 Americans were on board, and many were drowned. The protests over the *Falaba* affair were as nothing compared to those now aroused. The United States was deeply stirred and came near to declaring war against Germany, but the country was unprepared for war and did not even start to prepare for it until 1917, after war was admitted to be inevitable.

The American protests were met by the usual German promises, though even the Chancellor was convinced of the danger of making an active enemy of the United States, and on June 15 an imperial order was issued, forbidding the sinking of large passenger vessels. Von Tirpitz and the naval staff fought the order so furiously as to somewhat weaken imperial support of it. Encouraged by this, the naval instructions to submarines were apparently relaxed; for on August 19 the large British passenger steamer *Arabic*, outward bound, was sunk off the Irish Coast with the loss of 44 lives. The United States again protested strongly, and the German government apologized, quoting the statement of the submarine commander that the *Arabic* was apparently trying to ram him, and also repeating (September 2) their previous assurance that liners would not be sunk without warning and without safety of the lives of noncombatants, provided that the liners did not try to escape or offer resistance. Two days later, September 4, the liner *Hesperian* was sunk with the loss of 32 lives. The German government denied that she was destroyed by a submarine, but the proof seemed clear.

During the year, the Germans sank various American cargo vessels for which they agreed to pay. The Chancellor now forced Von Tirpitz to stop sinking liners, and on September 20, further orders were issued, suspending operations except in the North Sea. This condition of affairs remained unchanged until after the close of 1915, notwithstanding the arguments and protests of Von Tirpitz and the naval staff; but on Feb. 12, 1916, the German government issued a memorandum declaring that after February 29, merchant vessels armed with guns would be treated as belligerents. On March 24, the channel steamer *Sussex*, with 325 passengers, about 25 of them Americans, was torpedoed. Though it was not sunk, 80 persons were killed or injured. Following this, President Wilson threatened to break off diplomatic relations altogether, "unless the German government should now immediately declare and effect an abandonment of its present methods of submarine warfare against passenger and freight-carrying vessels." The German reply concluded with the statement that German naval forces had received an order that vessels would not be sunk without warning and the saving of life unless they should attempt to escape or offer resistance; but if the United States failed to secure the "freedom of the seas" from Great Britain, the "German government would then be facing a new situation in which it must reserve to itself complete liberty of decision." Although this proviso made the promise as to methods of warfare absolutely valueless except for the brief interval before Germany would decide that the United States had not obtained from Great Britain the "freedom of the seas"—an impossible absurdity—it was accepted by the President, who said he would "rely on a scrupulous execution henceforth of the now altered policy."

Fear of American hostility, or doubt of its success, held Germany back from unrestricted submarine warfare until the beginning of 1917, when the naval staff persuaded the government that it would be so effective as to starve the British people until they demanded peace. Fears of the United States were declared groundless. That country had evidently no warlike intentions, for it was wholly unprepared for war, and nothing of importance was being done to remedy this situation. The American political campaign of 1916 had been won on an anti-war platform by the aid of pacifists and pro-Germans and, as late as December, the President had made a speech in which he told the people not to lose their heads over talk of preparedness. "Moreover," the naval staff said, "the submarines would stop any attempts to transport troops to Europe before Great Britain was brought to her knees." A note to the Allies on December 12, proposing negotiations for peace, was rejected by them; and on Jan. 9, 1917, it was decided to commence unrestricted warfare on February 1. The new decision was publicly announced on January 31. While other areas were added later, the rough outlines of the war zone, as defined by the announcement, within which submarine warfare was to be unrestricted, included all north European waters between the meridians of 4° E. and 20° W. longitude, and between the latitudes of the Faroe Islands and Cape Finisterre, except over narrow lanes along the coasts of Holland and Spain; the zone also included all the Mediterranean except areas along the Spanish coast and a lane 20 miles wide leading to Greece. The last phase of the blockade was now reached. The United States at once broke off diplomatic relations with Germany. On February 3, the American Ambassador left Berlin and on the same date the German Ambassador at Washington was handed his passports; but the declaration of war was deferred until April 6 in the futile hope that Germany would rescind her decree.

Germany had now about 140 submarines ready for service and many more building; 269 were ordered in 1917 and the construction work on submarines and destroyers was pushed to the limits of the shipyard capacity. The total tonnage of Allied and neutral merchant vessels sunk during each month increased from 291,000 in January to 464,000 in February; 507,000 in March; and 834,000 in April. The tonnage sunk in May dropped to 549,000; in June, it was 631,000; in July, 492,000; in August, 489,000; in September, 315,000; in October, 429,000; in November, 259,000; and in December, 350,000. During 1918, it steadily decreased, with slight fluctuations, to 106,000 in October. Sixty-six German submarines were sunk in 1917 and 74 in 1918. In the early days of unrestricted warfare, the anti-submarine forces were inadequate in number for either patrol or convoy, but this number grew steadily, and the system of patrol and convoy was soon vastly improved. Depth bombs were supplied in constantly increasing quantities, and methods for their discharge were perfected. Aircraft became more and more valuable, especially for sighting submarines when submerged. Allied submarines increased in number and gained in effectiveness. Decoy vessels (Q-ships), P-boats, sub-chasers, sloops, trawlers, mine sweepers, booms, mine fields, paravanes, camouflage, and zigzag steering played their parts; but the most important vessels in the antisubmarine service were the destroyers, and the most effective system of protection was the convoy.

The first division (six boats) of American destroyers arrived at Queenstown on May 4, 1917, and, within the next 30 days, three similar divisions joined them. Not only did they greatly help to relieve the strain on the British forces, but news of their appearance on the blockade 28 days after the declaration of war was most inspiring to the Allies and more than equally depressing to the Germans. Before American troopships began to reach the danger zone in great numbers, many more American destroyers, together with patrol vessels, submarines, and cruisers, had joined the Allied forces, so that the rush of troops during the spring and summer of 1918 was so effectively guarded as to surprise not only the United States and its Allies but also the Germans, who had confidently expected to prevent absolutely the transport of any great number of troops and their supplies, and who were chagrined and alarmed by their complete failure.

The work of the British and French submarines during the War was less advertised than that of the German boats but was very important. Scouting in the North Sea, the Baltic, the Adriatic, the Ægean, and in the Black Sea and its connecting waterways—the Dardanelles, Sea of Marmora, and the Bosporus—were of the utmost value to the Allies aside from the destruction of the enemy's surface vessels and submarines. Some of the cruises of British submarines were among the finest feats of the War, afloat or ashore. The Italian submarines were few in number but did good work. The same may be said of the American boats that reached Europe in time for important use.

See Navies; Bomb, Depth; Hydrophone; Paravane; Vessels, Naval, *Submarine; World War, Naval Operations;* Blockade, Allied; War, Diplomacy of the.

SUBMARINE SUPPLY SHIPS. See Vessels, Naval.

SUBWAYS. See Rapid Transit.

SUDAN, so͞o'dän', Anglo-Egyptian. An African territory under the joint administration of Great Britain and Egypt, lying between Egypt and Uganda and the Belgian Congo, and extending from the Red Sea to the limits of Wadai in central Africa. Area, 1,008,100 square miles; population, estimated in 1928, 6,469,041. The chief towns are Khartum, the capital (31,965), Omdurman (79,238), Khartum North (14,319). Gum arabic continues the product of greatest economic value. In 1913, 33,353,393 pounds were exported (value, £E371,528); in 1927, 21,239 tons were exported (value, £E680,887). Cotton ranks second with an estimated production in 1926–27 of 130,000 bales (478 pounds each); in 1927–28 the estimated production was 110,000 bales. Other products include durra (millet), sesame, cattle, and ivory. In 1913 total exports were £E1,185,186; in 1920, £E4,712,652; in 1927, £E5,229,420. Imports for 1913, 1920, 1927, were £E2,109,476, £E7,006,865, £E6,155,310. Imports, in 1927, included cotton fabrics, iron and steel manufactures, sugar, coal, machinery and hardware, flour, etc. Great Britain easily leads in Sudan's foreign trade, buying over three-fourths of its exports and supplying nearly one-third of its imports.

It was seen by the Sudan government that only great irrigation projects could open up the country for economic exploitation. The two areas which have received attention are the Gezira district, between the White Nile and the Blue Nile, and the Tokar district in the Red Sea province. In the former, a project was commenced in 1914 for the opening up of about 300,000 acres by the construction of a dam on the Blue Nile, at an estimated cost of about £6,000,000. This project was put into operation in 1925. At the same time, the Egyptian government proposed to construct a dam on the White Nile below Khartum, for the use of its own lands. Work was commenced on this scheme in 1919 but was discontinued for lack of funds in 1921. The work on the Makwar (Blue Nile) dam continued; by 1922, it had cost £4,000,000. In 1928 there were 1728 miles of railway in operation. To facilitate communications, the British erected 16 wireless stations in the Sudan. The cost of government consistently increased. For 1913 and 1927, revenues were £E1,568,352 and £E5,929,945; expenditures for these years were £E1,533,065 and £E5,550,489. The budget for 1928 balanced at £E5,978,000. Surpluses from revenue were accumulated in a reserve and expended on public works.

The Sudan enjoyed the period of prosperity that was prevalent in all noncombatant countries during the World War. The rise in prices, the demand for cotton and gum, and the presence of large British forces in Egypt, accounted for the economic well-being. This state of affairs was reflected in the comparative peace that attended the British occupation. In 1916 the confines of the territory were extended to take in the whole of Darfur, which was incorporated as the fifteenth province of the Sudan. This was occasioned by the rebellion of the Sultan Ali Dinar who, working with the insurgent Senussi, contemplated an invasion of the Sudan. As a result of the conquest, Great Britain and France were able to settle the troublesome frontier question of Wadai and Darfur (1919). During the period of the War, military forces were in continual operation in the southern provinces, notably Mongalla and Nubia, because of local uprisings. The Sudan was little affected by Egyptian troubles (1919–23) and though Egyptian nationalism sought to include the Sudan in its aspirations, there was very little positive sympathy displayed by native Sudanese. The British government steadily refused to permit the new Egyptian state to absorb the Sudan (see Egypt). In 1924 Egyptian troops were evacuated and a new Sudan Defense Force, owing allegiance to the governor general, was created.

SUDERMANN, zo͞o'dẽr-män, Hermann (1857–1928). A German dramatist and novelist (see Vol. XXI). He wrote *Das bilderbuch meiner Jugend* (*The Book of My Youth*) (1922). The World War called forth the dramatic trilogy, *Das deutsche Schicksal* (1921). His last novels, *Der tolle Professor* (1921) and *Die Frau des Steffen Tromholt* (1927), and his play *Der Hasen-*

fellhändler (1927) showed a decline of his powers.

SÜDFELD. See Nordau, Max Simon.

SUEZ CANAL. The strategic importance of the Suez Canal for military purposes during the World War and the steady increase in traffic in subsequent years necessitated a programme of widening and deepening its waterway to take care of the increasingly large vessels which were passing through annually. Improvements were, therefore, carried out in accordance with plans made in 1921, to increase the minimum depth to 42 feet 6 inches, the minimum bottom width to 196 feet 8 inches, to reduce the curves, and increase the width at many points, especially at the curves, beyond the minimum standard; much of the canal bank was lined with stone to prevent washing, and at Port Said the breakwater was extended to prevent the silting up of the entrances.

Previous to the War, the traffic through the canal was about 21,000,000 tons annually, but during the War it declined to between 13,000,000 and 14,000,000 tons. By 1923, however, it had surpassed all previous records, and continued to increase until in 1928 it had reached unprecedented activity, in number of ships, net tonnage of ships, gross tonnage of merchandise, and receipts. In the latter year, passages of ships totaled 6084, their net tonnage 31,906,000, gross tonnage of merchandise 32,622,000, and receipts 222,396,000 gold francs, the latter item showing an increase of over 6 per cent above the previous high record set in 1927.

Considering the total net tonnage passing through the canal in 1927, southbound traffic accounted for 13,567,000 tons and northbound traffic for 15,398,000 tons. Southbound traffic in 1927 consisted principally of such commodities as metals and machinery, railroad materials, coal, cement, salt, fertilizers, textiles, petroleum, wood pulp and paper, and refined sugar, while the principal northbound commodities were cereals, amounting to 3,417,000 tons; mineral oils, 3,158,000 tons; oleaginous products, 3,138,000 tons; textiles, 1,864,000 tons; rubber; tea; and sugar cane. Australia figured prominently in shipments of wheat; Persia, in shipments of mineral oils; and Vladivostok and Dairen, in shipments of oleaginous products. Motor-vessel navigation through the canal showed a steady increase and amounted to 12.3 per cent of the total transits in 1927, a large increase over the previous year. Passenger traffic also showed a marked gain in 1927, especially in the southbound passages, the total passengers being 340,318.

SUEZ CANAL TONNAGE AND RECEIPTS, 1909–1928

Year	Ship Transits	Gross Tonnage [a]	Net Tonnage [a]	Cargo Tonnage [a]	Tolls [b]
1909	4,239	.....	15,408	19,924	117,755
1910	4,533	.....	16,582	22,435	127,203
1911	4,969	.....	18,325	24,548	131,035
1912	5,373	.....	20,275	25,444	132,929
1913	5,085	27,737	20,034	25,776	122,989
1919	3,986	21,925	16,014	13,973	136,970
1920	4,009	24,244	17,575	17,047	144,594
1921	3,975	24,956	18,119	17,509	144,493
1922	4,345	28,611	20,743	21,360	162,614
1923	4,621	31,329	22,730	22,777	171,962
1924	5,122	34,652	25,110	25,529	182,572
1925	5,337	36,910	26,762	26,578	192,170
1926	4,980	36,134	26,060	25,409	186,654
1927	5,545	40,127	28,962	29,524	208,651
1928	6,084	44,100	31,906	32,622	222,396

[a] In thousand tons.
[b] In thousand gold francs.

In 1927 the Suez Canal Company announced a reduction of 0.25 franc in canal tolls, effective Apr. 1, 1928. From that date, tolls were collected at 7 gold francs per net ton Suez Canal measurement for laden ships, and at 4.50 gold francs for ships in ballast. (One gold franc equals $0.193.) In 1884 the rate per net ton was changed to 10 francs for laden vessels and 7.50 francs for ships in ballast. From that time until Jan. 1, 1913, there was a gradual decline in rates, from 6.25 francs for laden vessels and 3.75 francs for ships in ballast. Then the rates were increased, until on Jan. 1, 1918, they were made 8.50 francs for laden vessels and the same for ships in ballast. From this time there was a gradual decline in rates until those mentioned above were adopted.

The Compagnie Universelle du Canal Maritime de Suez reported net profits for 1928 totaling 713,000,000 francs, against 659,000,000 francs in 1927. Dividend was declared on the 800,000 shares of 250 francs nominal par value, of which Great Britain holds 353,000 shares, amounting to 510 francs a share, compared with 455 francs in 1927; with the exception of 103,000 shares upon which capital had been repaid, which received 503 francs, against 448 francs. The 100,000 founders' shares received 585 francs, against 522 francs paid in 1927.

SULLIVAN, Edmund J. (1869–). A British illustrator. He was born in London, educated at Mount St. Mary's College, Chesterfield, and studied art in Hastings under his father. He was on the staffs of the *Daily Graphic* (1890–92) and the *Pall Mall Budget.* His work is represented in the New York Public Library and in public galleries in Melbourne, Vienna, Barcelona, and Rome. He wrote *The Art of Illustration* (1921) and *Line, an Art Study* (1922).

SULPHUR. Few discoveries in the field of chemical engineering were of greater significance than that of the Frasch process by which the sulphur deposits of Louisiana and Texas could be exploited in an efficient and economical way. In 1900 the domestic output of sulphur in the United States was valued at only about $500,000, and the demands of the industry were met by imports of sulphur and pyrite, or by native supplies of the latter substance. In 1902 came the successful development of the new process, and the production of sulphur has increased remarkably since then. The amount of sulphur mined and shipped, together with the value of the shipments in the interval from 1914 to 1927, is given in the accompanying table.

U. S. SULPHUR PRODUCTION

Year	Sulphur mined Long tons	Sulphur shipped Long tons	Value
1914	417,690	341,985	$6,214,000
1915	520,582	293,803	3,955,000
1916	649,683	766,835	12,247,000
1917	1,134,412	1,120,378	23,987,000
1918	1,353,525	1,266,709	27,868,000
1919	1,190,575	678,257	10,252,000
1920	1,255,249	1,517,625	30,000,000
1921	1,879,150	954,434	18,000,000
1922	1,830,942	1,343,624	24,000,000
1923	2,036,097	1,618,841	26,000,000
1924	1,220,561	1,537,345	25,000,000
1925	1,409,262	1,858,003	29,000,000
1926	1,890,057	2,072,687	37,300,000
1927	2,111,618	2,072,109	38,300,000
1928 [a]	1,981,873	2,082,924	37,500,000

[a] Estimated.

The year 1927 was the first since the closing down of the sulphur mine in Louisiana in 1924, that the production of sulphur has been equal to or larger than the shipments. Over 99.9 per cent of the shipments in 1928 was made by two companies in Texas, whereas more than 99.9 per cent of the shipments was made by these companies and the company in Louisiana which was still shipping from stocks. Production and shipments of sulphur also were made by two other mines, one in Nevada and one in Utah.

The development of the American sulphur industry not only had peculiar significance in the United States but it was a very vital matter for Italy. In 1906 the Sicilian production was 475,553 metric tons and, with the development of the American mines, it was realized that the Italian industry was seriously threatened by the United States, as Italy was the only serious competitor of this country. An agreement between the American and Sicilian sulphur producers regulating the world's unrefined sulphur market was concluded early in the spring of 1923. Prices were to be regulated in relation to the demands for consumption, with an intention of gradually regaining the pre-war levels based on a gold standard, and to be increased by $1 a ton over those temporarily put into effect in October, 1922. North America was to be supplied by the American producers, Italy by the Sicilian producers, and the remainder of the world proportionately by the two groups, with the provision that Sicilian producers might sell to any country a maximum of 65,000 tons for the manufacture of sulphuric acid.

This agreement permitted Sicily to export annually 210,000 tons, including 65,000 tons for sulphuric acid, a quantity largely in excess of Sicilian exports up to 1923. Since 1923 Sicilian exports have constantly exceeded the quota allotted under the 1922 agreement. In 1927 a new basis of agreement was reached, whereby the Italian industry was allowed more liberty in export markets, with the result that total exports of Italian sulphur showed a decided increase in 1927 and a further increase was estimated for 1928. The Sicilian production together with that of all Italy, is indicated in the accompanying table.

SICILIAN AND ITALIAN PRODUCTION OF SULPHUR

Year	Sicilian Production Metric tons	Total Italian Production Metric tons
1914	334,974	377,843
1917	177,453	211,847
1918	194,585	234,296
1919	181,744	226,126
1920	224,247	263,603
1921	240.089	273,872
1922	137,640	191,600
1923	206,238	256,342
1924	241,156	294,899
1925	207,998	263,590
1926	208,741	273,791
1927	231,440	297,646

SULPHURIC ACID. See CHEMISTRY, APPLIED.

SUMATRA. See DUTCH EAST INDIES.

SUMMERALL, CHARLES PELOT (1867–). An American army officer. He was born at Lake City, Fla., and graduated at West Point (1892). Entering the Army as second lieutenant, he served in the Philippine campaigns of 1899–1900 and was with the China Relief Expedition of 1900–01. He located and began the construction of Fort William H. Seward in Alaska in 1902. From 1905 to 1911, he was senior instructor in artillery tactics at West Point. During the years 1913–17, he was lecturer at the Army War College. In 1917 he located field artillery training camps at Anniston, Ala., and Monterey, Calif., and from April to July of that year, he was a member of the military mission to England and France. Joined the A. E. F. in France in October, 1917, having been made a brigader general of the National Army, and in 1918 commanded, in succession, the 1st Division and the 5th Army Corps (until after the Armistice). In 1919 he commanded the 9th Army Corps and the 4th Army Corps as a brigader general of the Regular Army. Besides serving on various special missions, he was a member of the Inter-Allied Military Commission at Fiume and was on duty with the American Mission to Negotiate Peace to Aug. 31, 1919. He was in command of Camp Taylor, Ky., and Camp Dix, N. J. (1919–21), being promoted to the rank of major in 1920, and from 1921 to 1924 commanded the Hawaiian Department. After commanding the 8th Corps Area and the 2nd Corps Area, he became Chief of Staff of the U. S. Army in 1926. In the World War, he was awarded the Distinguished Service Medal and decorated with the Distinguished Service Cross (U. S.) for gallantry at the Battle of Soissons with the 1st Division. He also received the Victory Medal of the United States for his work in five major operations of the A. E. F.

SUMNER, FRANCIS BERTODY (1874–). An American zoölogist, born at Pomfret, Conn. He was educated at the University of Minnesota and at Columbia University. He was instructor at the College of the City of New York (1899–1906); director of the biological laboratory of the United States Bureau of Fisheries at Woods Hole (1903–13); as well as biologist at the Scripps Institution for Biological Research (1913–19); associate professor of zoölogy (1919–26) and professor since 1926 at the University of California. In 1927 he also became research associate of the Carnegie Institution of Washington. He published extensively on the development of the bony fishes, on the fauna of the Woods Hole region, and more recently on the influence of environment on, and heredity of, the coat color of various mammals.

SUN; SUN SPOTS. See ASTRONOMY; METEOROLOGY; PHYSICS.

SUNDAY-SCHOOL UNION, AMERICAN. An organization formed in 1817 as the Sunday and Adult School Union by members of various religious denominations for the purpose of establishing and maintaining Sunday schools, and circulating religious publications. The work of the Union is carried on chiefly in rural districts where there was little church organization, and among Negroes in the South. During the year ending Mar. 1, 1929, missionaries established 673 new Sunday schools with 20,929 pupils and 2180 teachers, compared with 1368 new schools with 47,008 pupils and 4886 teachers during the year ending Mar. 1, 1915. In communities in which Sunday schools had been discontinued, the Union reorganized 515, with 14,790 pupils and 1655 teachers, in 1928–29, compared with 687, and 21,357 pupils and 2287 teachers in 1914–15. From these schools, there developed in 1928–29, 28 churches of various Protestant denominations, 12 of which erected church buildings, as against 86 churches with 27 buildings in 1914–15. In connection with the Sunday schools, 130 preaching stations were established in 1928–29. The Union was also responsible in the year first mentioned for the organization of 168 young people's societies, and 258 prayer meetings, having sponsored 155 societies, and 346 meetings in the latter year. In order to interest the country people in church work, missionaries paid 198,081 visits in 1928–29, as against 188,652 in 1914–15.

Besides publishing 12 Sunday-school periodicals, or 1,835,066 copies, the union issued in 1928–29, 285,925 copies of religious books and school pamphlets. Missionaries distributed 12,449 Bibles, Testaments, or Gospels in 1928–29, as against 24,529 in 1914–15.

Two new features of the union have developed recently, first, the organization of all-day group gatherings, bringing together rural Sunday schools. In 1928–29, 422 such gatherings were held with an attendance of 75,775 persons. Another development has been the Daily Vacation Bible School work, which has proved as practicable in rural communities as in cities. During the season of 1928, 528 such sessions, with an enrollment of 15,605, were held, meeting daily, usually for a period of two weeks. The president of the union in 1929 was E. Clarence Miller, National headquarters are at 1816 Chestnut Street, Philadelphia, Pa.

SUN YAT-SEN, sōōn′ yät-sĕn′, (1867–1925). A Chinese revolutionary leader (see VOL. XXI). When Yuan Shih-kai died in 1916, Dr. Sun headed a group of Cantonese who fought against the party in power, and in 1921 he was elected President of the Southern Chinese Republic. In 1922 the commander-in-chief of his army revolted and he fled to the foreign concessions in Shanghai, returning to power in Canton in 1923. He was reported to have made an active allianee with the Bolsehvists, which cost him most of his foreign sympathy. On Mar. 12, 1925, he died in Peking, where he had gone to attend a conference of the leaders of the different sections of China, with the hope of procuring peace by alliances between the sections. In 1929 his body was taken to Nanking and buried with state honors in an impressive mausoleum on Purple Mountain above the city. See CHINA.

SUPERCHARGERS. See INTERNAL-COMBUSTION ENGINES.

SUPERHETERODYNE. See RADIO TELEPHONY.

SUPERPOWER TRANSMISSION SYSTEM. See ELECTRIC POWER TRANSMISSION AND DISTRIBUTION.

SUPRARENIN. See ADRENALIN.

SUPREME COUNCIL. See PEACE CONFERENCE AND TREATIES.

SUPREME COURT, UNITED STATES. See LAW, PROGRESS OF THE; LABOR LEGISLATION, *Supreme Court Decisions;* UNITED STATES, *History*; TRUSTS.

SURFACE, FRANK MACY (1882–). An American biologist and economist, born at Eaton, Ohio. He was educated at the State University of Ohio (A.M., 1905) and at the University of Pennsylvania (Ph.D., 1907). He was associate biologist at the Maine State Experiment Station (1907–10 and 1913–17); biologist at the Kentucky Experiment Station (1910–13); assistant chief statistician of the Division of Food Inquiry (1917–19), and chief statistician of the American Relief Administration (1919–20). Since 1923 he has been in the service of the U. S. Department of Commerce, becoming in 1926 assistant director in charge of domestic commerce. He wrote *The Stabilization of the Price of Wheat during the War* (1925); and *American Pork Production in the World War* (1926).

SURGEONS, AMERICAN COLLEGE OF. An association or guild organized in 1913 by some 500 surgeons of North America representing every branch of surgery. The purpose of the college is to improve the standard of surgery, as well as that of the competency and character of the practitioners of surgery, and to educate the public and the profession to understand that special training is demanded and that the surgeon elected to fellowship in the college has had such training. Membership, therefore, is on the basis of merit only and applicants for fellowship are examined with reference to professional ability and moral and ethical fitness. Each applicant must submit 1000 case records, of which 50 must be complete records of major work which he has done himself and 50 may be case histories in abstract. The membership grew from 500 in 1913 to approximately 8000 in 1928, and included outstanding surgeons in the United States, Canada, and the Latin-American countries.

Among the activities of the organization are clinics held at the annual meeting of the Clinical Congress of Surgeons of North America and at sectional meetings where the work of visiting and local surgeons may be observed. In 1917 the college began its hospital standardization programme which by 1927 had been extended to include a careful survey of 2581 hospitals of 35 beds and over, and of these 1803 or 69.9 per cent were fully or conditionally approved. The library and literary research of the college was organized to further the standardization of literature on surgery and closely allied subjects and to encourage a wider reading and study of scientific material. A staff of research workers was maintained to compile medical and surgical bibliographies and to abstract and translate from foreign languages. Thus, the accumulated thought and experience of surgeons writing in many languages and on any specified subject was placed before fellows of the college whose time for reading was very limited. The most recent responsibility assumed by the college was an extensive programme for medical motion-picture films for use in teaching for the profession, for nurses, and the laity. The president of the organization in 1928 was Dr. George D. Stewart, of New York City, and the director general, Dr. Franklin H. Martin. *Surgery, Gynecology and Obstetrics* is the official journal of the college, and its headquarters are at 40 East Erie Street, Chicago, Ill.

SURGERY. As a result of the World War, there was a certain amount of reversion to first principles in post-bellum surgery. Whether such reversion was beneficial is another matter. Surgery in 1929 may be an improvement in some ways over surgery in 1914, but is such improvement due necessarily to military experiences? Thousands of crippled children and adults owe their condition in part to lack of organization and equipment, special hospitals, and vocational training schools. It should be possible after ordinary traumatism and infantile paralysis—to go no further—in the interest of salvage, to save 10 per cent of the victims if the requisite apparatus could be guaranteed. As a result of war experience, we know that proper first aid often prevents crippling. One of the chief lessons from the War had to do with splints and splinting, the latter requiring team work among the surgeons. In all locations in whieh accidents have a cumulative incidence, splints are now kept on hand in sufficient amount, while attempts at standardization of splints and splinting have been patterned successfully upon military surgery. In routine surgery, splints are adjusted with the principal object of prevention of deformity, yet this must at times antagonize the principle of wound treatment.

The Carrel-Dakin solution which proved of such value in war wounds, as well as the other methods in vogue for wound treatment, are naturally antagonistic to the principle of fixed dressings intended to avert deformity; and until the two forms of treatment can be brought in harmony with each other, the status of wound treatment will be unsatisfactory. Some form of compromise must be forthcoming; permanent splinting must not be allowed to interfere with wound drainage. Stiffness of joints after immobilization will not be due to the treatment but to the original injury. The extremely radical methods of cleansing infected war wounds are not required in peace surgery and would be unnecessarily drastic.

Advances in surgical principles are necessarily slow and concerned largely with minimizing the risks of capital operations, especially in subjects already in peril from injury. Here, to the dangers of traumatic shock are added those of operative shock. To diminish the risk of shock and to prevent post-operative complications is the desideratum of all operating surgeons. The dangers of anæsthesia in these subjects supply an additional element of risk. The condition known as acidosis, as interpreted by certain urinary findings, has been made a contra-indication to the use of general narcosis and some surgeons will not intervene until the urinary findings are normal. It is claimed that the danger of post-operative embolism is increasing and that it may be due to too indiscriminate intravascular injections of substances of many kinds. Recently, two new resources have been added for the prevention of shock, of which one is diathermy, as practiced in the Cleveland Clinic, and the other is the addition of insulin to the ordinary solution of dextrose, as carried out in the New York Hospital. One unit of insulin is added to three grams of dextrose and 1000 cubic centimeters of saline infusion. While it is impossible, as a rule, to prove anything in these cases by figures, there is the conviction on the part of the beholder that the results are worthy of the effort. See ABORTION; ANÆMIA; ANGINA PECTORIS; CANCER; GALLSTONE DISEASE; WOUNDS.

SURINAM. See GUIANA.

SUTHERLAND, GEORGE (1862–). An American jurist and legislator (see VOL. XXI). He served as United States Senator from 1905 to 1917, but was defeated for reëlection in 1916. He was appointed by President Harding to the United States Supreme Court in 1922. He is the author of *Constitutional Power and World Affairs* (1919).

SUTRO, ALFRED (1863–). A British dramatist. His education was acquired at the City of London School and at Brussels. His plays include *The Cave of Illusion* (1900); *Foolish Virgins* (1904); and *Freedom* (1916). He has produced many dramas in London.

SUTTON, SIR J. BLAND-. See BLAND-SUTTON, SIR JOHN.

SVALBARD. (SPITSBERGEN). An Arctic archipelago of about 25,000 square miles lying between 76° and 80° north latitude and between 10° and 30° east longitude. It includes the West Spitsbergen, Prince Charles Foreland, Northeast Land, Barents Island, Edge Island, King Karl Island, Swedish Foreland, Abel Island, and Hope Island. Discovered in the twelfth century by a Norseman, this island group was rediscovered in 1596 by Barents, visited by Hudson in 1607, and became the scene of a lucrative whaling industry in the seventeenth century. In the course of time, its whaling, fishing, and fur resources became practically depleted. For this reason, the problem of sovereignty which had been unsettled when the European whaling industry had centred there was allowed to lapse until the discovery and exploitation of high-grade coal deposits rendered it again a vital problem. On Feb. 9, 1920, a treaty which vested sovereignty in Norway was signed by the Versailles Treaty Powers. Since many countries had participated in the discovery and exploitation of this archipelago and since its coal had been mined by different nationals since 1904, all signatories to the treaty have mining, hunting, fishing, and trading privileges. A Danish Commissioner is appointed to examine disputed claims. Norway officially took possession on Aug. 14, 1925, and reëstablished the former name of Svalbard.

It has been estimated that there are in West Spitsbergen 8000 million tons of coal of which 1500 million tons are of excellent quality. Mining activities are centred in Ice Fiord, where there are six camps of English, Norwegian, Swedish, Russian, and Dutch companies. The total yield of the mines was 4500 tons in 1910 and 313,000 tons in 1927. Although this industry is handicapped by having to import all supplies and export all coal in the summer season, decided advantages are present in the form of accessibility, use of galleries instead of shafts, freedom from the use of mine props, long daylight, and easy ventilation. Seven settlements have grown up on the west coast—Longyear City with a population of ,529 is the largest. Kings Bay is known as the base for most of the aërial expeditions in the Arctic Sea. The total population numbers about 1500 in the winter and is larger in summer. Numerous wireless stations are maintained and there is regular postal service.

A large amount of research has been accomplished and excellent maps have been prepared of Svalbard. Norwegian explorers have been particularly active. Oceanographic studies were aided by the Prince of Monaco. Iron ore, asbestos, alluvial gold, gypsum, and marble are some of the minerals discovered. The Oxford University Expedition of 1924 mapped much of the east coast of Northeast Land and was the first to use an airplane for detailed Arctic exploration. The Norwegian government has recently established a commission to regulate exploration in Svalbard.

SVEČENSKI, LOUIS (1862–1926). An American violinist, born at Esseg, Croatia. After completing his studies at the University of Agram, he won a government scholarship and attended the Akademie der Musik at Vienna, where his teachers were J. Grün for violin and J. Hellmesberger for composition (1881–85), while among his classmates were Franz Kneisel and Fritz Kreisler. Having been brought to the attention of Gericke, then conductor of the Boston Symphony Orchestra, he settled in Boston as one of the first violins of the orchestra, and remained until 1903. When Kneisel organized his famous quartet in 1886, Svečenski became the viola player and held this position without interruption until the dissolution of the organization in 1917. In 1904 he joined the faculty of the Institute of Musical Art, in New York, retaining this post until his death. From 1924, he also conducted the class in chamber music at the Curtis Institute of Music in Philadelphia. He published *Twenty-five Technical Exercises for Viola.*

ŠVEHLA, ANTONÍN (1873-). A Prime Minister of Czechoslovakia. A member of the Bohemian Diet in 1908 and leader of the Republican Party in Bohemia before the World War, he became head of the National Revolutionary Committee in Prague during that conflict and was a member of the Constitutional Assembly in 1918. In the new Czechoslovak state, he became leader of the Agrarian Party and was Minister of Interior (1918–20), a member of Parliament (1920-), and Prime Minister (October, 1922–September, 1929). The Conservative Coalition government, of which he was the head, was considerably weakened by Socialist gains in the elections of December, 1928, and he was forced to resign the following September.

SWANSON, CLAUDE AUGUSTUS (1862-). A United States Senator (see VOL. XXI). He was reëlected to the Senate from Virginia in 1916, 1922, and 1928. He has been a member of the Senate committees on expenditures in executive departments, foreign relations, naval affairs, public buildings and grounds, and rules.

SWARTHMORE COLLEGE. A nonsectarian coeducational institution at Swarthmore, Pa., founded in 1864. The student enrollment increased from 434 in 1914 to 540 in 1928. During this period, the board of managers voted to limit attendance to approximately 500 students. To the college library of 60,000 volumes there was added the Friends' Historical Library, and in 1926 Clement M. Biddle donated funds to erect a building to house this library. The Sproul Astronomical Observatory was completed in 1915 and two swimming pools were added to the gymnasium. In 1920 Hicks Hall of Engineering was built. The Cloisters, a group of six fraternity and nonfraternity club houses, were opened in 1925 and Worth Dormitory for girls was completed in 1924. Beginning in 1925, the General Education Board awarded the college an appropriation of $250,000 over a period of five years for the development of honors courses in order to afford a thorough test of the possibilities of honors courses as an educational system for exceptional students in American colleges and universities. In 1927 a gift of $300,000 from the Clothier family was received for an auditorium in memory of Isaac H. Clothier, and social buildings, including a memorial for Elizabeth Powell Bond, former dean, were erected. The physics research laboratory of the Bartol Foundation of the Franklin Institute was built in 1928. In that year, productive funds of the college amounted to $3,700,000. President, Frank Aydelotte, LL.D.

SWAZILAND, swä'zē-lănd'. A British native protectorate in South Africa under the control of the British Colonial Office and administered by a resident commissioner under the direction of the high commissioner for South Africa. It has an area of 6705 square miles and a population, by the census of 1921, of 112,838, of which 2235 were Europeans. The main concern of the administration is the expropriation of monopolies and concessions which had been granted to whites by the Swazi chief, Mbandeni. The public debt amounted to £55,000 in 1927. Swazis were settled on land reserves which amounted to about one-third of the total acreage in the protectorate. The costs of administration increased from £63,967 in 1913–14 to £103,681 in 1927–28. Native taxes, customs, sales, leases, concession rents, and licenses furnish the revenues, which totaled £90,706 in 1927–28. The people are largely a pastoral folk and export oxen and hides to the Cape. Live stock in 1927 numbered: cattle, 350,000; horses, 1000; and sheep and goats, 200,000. Recent experiments with tobacco and cotton by white farmers are meeting with success. Tin mining is important, the yield in 1927 being worth £42,776. Gold production in the same year was 1135 ounces, valued at £4,795.

SWEDEN, swē'dĕn. A kingdom in northern Europe with an area of 173,154 square miles. Its population (1928 and 1913) was 6,087,923 and 5,638,583, of which the urban population comprised 1,929,713 and 1,485,840. The chief cities and their population were (1928 and 1912): Stockholm, 464,699 and 350,955; Gothenburg, 233,303 and 173,875; Malmø, 117,197 and 92,338; Norrkøping, 60,671 and 46,674; and Helsingborg, 53,371 and 33,863.

Agriculture. The proportion of the population engaged in agriculture decreased from 70.9 per cent in 1900 to 55.8 per cent in 1920. In 1929 there were in Sweden 9,534,200 acres of land under cultivation, 2,280,000 acres of permanent meadows, and 60,746,000 acres of forests and pastures. The total value of the crops in 1928 was $309,004,000 and in 1927, $302,032,000, of which hay represented $84,143,000; oats, $44,924,000; potatoes, $30,839,000. In 1920 there were 2,736,000 cattle, 1,011,000 swine, 1,568,000 sheep, 113,000 goats, and 728,000 horses. The following table gives the acreage and production for 1913 and 1927:

Crop	Area (thousands of acres)		Production (thousands of units—bushels, except as indicated	
	1909–1913	1927	1909–1913	1927
Wheat	255	404	8,103	11,298
Rye	977	849	24,101	18,726
Barley	448	415	15,035	12,472
Oats	1,956	1,803	86,050	78,895
Mixed grain	430 [a]	653	312 [a] [b]	467 [b]
Potatoes	377	390	57,580	39,252
Sugar beets	78	101	940 [b]	993 [b]
Hay	3,010 [a]	3,036	4,062 [a] [b]	5,076 [b]

[a] 1911–1915 average. [b] Unit, metric ton.

The 1928 production (in tons) was: wheat, 529,878; rye, 435,947; barley, 208,358; oats, 1,268,769; mixed grain, 474,258; potatoes, 1,793,085; sugar beets, 1,096,002; fodder roots, 2,895,458; and hay, 5,334,372.

Mining and Industry. In 1927 there were 2855 wood and lumber mills (1248 in 1912) employing 100,770 workers (37,908 in 1912). Wood-pulp production (1927) was valued at $26,795,384. The coal supply is small and insufficient for the requirements, production during 1927 being 398,298 metric tons. Sweden is, however, very highly developed electrically, utilizing its waterfalls for the production of motive power. Sweden disposed of approximately 1,557,000 developed turbine horse power. In 1927 there were produced 9,661,000 tons of iron ore, 417,765 tons of pig iron, 486,900 tons of steel ingots, 398,000 tons of coal, 460,000 tons of cement, 1,558,000 tons of chemical wood pulp, 601,000 tons of cardboard and paper, 184,358,000 cigars, 42,500 tons of margarine, and 20,975 tons of cotton yarn. In 1928 the iron and steel industry was more active, producing 417,000 metric tons of Martin steel ingots (371,400 in 1927); 80,200 tons of crucible and electric steel (53,100 in 1927); 413,000 tons of rolled and forged steel and iron (338,800 in 1927). Pig iron production dropped from 417,800 tons in 1927 to 393,100 in 1928. At the end of 1928, there were 148 furnaces in operation as compared with 131 in 1927.

Transportation and Communication. The length of railroad line at the end of 1927 was 10,110 miles, of which 3877 miles were state owned, and 6233 were owned by private companies. In 1913 the total length of state and privately owned lines was 8933 miles. In 1926 both classes of lines carried 65,862,000 passengers and 37,742,000 metric tons of freight, and had gross receipts of $90,276,000. On Jan. 1, 1928, the Swedish merchant marine consisted of 2522 vessels, 909 of which were 200 tons or over. Their total capacity was 1,477,692 gross tons. In 1927, 29,791 vessels of 16,253,000 net registered tons entered the ports of Sweden, and 29,772 vessels of 16,235,000 tons cleared. In 1927 there were 3796 post offices, 49,010 miles of telegraph wire, and 532,739 miles of telephone wire (466,787 instruments).

Commerce. Swedish exports (1928 and 1913) were valued at 1,566,933,692 and 817,347,000 crowns; imports, 1,680,077,986 and 846,538,000 crowns.

In 1927 Swedish foreign trade reached record quantity figures, and was exceeded in value only during the abnormal years 1919 and 1920. Import and export values, as compared with 1926, increased 6.5 per cent and 14 per cent, respectively. Average import prices, principally by reason of mineral oils and coal, dropped about 10 per cent, as compared with 1926, while the reduction in export prices was only about 3.3 per cent. The chief imports were wheat, fruits and nuts, coffee, yarn and cordage, coal, mineral oils, iron and steel, machinery, and automobiles; chief exports, wood pulp, wood, wood manufactures, paper, iron ore, and machinery. The United States supplied 12.7 per cent of the imports, and purchased 10.9 per cent of the exports; Germany, 30.6 and 16.8; United Kingdom, 16.7 and 28.0; Denmark and Norway, 10.7 and 10.9.

Finance. On Jan. 1, 1929, the state debt stood at 1,831,862,476 crowns. The budget proposal for 1928–29 balanced at 744,746,400 crowns. In 1927–28 revenue totaled 749,792,858 crowns, and expenditures 739,829,701. The exchange rate was generally around par during the period (26.8 cents). The cost of living, which, in July, 1920, reached 270 (as based on the 1914 prices at 100), dropped to 236 in July, 1921, and 171 in December, 1927.

History. The outbreak of the World War occasioned an immediate declaration of neutrality by Sweden, in company with the other Scandinavian countries, and in this she persisted to the end. Her position was a difficult one, and the Swedish people displayed extraordinarily good sense in circumventing the vexing problems which arose. In the beginning of the War, it appeared that Sweden's economic stability would be little deranged, for she at once became the go-between for Germany and America. For a time, this trade flourished, but as the submarine campaign intensified and the British blockade became tighter, Sweden began to feel the pinch of necessity. From 1916 on, coal imports from Great Britain began to drop off seriously. The blockade was thrown not about Germany, but about the Scandinavian countries, for there were no means of ascertaining whether imports to Sweden were not designed for transshipment to the Central Powers. The result was that the suffering of the population was often acute. Measures had to be taken for the regulation of industry and conservation of what little food and raw material stocks Sweden had or was able to get. All exports were closely scrutinized and those of the more important domestic products prohibited; a financial moratorium was imposed; the Government was empowered to fix prices, hold up the sale of shipping, take in hand the whole matter of insurance, and resort to rationing. On this last score, the life of the greater part of the population was, of course, intimately touched. A food commission was set up to supervise the importation of foodstuffs and in 1915 it resorted to price-fixing. In 1916–17, sugar cards and bread cards were first employed, the bread allowance being generally 250 grammes per person per day. Other supplies rationed were potatoes, milk, and coffee. All such regulations were finally lifted in August, 1919.

Industry likewise suffered. In the activities dependent on the use of foreign raw materials, it was necessary to form import associations for the distribution of stocks. Before the end of the War, rationing was the rule in almost every industry. In the matter of fuel, for which Sweden depended on outside sources, the people were hard hit. It was necessary, therefore, to create a fuel commission, which undertook the exploitation of the country's forests on a grand scale. Mines and railways were kept going, but because prices charged were less than the cost of cutting, the Government had to assume a deficit of 100,000,000 crowns.

Sentiment regarding the War at first gravitated toward the Central Powers. The rigors of the British blockade had seriously interfered with the course of Swedish life, perhaps more profoundly than with those of the other Scandinavian peoples, and the Swedes adopted a more bellicose attitude toward the Entente. In 1916 debate in the Riksdag was very bitter, the Russian decision to fortify the Åland Islands particularly giving offense. Under the prompting of the military or Activist Party, the Riksdag passed a military appropriation of 104,000,000 crowns; but from 1917 on, the general attitude changed. A cabinet crisis on Mar. 5, 1917, precipitated the fall of the Hammarskjöld ministry, and the succeeding cabinets concerned themselves more and more with the problem of reaching an agreement with the Entente. The question became more pressing as food became scarcer and rioting more frequent. Finally, in February and in June, 1918, understandings were effected with Great Britain whereby Sweden was permitted to import stocks of food and such raw materials as phosphates, oils, coal, cotton, wool, rubber. In return, Sweden turned over part of her merchant marine to the Entente and guaranteed the export of her iron ores.

The unsettled economic conditions and the spread of democratic doctrines immediately after the War left their mark on the progress of Swedish events in the years 1919–24. By laws passed in 1919 and 1921, the Riksdag made the right of suffrage universal, women being given the franchise on May 26, 1919. In 1921 a national referendum law was passed. A question of greatest national interest was the discussion over the legalization of the eight-hour day in 1919. After a prolonged debate, the measure was defeated in the Riksdag with the result that the Chamber was dissolved and a new election held. The new Chamber proved more amenable to the Government's wishes and the law for an eight-hour day was carried. The prevalence of radical ideas was further indicated when the King was compelled to summon Hjalmar Branting, leader of the Social Democrats, to form a government in 1920. An ambitious programme for the inauguration of inquiries into socialization of industry, expropriation of large estates, disestablishment of the State Church, and disarmament, was announced, but the Government went down to defeat in the autumn elections, as a result of heavy polls for the Right, and was compelled to resign. No temporary expedients or brave gestures could act as stop-gaps. The depression of 1920–21 which gripped the world was felt in Sweden, too, for in the general stagnation about 150,000 men were out of work at the end of 1921.

In the election of 1921, the Social Democrats made sweeping gains with the result that Hjalmar Branting formed a Socialist government for the second time. The continued disorganization of industry manifested itself in a growing turbulence and the years 1922–23 saw the country gripped by strikes in saw mills, wood-pulp factories, and iron works. The Franco-Belgian occupation of the Ruhr was another heavy blow to the Swedish iron industry. Representing only a minority party, the Branting ministry lacked the power to force through remedial measures, and on Apr. 6, 1923, it fell from office on the question of unemployment doles. A Conservative cabinet was then organized under Premier Ernest Trygger.

From the autumn of 1923 onward, the Swedish economic situation showed marked improvement. Sound public finance was reflected in a balanced budget and a decreasing public debt to which the Government added the enviable distinction of the earliest European return to the gold standard. The Riksbank resumed specie payments on Apr. 1, 1924. Under such circumstances, industry and commerce began to forge ahead. Hydroelectric underwent rapid motorization; the radio industry development was pushed; commercial aëronautics expanded phenomenally; the merchant marine thrived; bank deposits mounted steadily. The international balance of trade turned in Sweden's favor in 1927 and Swedish capital began to be invested abroad in increasing amounts. To cite but one instance, the Swedish Match Corporation secured a monopolistic position in France, Hungary, Portugal, Poland, Peru, Greece, Estonia, Latvia, Ecuador, Jugoslavia, and Rumania with ramifications in other parts of the world.

To a very considerable extent, Swedish political controversies came to revolve around the issue of national defense vs. disarmament. The successful maintenance of neutrality during the World War had emphasized Sweden's independent attitude, but proximity to Finland and Russia involved her in questions of importance. The establishment of the Republic of Finland in 1917 divided Swedish counsels. There was a large body of opinion favorable to immediate recognition; another group, concerned over the ownership of the Åland Islands, advocated a more circumspect policy. In 1918 Finland was recognized, though Sweden refused to take sides in the internecine war between the Reds and the Whites which broke out in that year. The Åland Islands dispute was eventually submitted to the League of Nations in which Sweden had accepted membership. The League's decision (May, 1921) granting the islands to Finland was received with much disfavor and tested Sweden's pacific disposition to the utmost. Meanwhile, a Russian commercial delegate had been permitted to establish his residence in Stockholm and though in 1919 the unpopularity of the Bolshevists forced his departure, Sweden categorically refused to join in the Allied blockade of Russia. Commercial relations were resumed in 1920. Late in 1923, newspaper criticism led to the resignation of Foreign Minister Hederistjerna for advocating an alliance between Sweden and Finland against possible attack by Russia, and in May, 1924, *de jure* recognition was accorded to the Soviet régime.

Hjalmar Branting was an outstanding champion of the League of Nations, but early in 1924 his political opponent, Premier Trygger, expressed a lack of confidence in the League's ability to guarantee international justice and peace. No political party advocated complete disarmament, but a sharp struggle took place in the Riksdag over the general question of defense policy—the reduction and reorganization of the army, the maintenance of a strong navy, and the creation of an independent air-force board. The Government's army-navy bill passed the Upper House but was rejected in the Lower by a coalition of Social Democrats and Liberals in favor of a more drastic curtailment of expenditure. Deadlock between the two chambers led the Government to dissolve Parliament and appeal to the country. A bitter political campaign culminated in a relatively indecisive election (September, 1924); the Social Democrats winning 104 seats (gain of 5); the Conservatives, 64 (gain of 2); Liberals, 33 (loss of 8); Farmer's Union, 24 (gain of 3); Communists, 5 (loss of 2). The Trygger cabinet resigned (October 14), and Hjalmar Branting again formed a ministry of Social Democrats. Ill health compelled Branting to relinquish the Premiership in January to Richard Sandler, former Minister of Commerce, though he remained in the cabinet without portfolio until his untimely demise (Feb. 24, 1925), an event which threw all Scandinavia into mourning and was felt keenly throughout the world. Several months later (May 5) Branting's ablest lieutenant, Frederick V. Thorrson, Minister of Finance, likewise died, and with the passing of these two veterans the leadership of the Social Democratic Party devolved upon a younger generation.

After six years of debate, Sweden was the first continental European nation voluntarily to take an important step toward military disarmament. In the teeth of bitter and determined opposition from the Conservatives and Agrarians, the Social Democrats, aided by the Left Wing Liberals, carried their army-reduction programme, eliminating some eight infantry regiments, four cavalry regiments, and discharging some 8900 privates enlisted for long terms as trainers. Consideration of naval policy was postponed, but aviation was made an independent arm of the service.

Prospective lessening of military expenditures promptly created a new political issue: What to do with the saving? The Conservatives proposed tax reduction to lessen economic burdens. The Social Democrats advocated insurance against unemployment, but Carl G. Ekman, leader of the Left-wing Liberals (People's Party) would not support this project. On the other hand, the Social Democrats were decidedly antagonistic toward prohibition, the special measure of the People's Party, and reciprocal agreement on these two measures appeared improbable. In May, 1926, the crucial test came and the Sandler ministry resigned after being defeated on the unemployment-relief issue. Ekman, the outstanding personality in the Riksdag since the death of

Branting, now formed a minority cabinet (June 6) of Populists and Liberals. The new Government was committed to prohibition, but could hardly hope to carry such a measure without aid from other groups. The Social Democrats, embittered by Ekman's subversion of their cabinet, refused coöperation, whereupon the Premier effected a partial rapprochement with the Conservatives, modifying his former stand on army reduction and postponing the dissolution of some of the regiments. Although its position was considerably weakened by setbacks and compromises, the Ekman government managed to avoid outright defeat for over two years. A naval construction programme in 1927 caused a sharp cleavage in Social Democratic ranks, but sweeping educational reforms which were sponsored by the Government were carried through with their aid.

In an effort to regain power, the Social Democrats who had absorbed a few right-wing Communists in 1926 foolishly formed a close political alliance with the regular Communists for the election of 1928, but suffered a serious rebuff in consequence. The September ballotting produced a Lower House with the following complexion: Social Democrats, 90 (loss of 16); Conservatives, 73 (gain of 8); Liberal Prohibitionists, 28; Agrarians, 27 (gain of 9); Communists, 8 (gain of 4); and Liberals, 4. On Sept. 26, 1928, the Ekman ministry resigned and shortly afterward ex-Admiral Arvid Lindman succeeded in organizing a new Government of Conservative tendency, which, however, barely survived the 1929 session of the Riksdag. Its proposal to increase the tariff on sugar met defeat at the hands of the Social Democrats once again in alliance with the Liberal Populists. A projected increase in military expenditures was similarly negatived. Most serious reverse of all, a parliamentary storm forced the dismissal (June 7, 1929) of Finance Minister Wohlin, as a result of irregularities in his policy in connection with certain recent bank failures. The Lindman ministry emerged from the fray sadly damaged in prestige and with its future clouded with dubiety.

In the meantime, Swedish foreign policy moved steadily toward one goal—the achievement of international peace and security. A stanch supporter of the League of Nations, Sweden stood always ready to reinforce her covenant obligation though sedulously eschewing any "entangling alliance." (Repeated suggestions that Sweden enter into a defensive understanding with her Scandinavian sister states in a Baltic union were consistently opposed on the ground that such arrangements might be taken in an unfriendly sense by Russia.) Commencing with a renewal for 20 years of the compulsory arbitration treaty with Norway first signed in 1905 and now happily enlarged to cover all possible subjects of disagreement, the Swedish government proceeded to negotiate a whole network of virtually similar treaties not only with the remaining Scandinavian powers (Denmark and Finland) but with other countries as well, including Czechoslovakia (preliminary), Austria, Belgium (sweeping), Poland, France (limited), the United States of America, and Spain. In 1929 the Riksdag sanctioned Sweden's adherence to the Kellogg-Briand Pact.

SWEDENBORGIANS. See NEW JERUSALEM, CHURCH OF THE.

SWEDISH LITERATURE. See SCANDINAVIAN LITERATURE.

SWEET BRIAR COLLEGE. A college for women founded at Sweet Briar, Va., in 1906, offering only liberal arts courses terminating in the A.B. and B.S. degrees. The number of college students increased from 74 in 1914 to 445 in 1928, and the faculty from 20 to 44. The library increased from 4100 to 16,000 volumes between 1914 and 1928 and the annual income from $125,957 to $402,559. In 1925 an administrative and academic building, a residence hall, and an infirmary were built; and a new library, a gift in memory of Mary Helen Cochran, was under construction in 1928. Enrollment in the college is to be limited to 500. President, Meta Glass, A.M., Ph.D., who succeeded Emilie Watts McVea, Litt.D., LL.D., in 1925.

SWIMMING. Swimming as a sport has the distinction of leading the way in the matter of record-breaking year after year. Hundreds of new records come up for acceptance or rejection at the close of each season. This condition is due chiefly to the variations in the sizes of pools, necessary turns, and type of swimming involved. Increased speed and greater endurance, however, appear to characterize this sport more than any other each succeeding year, thus adding to the mass of new records claimed or listed. The world-wide interest gained by swimming competitions was emphasized in the 1928 Olympic Games in which 40 different countries participated. While the United States made practically a clean sweep of the events, the improvement shown by its rivals was most noticeable. Long-distance swimming has been featured by the many attempts, some successful, to negotiate the English Channel and by the Catalina Marathons off the coast of California.

SWINNERTON, FRANK ARTHUR (1884–). An English novelist and critic, born at Wood Green. His writings include: *The Merry Heart* (1909); *The Young Idea* (1910); *The Casement* (1911); *The Happy Family* (1912); *George Gissing: A Critical Study* (1912); *On the Staircase* (1914); *R. L. Stevenson: A Critical Study* (1914); *The Chaste Wife* (1916); *Nocturne* (1917); *Shops and Houses* (1918); *September* (1919); *Coquette* (1921); *The Three Lovers* (1922); *Young Felix* (1923); *The Elder Sister* (1925); *Summer Storm* (1926); *Tokefield Papers* (1927); and *A Brood of Ducklings* (1928).

SWITZERLAND, swĭt'zẽr-lănd. A country of south central Europe. Its area is 15,940 square miles, of which 507 square miles are lakes of more than 25 acres in area, and 3072 square miles otherwise unproductive. Of the productive land, 3576 square miles were forests in 1921, 69 square miles in vines, and 8721 square miles in agriculture and mountain pasturage. According to the 1920 census, the population was 3,886,090, compared with 3,765,123 in 1910; estimated in 1928, 4,018,500. The largest cities in 1928 were Zurich, 222,900; Basel, 144,550; Geneva, 128,125; Berne, 109,850; Lausanne, 78,050; and St. Gall, 64,460. In 1920 the number of German-speaking persons in Switzerland was 2,750,622; French-speaking, 824,320; Italian-speaking, 238,544; Romansch-speaking, 42,940; and speaking other languages, 23,894. In 1913, emigration for overseas countries was 5787; in 1927, 5272. Switzerland is largely a Protestant country, although in 10 of the 27 cantons, including St. Gall, Lucerne, Fribourg, Tessin, and Valois, Catholics are considerably in the majority. There is, however, no State church, all denominations being supported by voluntary contributions. In

1920, there were 2,230,597 Protestants, 1,585,311 Catholics, and 20,979 Jews.

Education. In the school year 1927–28, there were 4407 primary schools, with 16,544 teachers and 473,865 pupils; 599 secondary schools, with 2341 teachers and 48,579 pupils; and 98 intermediate schools, with 684 teachers and 13,289 pupils. There were also supplementary professional, industrial, commercial, agricultural, and domestic-science schools. The higher professional schools (including also normal and arts and crafts schools) numbered 48, with over 32,000 students. The seven Swiss universities are located at Basel, Zurich, Berne, Geneva, Lausanne, Fribourg, and Neuchâtel, with 6526 students. The University Institute for International Studies was opened at Geneva in October, 1927.

Agriculture. Agricultural production in Switzerland was as follows:

Crops	Area (thousands of acres)		Production (thousands of units—bushels, except as indicated	
	1909–1913	1927	1909–1913	1927
Wheat	105	174 [a]	3,447	5,982
Rye	60	49	1,855	1,657
Barley	13	16	441	583
Oats	81	51	4,784	3,059
Potatoes	115 [b]	119	24,924 [b]	24,618
Grapevines	59	37	11,842 [c]	9,246 [c]

[a] Maslin and spelt included with wheat.
[b] 1911–1913.
[c] Unit, gallon.

In 1926 there were 1,587,000 cattle, 635,000 swine, 169,000 sheep, 287,000 goats, and 139,000 horses. Dairying is the most important branch of agriculture.

Industry. Switzerland is an industrial country in spite of a lack of raw materials; the chief natural resource is water power. The total water power available was estimated at 2,699,336 horse power in 1914, of which 1,067,000 horse power was in use in 1925; water power was used principally by hydroelectric stations, and by the chemical and textile industries. At the end of 1927, there were 8163 factories in operation in Switzerland, employing 354,496 workmen. The principal industries in 1927 were machinery and appliances, with 61,485 workmen; cotton textiles, with 34,517; silk textiles, with 25,966; watch and jewelry manufacture, with 42,687; metallurgy, with 26,778; and foodstuffs and beverages, with 24,702. After the World War, many of the strongest industries, especially the machine industry, were greatly injured by competition with countries having depreciating currencies, and by the high cost of raw materials. The watch industry, however, was best able to meet competition and was, in 1929, in a flourishing condition. Unemployment, which was not a notable problem before the War, became very high in 1921, and reached a maximum in February, 1922, with 146,302 wholly or partly unemployed. A gradual improvement occurred with 35,314 in July, 1923, and with 13,701 at the end of December, 1927.

Commerce. Total exports during 1928 were valued at 2,134,000,000 francs, an increase of 111,000,000 francs, as compared with 1927; imports increased from 181,000,000 francs to a total of 2,744,000,000 francs. There was a good advance in exports of watches, machinery, dyestuffs, aluminum, rayon, knitted wear, and shoes. Imports of textile raw materials declined 11 per cent in quantity, the loss applying chiefly to cotton. Imports of manufactured goods increased 100,000,000 francs in value.

Finance. Budget deficits were not common and never large in Switzerland before the War. In 1913 expenditures were 192,000,000 and receipts 187,000,000 francs, with a deficit of 5,000,000 francs. By 1928 expenditures had risen to 347,490,000 and receipts to 338,230,000 francs, with a deficit of 9,260,000 francs. Unemployment subsidies and subventions to depressed industries, added to expenses arising from maintaining armed neutrality in the War, contributed to this deficit. The budget for 1929 called for revenues of 352,800,000 francs, and expenditures of 350,925,000 francs. The public debt of Switzerland on Dec. 31, 1913, amounted to 148,270,000 francs; by the end of 1921, it had increased to 2,063,360,800 francs, and by 1928, to 4,952,596,000 francs, including the debt of the federal railways. It was expected that the budget deficits would be eliminated within a few years, but the large amount of the public debt contracted after the beginning of the War, created a heavy burden for the Swiss taxpayer.

Communications. Water connections between Switzerland and other countries were unimportant, except by the Rhine from Basel, and internal waterways are not suitable for through navigation. Swiss railways are, therefore, of great importance to the country. They consist of a network of 2340 miles of standard-gauge line, of which 1829 miles are owned by the federal government. The financial condition of the Federal Railways, which was unsatisfactory after the World War, showed improvement, the year 1928 being the most favorable experienced since the War. Operating receipts in 1928 were 419,033,000 francs, as compared with 395,525,000 francs in 1927, while operating expenses were 254,016,000 francs, or only 3,000,000 francs more than in 1927. In 1929, 67 per cent of the total federal trackage was electrified, and it was estimated that 85 per cent of all traffic would be handled by electric locomotives during the year. The private railways have much less traffic than those of the Government. There were also, in 1926, 340 miles of tramways which carried a total of 188,440,000 passengers, and 30 miles of aërial mountain cableways, which transported 11,380,000 passengers.

History. Switzerland's position during the Great War was perhaps more difficult than that of any other neutral nation. Without a merchant marine and hemmed in on all sides by belligerents, her political and economic position could hardly be said to be of her own ordering. In the Swiss mind, there were two spectres ever present: the fate of Belgium and the very real danger of starvation.

Upon the outbreak of hostilities, the army was immediately mobilized for the preservation of the neutrality and territorial integrity of the country. Lessening fear of invasion, together with added financial burdens, led the Government from time to time to demobilize detachments of troops. Distress among soldiers' families occasioned governmental measures for relief, while private agencies contributed unstintingly to the same end. In all, the War cost Switzerland, in the defense of her frontiers, some $200,000,000. In spite of very heavy taxation, recourse was had to numerous loans and the public debt of the Confederation increased about tenfold. It was not until late in 1920 that troops were definitely withdrawn from the frontiers and the regular channels of communication once more thrown open generally.

Economically, the plight of Switzerland was equally wretched. The country was overpopulated and overindustrialized in proportion to its resources. Dependent on the Allies for foodstuffs and on the Central Powers for fuel, fertilizers, and raw materials, it was extremely difficult for the Alpine state to find a *via media* between the two groups. With the continuance of the War, the pinch of necessity was felt more and more acutely, and ultimately almost all necessities of life fell under the control of the central authorities to be rationed with greater or less parsimony. Certain industries flourished. Exports of embroideries, chemicals, silk yarns, wrought copper, iron forgings, and munitions mounted, for all belligerent states had an interest in keeping Swiss factories at work. Years of material privation and moral strain led to increasing social unrest. The year 1918 saw increasing friction between the Social Democrats and the federal government, culminating in a general strike on November 11–12, which temporarily paralyzed the economic life of Switzerland. The programme of the movement embraced such familiar objectives as proportional representation, woman suffrage, democratic reorganization of the army, a state-imposed 48-hour week, state social insurance, etc. The troops remained loyal and the strike collapsed after two days. It was in large measure an echo of the Russian and German revolutions.

There was no brighter page in European history during this tumultuous period than Switzerland's conduct toward foreign nationals voluntarily or involuntarily detained within her borders. In addition to temporarily stranded tourists, there were interned soldiers. Before the end of the War, at least 25,000 men of nations at war were being housed, fed, schooled, and set to work by Swiss authorities. To the Swiss Red Cross fell the work of exchanging prisoners and caring for the sick and wounded. The International Red Cross at Geneva tried to facilitate communications between belligerents, check the bombarding of hospital stations, and the like. More than ever, Switzerland became a centre of international activity. A whole series of Socialist conferences assembled there. See SOCIALISM.

Switzerland's rôle in international affairs assumed more significant proportions after the War. Continual protests against abject dependence upon her neighbors for communications with the outside world were finally heeded by the Peace Conference in 1919 and she was given freedom of access to the sea via the Rhine, thereby paving the way for a merchant marine of tugboats and barges. The Gotthard railway convention of 1909, so obnoxious to Switzerland, was repealed. The agitation of German Austrians in the Vorarlberg Province for admission to the Swiss union was not successful largely on account of the reparations question, though many Swiss objected to the addition of 15,000 more German-speaking people to the already heavy German majority. In 1921, however, the Swiss Federal Council consented to the incorporation of the little Principality of Liehtenstein into the Swiss customs union (effective in 1923). Diplomatic and consular representation and the management of ports and telegraphs were also turned over to Switzerland. Switzerland's post-war relations with Germany and Austria were generally harmonious. Quite different was the case with respect to Italy and France. Italian territorial ambitions had by no means been satiated by her success in the Tyrol. *Italia irredenta* likewise embraced the Swiss canton of Ticino and this had long been a source of conflict between the two countries. The ultra-nationalist Fascist Revolution in Italy therefore created many misgivings in Switzerland. Mussolini, it is true, officially discountenanced irredentist agitation and endeavored to consolidate Swiss-Italian friendship both economically and politically, but the steady growth of Fascist organizations on Swiss soil, particularly in Ticino, all well disciplined and blindly obedient to the Italian government, boded ill for the future. With France occurred a decade of dispute over the régime of the free-trade zones created about Geneva by the treaties of 1815. Denounced by the French government in 1918, they were (by Art. 435 of the Treaty of Versailles) made subject to negotiation between France and Switzerland. A convention of Aug. 7, 1921, gave Switzerland certain economic advantages but agreed to the advancement of the French customs line to the political frontier. Simultaneously a convention was signed providing for the abandonment of the Swiss claim to the military neutrality of Upper Savoy. Though approved by the Swiss Parliament, the Zones Convention was overwhelmingly rejected in a popular plebiscite on Feb. 18, 1923, by 410,227 to 92,541 votes. The Poincaré government, alleging bad faith and claiming authority under the Treaty of Versailles, took the unilateral step of abolishing the zones régime on Nov. 10, 1923. This action aroused great indignation in Switzerland.

After protracted negotiations, a new agreement was arrived at referring the controversy to arbitration by the International Court at The Hague. Tension was relaxed, but lingering bitterness in Switzerland was exacerbated by French maintenance of customs control and by the procrastination of the French Assembly in approving the arbitration agreement. Not until April, 1928, were ratifications exchanged. An arbitral decision was expected in 1929. Strained relations with her powerful Latin neighbors had meanwhile impelled Switzerland to overhaul her military training system and to modernize the equipment of her troops. With noncontiguous Soviet Russia, the Swiss government came into conflict because of the assassination on May 10, 1923, of Vorovsky, Russian plenipotentiary at the Lausanne Conference. Dissatisfied with Swiss handling of the matter, the Moscow authorities indignantly expelled numerous Swiss nationals from Russia and instituted an economic boycott. Switzerland retaliated by a similar embargo and the situation continued extremely strained until the conclusion of a protocol of adjustment at Berlin, Apr. 14, 1927, which, however, did not involve Swiss *de jure* recognition of the Soviet régime.

Most important of all factors in bringing Switzerland to international attention was the League of Nations, the seat of which was established at Geneva. Swiss statesmen evinced a keen interest in the new organization from the outset and endeavored to ensure the entry of their country. The chief question at issue was whether membership would be compatible with the perpetual neutrality of Switzerland which had just been reaffirmed by the Treaty of Versailles. After some months of doubt and the possibility of adverse action by the Supreme Council of the

Allies, the Swiss government finally succeeded in obtaining a decision of the Council of the League, Feb. 13, 1919, granting a special status to Switzerland. Then followed a hotly contested political campaign which ended in a narrow victory for the pro-League element (400,000 to 300,000) in the referendum of May 16, 1920. Swiss representatives, headed by M. Motta, participated usefully in successive assemblies of the League. Not content with joining the League of Nations and later accepting compulsory jurisdiction of the Permanent Court of International Justice, Switzerland concluded a score of arbitration treaties.

In common with other countries, Switzerland experienced a severe economic crisis during the post-bellum period. The world-wide movement for higher tariffs had an adverse effect on Swiss prosperity despite protective measures adopted by the Government. Unemployment, comparatively little in December, 1920, increased apace during the following year, the number of unemployed reaching 146,000 early in 1922. Special subsidies were granted to various industries—watch-making, dairying, embroidery-making, hotel-keeping, cereal- and stock-raising—and vast sums were expended for the relief of unemployment. Gradually, the situation began to improve. Unemployment was reduced and by 1928 the economic situation was generally satisfactory with industry, trade, and tourist traffic all doing well, though the international agrarian crisis was affecting Switzerland, causing great discontent among the peasantry and necessitating measures of relief. The intensive development of hydroelectric energy facilitated the electrification of railways and promised to make Switzerland independent of other countries for fuel, etc.

In the realms of politics and social development, Switzerland kept an even balance. Successive triennial legislative elections (1919–1922–1925–1928) registered little change in the relative position of the various parties, and not having a "parliamentary" system, the country was undisturbed by ministerial crises, but there was no lack of political agitation and controversy. The burdensome war debt and mounting governmental expenditures caused annual budgetary deficits. Since a special war-time general property and income tax re-authorized in 1919 failed to ameliorate the situation, the Social Democrats initiated a proposal for a practically confiscatory graduated capital levy, but this was decisively rejected by 790,584 to 109,484 votes in the plebiscite of Dec. 2–3, 1922. Any saving effected by cutting down normal running expenditures was immediately offset and even exceeded by ever-growing outlays called for by beneficiary and paternalistic legislation—unemployment relief, industrial subsidies, sickness and accident insurance, old-age pensions, etc. Nevertheless, Switzerland managed to maintain a stable currency, seceding from the Latin Monetary Union and considering the adoption of a gold standard. The woman-suffrage movement encountered obstacles and the prohibition movement experienced decided setbacks. Switzerland, laboratory of political experimentation along so many lines, seemed averse to these particular movements.

SYKES, SIR MARK (1879–1919). An English public official, born at Sledmere, Yorkshire, and educated at Cambridge. He served in the South African War in 1902 and became secretary to Sir George Wyndham in Ireland in 1904. In 1905 he went to Constantinople as attaché to the British Embassy. His knowledge of Mesopotamia and Palestine proved invaluable during the World War, and he was sent on important special missions to Russia, Mesopotamia, and Syria. He also raised a battalion of the Yorkshire Regiment. His books include: *Through Five Turkish Provinces* (1900); *Dar-el-Islam* (1903); *Five Mansions of the House of Othman* (1909); *The Caliph's Last Heritage* (1915).

SYKES-PICOT TREATY. See MESOPOTAMIA; WORLD WAR, DIPLOMACY OF THE.

SYMONS, sĭm'onz, ARTHUR (1865–). An English poet and critic (see VOL. XXI). His later works include *Figures of Several Centuries* (1915); *Tragedies* (1916); *Tristan and Iseult* (1917); *Colour Studies in Paris* (1918); *The Toy Cart* (1919); *Studies in Elizabethan Drama* (1920); *Charles Baudelaire* (1921); *Translations from Baudelaire* (1925); and *Eleonora Duse* (1926).

SYNDICALISM. Syndicalism is a form of revolutionary socialism which, although based on the Marxian theory of the class struggle and of the failure of capitalism, repudiates the state, political organization and activity, and the ownership of the means of production by the state or any other political organization. Instead, it believes in strictly industrial organization and in the ownership of the means of production by groups of producers. It regards the industrial union as the unit of organization. Its aim, the industrial society, is to be composed of the aggregate of these coördinated industrial units. Control of production is to be vested in the workers. Toward that end, syndicalism employs revolutionary tactics: the general strike, direct action, sabotage, etc. See SABOTAGE. The Syndicalists take pride in possessing a hard realism which takes account of the existing situation, employs such methods as are required to attain a given end, and does not permit emotion to enter into the issue.

The years following the War were of marked importance for the Syndicalist movement. Although it suffered reverses in some countries, as in France, it made on the whole important forward strides. For the first time, efforts were made at international Syndicalist unity. A number of Syndicalist organizations were affiliated with the Red International of Labor Unions, organized at Moscow, July 15, 1920. In opposition to this body, because it was "not capable of organizing the revolutionary workers of the world into one compact fighting body" and was, moreover, an off shoot of communism, the strictly Syndicalist International Workmen's Association was established in Berlin, December, 1922–January, 1923.

The foremost Syndicalist organization in the United States was the I. W. W. (see INDUSTRIAL WORKERS OF THE WORLD). At the height of its power in 1923, the I. W. W. reported a membership of 58,000. Contrary to the general belief, the membership of the I. W. W. does not consist of foreigners but of native Americans of old stock. At the close of 1928, the organization occupied a rôle of minor significance in the American labor movement.

In France, the homeland of syndicalism, the Syndicalist movement weakened greatly and, after the outbreak of the War, its adherents became the minority in the General Confederation of Labor, instead of being, as before, the dominant group. This Syndicalist minority seceded in 1921 and formed the revolutionary General Confederation of United Labor. In England, the

Syndicalist movement had some strength during the latter part of the War. There existed a Syndicalist movement in Germany with a membership of 100,000, but it was very insignificant in comparison with the strength of the Socialists and Communists in that country. Italy had two Syndicalist organizations, the Italian Syndicalist Union and the Italian Union of Labor. With the appearance of Fascism, Italian revolutionary syndicalism disappeared. Italian Syndicalists, with the organization of the state into corporations, gave up Sorel's idea of violence and the class struggle, for Fascism's ideas of interclass solidarity and a united national front. (See FASCISM.) There were also considerable Syndicalist elements in Spain, Canada, New Zealand, Australia, South Africa, and Argentina.

SYNTHOL. See CHEMISTRY, APPLIED.

SYPHILIS. In the period since 1914, our knowledge of this disease continued to increase in several directions. Historically, the attempts of the late Iwan Block to uphold the dogma that Old World syphilis was derived entirely from the American aborigines largely were set at nought. Even if the returned mariners of Columbus did become contaminated in America, and even if they did originate a focus of disease in Spain, there are no good reasons for doubting that the malady was already existent in the Old World. Medical history writing has made great advances in recent years and a new technique has developed. From the purely documentary side, it is difficult to uphold the existence of a great European epidemic of the disease late in the fifteenth century. The records of cities which, according to tradition, were ravaged by the disease, show no evidence in their archives of any unusual disbursement of public funds during 1495 and subsequent years. Students of old civilizations, such as those of Persia and Egypt, have pointed out that some of the modern folk designations of syphilis are of high antiquity. It is increasingly evident that the history of syphilis should be rewritten along purely scientific lines, paying little heed to old writers who wrote consciously of the disease on a basis of gossip and tradition.

The belief that syphilis prevails in proportion to the amount of commercialized vice which obtains in a given locality seems to rest on a fallacy of some sort. Since the disease has been reportable, there is no evidence of any notable falling off in its incidence, and a large proportion of fresh infections escapes record. New York City in 1924 was quite free from commercialized vice and had been free for some years previously; yet there was an average of 400 new cases reported every week, which means 20,000 annually, a figure which is no index of the actual number of new infections. In addition, the number of United States and Canadian youth infected in Europe is said to have been very large, fully justifying the use of the prophylactic measures which are often condemned unjustly as condoning vice.

The opinion gained ground during the World War that no opprobrium can be attached to medical authority when the efforts at prevention take place after the soldier has been exposed to the danger of contracting the disease. Neglect under such circumstances would be criminal. In regard to prophylaxis before the exposure, this has been well defended on economic grounds, because an infected soldier or sailor becomes a charge on his command and must be interned and treated, and prevented from disseminating his disease; but all prophylactic measures whether undertaken before or after exposure, as well as all rapid and certain measures of treatment, have been attacked by moralists as inciting to further immorality by withdrawing the discipline of punishment.

The enormous vogue of salvarsan in the treatment of syphilis is best shown by the fact that the discovery by United States chemists during the War of how to make this German proprietary is said to have netted the United States government half a million dollars from the sale of the drug to consumers through distributing firms.

In speaking of the persistence of syphilis despite the abolition of officially or otherwise segregated vice districts, a word must be said as to the effects of prohibition, which it was hoped would work favorably against the spread of the disease. Many cases of infection were formerly directly traceable to intoxication, and it was often claimed that commercialized vice could not flourish without alcohol. Nevertheless, as already pointed out, the incidence of the disease does not diminish in large cities; and either prohibition does not prohibit, or diffusion of the disease is only slightly affected by alcoholic indulgence.

The chief interest in this disease of recent years lies in the domain of treatment. Salts of bismuth used hypodermically have attained an eminence but little inferior to mercury and the organic arsenicals. In cases which do not thrive under the older remedies, bismuth supplies a reserve. Potassium iodide, once regarded as a valuable remedy, is but little in evidence today in the literature of syphilis therapy. The sensational cure of paresis by malaria inoculation has been gradually extended to syphilis in general, although only after drug treatment has proved unsatisfactory. This form of treatment has been rather slow in reaching America, but has been in use at the Mayo Clinic for paresis and neurosyphilis in general since 1924. Among cases eligible for this treatment are those which are free from symptoms but have positive reactions in the cerebrospinal fluid. Apparently, in neurosyphilis with the exception of paresis, the drug remedies are first tested, but in the latter malady, drugs have always failed, so that malaria inoculation is used without delay. A substitute for the latter is typhoid vaccine, given purely because, like malaria virus, it produces fever. In some of the European clinics, the malaria treatment has been extended to the non-nervous forms of the disease and even to early cases, but the wisdom of this course is questionable.

SYRACUSE. A city of New York State. The population increased from 37,249 in 1910 to 171,717 in 1920, to 182,003 in 1925 (State census) and to 199,300 in 1928, by estimate of the U. S. Bureau of the Census. In 1926–27 the municipal boundaries were extended to include Eastwood, Onondaga, and Genesee Manor, and the population was increased by 10,732. The metropolitan area embraces the adjacent townships of Camillus, Dewitt, Geddes, Manlius, and Salina. The authority of the City Planning Commission was extended in 1923 to cover supervision of new developments in the outskirts of the city. Building construction has been active, reaching an estimated value of $32,000,000 in 1927. The major building projects included two new hospitals, one constructed by the city and the other to replace the old Syracuse Memorial Hospital; five office buildings, the Loew Theatre and Office Building, the State Tower, the Chimes, the Hills, and the New York Telephone buildings; and two new hotels. A school-building programme totaling $2,500,000 has been carried out since 1924. In 1928 the city embarked on a 10-year improvement plan calling for an expenditure of $35,000,000 in extending streets, sewers, and water mains. The principal feature was the construction of the Erie Boulevard, 56 feet wide, over the filled-in bed of the old Erie Canal. The municipal airport, covering 133 acres, has been established about 6 miles northwest from the centre of the city. In 1926 22,562 persons were employed in 414 industrial establishments of Syracuse and received $32,195,917 in wages; the value of products manufactured was $147,902,737. Bank clearings in 1928 reached $347,594,000. The assessed valuation of property in 1927 was $302,326,000; the net debt was $24,248,000.

SYRACUSE UNIVERSITY. A coeducational institution at Syracuse, N. Y., founded in 1870 and fostered by the Methodist Episcopal Church, but nonsectarian in administration and policy. With the exception of the war years, the number of students registered increased steadily from 3933 in 1914 to 5430 in 1928. The faculty increased in the period from 300 to about 600 members and the library from 100,000 to 173,000 bound volumes, and 60,000 pamphlets. By gift and legacy, the university received about $1,000,000 from Mrs. Russell Sage. John D. Archbold's gifts, including the stadium and gymnasium, aggregated over $2,000,000. The School of Nursing was established in 1915, and the college of home economics was opened as a school in 1918, and made a college in 1921. The college of business administration was established in 1920, having been founded as a school in 1919. An evening school was opened in 1918. In 1927 the University inaugurated a policy of surveying, with the aid of outside experts, the curricula and academic equipment of its various schools and departments. As a result of the study, the law school was completely reorganized with full-time teachers replacing practicing lawyers who had been teaching on a part-time basis. With the coöperation of the American Library Association, a similar study was made of the library school resulting in reorganization. By 1928 a similar result was achieved with the college of home economies and in the same year a teachers'-pension system for all grades was adopted. Work in dramatics under expert supervision largely took the place of extra-curricular activity in this field and a system of student self-government was established. Productive funds in 1928 amounted to $3,539,985. Chancellor, Charles W. Flint, D.D., LL.D., Pæd.D.

SYRIA, sĭr'ĭ-ȧ. A former province of the Turkish Empire in Asia, but after 1920, an independent state, whose affairs were supervised by France as a mandatory power. The French mandate for Syria was confirmed by the League of Nations on July 24, 1922. Henri Ponsot was appointed high commissioner in October, 1926. Administratively, the country was divided on Jan. 1, 1925, into four territories, namely Syria, Alawiyya, Great Lebanon, and Jebel Druze. The total area of the mandated region has been placed at 60,000 square miles, and the population in 1926, at 2,046,857. The population is for the most part of Arabic origin, and Arabic is the prevailing language. Other nationalities represented are Turks, Turcomans, Kurds, Circassians, Armenians, Persians, Jews. A religious classification showed the following: Moslems 1,514,755, of whom 1,075,816 were Sunni Moslems, Christians, 505,419; and Jews (principally in the four large cities) 16,526. The important cities with their 1921 populations were Damascus (170,000); Aleppo (140,000), Beirut, capital of Greater Lebanon (80,000), Hama (35,000), Homs (60,000), Tripolis (30,000), Antioch (30,000), Alexandretta (15,000). Education is supported by the French, British, and American missions. The last maintain a college at Beirut, as do also the Jesuits and Greek Catholics. The education of women is receiving considerable attention.

Industry. Syria is an agricultural country, though it was estimated that only 10 per cent of the lands west of the Euphrates was being tilled. Of the million acres being worked, fully 750,000 were under wheat and barley. In 1927 the yield (in metric tons) was: wheat, 396,600; barley, 333,650. The wheat raised was entirely for local consumption, while barley, after 1919, was being exported in considerable quantities to England and Germany, to be used in the making of beer. Other crops of importance are sesame (from which oil is produced), tobacco, olives, silk, oranges, lemons. Live stock suffered severely during the World War, as may be seen by the fact that sheep and goats numbered 4,800,000 in 1914, and only 2,408,000 in 1920, cattle 500,000 in 1914, and only 293,000 in 1920, horses and donkeys 270,000 in 1914, and only 143,000 in 1920. Lead, iron, copper, nickel, lignite, petroleum, and other minerals have been discovered, but none mined in paying quantities. Manufacturing is still in an embryonic stage. Sericulture, oil, soap, flour receive some attention.

Trade. Previous to the War, exports averaged 60,000,000 francs ($11,670,000), and imports 124,000,000 francs ($23,932,000). That the country's trade was showing some recovery after 1920 was revealed by the trade figures for the subsequent years. Imports for 1927 amounted to $50,300,000; exports, $21,486,000. The very high adverse trade balance, and the falling off of the transit trade with the interior because of customs barriers, indicate that the economic situation is a difficult one. The country's revenue (i.e., invisible exchange) was being derived mainly from the spendings of the French Army of Occupation, and from remittances by Syrians in North America and South America. Leading exports are wool, hides, olive oil, tobacco, fruits, wine, etc. Leading imports are cotton goods, food products, iron and steel, building materials, etc. Principal countries of origin in value of imports in 1927 were United Kingdom, France, Egypt, Italy, Germany, United States, Belgium, Turkey. Principal countries of destination in value of exports in 1927 were France, Palestine, Egypt, Turkey, United States, Italy. The port of Beirut handled three-fourths of all the trade. Other customs ports were Tripoli, Alexandretta, Aleppo, and Damascus.

Communications. There were, in 1927, 492 miles of railway in Syria. A line traversed the interior from north to south with branches to the chief ports. Alexandretta, by way of Aleppo, was connected with the Bagdad Railway, which had 190 miles of line in Syria. Damascus, similarly, was on the route of the Hedjaz railway into the south. A motor route extends across the Syrian desert between Beirut and Bagdad. In 1927, 1612 vessels of 3,099,278 tons entered the ports of Lebanon and Syria.

Finance. In May, 1920, the unit of currency was made the Syrian pound (£S), equivalent to 20 French francs ($3.96). Notes were issued by the Bank of Syria, and by Dec. 31, 1927, notes in circulation totaled £S7,675,000. The budget for 1927 showed a balance of receipts and expenditures of 1,508,630 Syrian gold pounds; that for 1928 a balance at 2,343,608 pounds. In 1921 the whole mandate territory had received a subsidy of 25,000,000 francs from the French government, but in 1922 this grant was discontinued in the hope that the local budgets could be made to balance.

History. Though French and British troops did not move on Syria until late in 1918, the location of the country as one of the important transit lands between the East and the West made it the scene of extraordinary hardships for the population. As a result of conscriptions, deportations, disease, starvation, and the exactions of their Turkish rulers, as well as the stringency of the blockade, the native Syrians had been depressed into a condition of complete helplessness. By 1918 it was estimated that the population of the vilayet of Beirut alone had fallen off 150,000. The débâcle of the Turk during October–November, 1918, and the arrival of French and British troops, however, did not put the fears of the population at rest. Those agreements among the Allies for the partition of the Near East which had been made public had taught the Syrians that an interest in them was not occasioned by strictly altruistic motives. By the secret Treaty of London of 1915 and the Sykes-Picot Agreement of 1916, Turkey in Asia had been partitioned into spheres of influence among the Allies, the Syrian coast and hinterland falling to France. The British and French Armies of Occupation were received, therefore, with open hostility. The withdrawal of British troops in November, 1919, left the French in a precarious position.

By the treaty of Sèvres (Aug. 10, 1920), Turkey renounced Ottoman sovereignty over Syria, including Cilicia, and by subsequent action of the Council of the League of Nations, July 22, 1922, France was formally instructed with a mandate over Syria, although formal promulgation of the mandate was further postponed by Italian objections. The southern and eastern boundaries were fixed in principle by an Anglo-French Convention on Dec. 23, 1920, and definitively by an Anglo-French Agreement of Feb. 3, 1922, effective Mar. 10, 1923. The northern frontier, which by the Sèvres treaty had run eastward from the gulf of Alexandretta to the Tigris, including the corresponding section of the Bagdad Railway, was modified by the Franco-Turkish Treaty of Angora, Oct. 20, 1921; by this treaty, France restored to Turkey not only Cilicia but also a long strip running eastward almost to the Tigris and including the Bagdad Railway from a point near Aleppo to Nisibin—about 9000 square miles in all. This new boundary was confirmed by the Treaty of Lausanne, July, 1923. Meanwhile, the proposals of the Syrian National Congress of July 2, 1919, for a free Syrian state to extend into Palestine and a request for an annulment of those agreements whose purpose was the partition of Syria having met with rejection, the anti-European hatred was fanned into flame.

Affairs were further complicated by the pretensions of Emir Feisal, son of King Husein of the Hedjaz, who sought to found a constitutional monarchy in Syria and at the same time maintain the friendship of the British and French. Fighting broke out late in 1919 and continued through 1920. On Mar. 8, 1920, a Syrian National Congress meeting once more at Damascus repeated the programme for complete independence and offered the crown to Emir Feisal. Feisal accepted and formed a government. The result was a rekindled ardor, and the attacks on the French increased in number, against the counsels of the new King, whose desire it was to conciliate the French. Antioch fell before an Arab force in March, while disorders spread far to the south into Palestine. Assistance was received from the Angora government in the north and fighting went on between the Turks and the French in northern Syria during the whole of 1920.

In July, 1920, a French Army under General Gouraud won an overwhelming victory over the Arabs outside Damascus, occupied that city, and overthrew King Feisal. On August 4, the Emir was compelled to leave the country. Not until July, 1921, however, could Gouraud report that the pacification of Syria was completed. Then, to prevent the development of any strong nationalist feeling, Syria was divided into five administrative districts, each with a different name and different laws, but all under the same French High Commissioner who thus became a sort of governor general. Lebanon, in the south, was given autonomy and enlarged by attaching the plains of Bekaa to the mountains of Lebanon. Jebel Druze (south of Hauran) likewise became an autonomous unit, with an elected council and a Druse governor. The remainder of the mandated territory was divided into the three states of Aleppo, Damascus, and the Territory of the Alaouites, each state having a more or less representative and autonomous State Council, and sending five delegates to the Federal Council of Syria.

On Jan. 1, 1925, Damascus and Aleppo were united to form the single state known as the Republic of Syria. Naturally, it was the French officials in every case who were the Government. In 1929 the French officials in the entire Syrian mandate numbered 352.

A group of factors combined to make relations between the French and the natives difficult: (1) The Moslems, who were in the majority, felt that the French were favoring the Christians; (2) a strict censorship of press and speech was maintained; (3) the depreciated French currency was substituted for the gold and silver that had been in circulation previously; (4) French was made the language of the law courts; (5) martial law was set up and continued until 1925. In January, 1925, High Commissioner Weygand, who had been appointed in May, 1924, was removed at the insistence of the radicals in the French Chamber of Deputies. He was succeeded by the anti-clerical General Sarrail, who antagonized even the Christian elements in Syria, and then, in July, 1925, crowned his administration by imprisoning a number of rebellious Druse sheiks after having invited them to Damascus for a peaceful conference.

The revolt, which until then had been local, now spread quickly and some French troops in Damascus were attacked by an outraged populace. A bombardment and bombing of the city by artillery and airplanes followed, in which about one thousand natives, mostly women and children, were killed, and the city ruined. Sarrail was recalled, and during an interim the French authorities armed the Christians so that they might help subdue the revolting Moslems. A new commissioner, M. de Jouvenel, appointed Nov. 6, 1925, restored order temporarily, but was faced by a new uprising early in 1926. On May 6, Damascus was again bombarded, whereupon the League of Nations Mandates Commission criticized French policy. A new commissioner, M. Auguste Henri Ponsot, was then appointed (Oct. 4, 1926). He had 30,000 French troops at his disposal and by the summer of 1927 could announce the restoration of quiet and order.

The exodus of a total of about 50,000 Syrians from their country in the years 1926 to 1928 led to a debate in the French Chamber in November, 1928, on the advisability of granting Syria its unconditional independence. Poincaré, however, strenuously opposed the idea. His chief point was that if France got out of Syria the League would assign it to some other power, and no other country could undertake the task of preparing Syria for independence with such "magnificant disinterestedness" as France. The Chamber then simply dropped the matter.

On Aug. 12, 1928, Ponsot prorogued a Syrian Constituent Assembly for three months because of its insistence upon inserting a declaration calling the mandate an "independent sovereign state" into the draft of a new constitution. In November, the Assembly was prorogued for another three months, and then in February, 1929, it was dismissed for a third time, on this occasion indefinitely. Then, the students of the Syrian University in Damascus went on strike on Apr. 4, 1929, because the Government proposed to reduce the appropriation for the institution. The law and medical students were soon joined by the students of all the secondary schools in Damascus, and on April 9, they sent a delegation to Beirut to confer with High Commissioner Ponsot. On April 13, he acceded to their request and the budget was restored. Reports from Syria in June, 1929, indicated that "economic conditions in the country continued to deteriorate." Elizabeth P. MacCallum's *The Nationalist Crusade in Syria*, published by the Foreign Policy Association, New York, 1928, presents the best account of Syrian relations in the decade following the War.

SZE, Sao Ke Alfred (1877–). A Chinese diplomat, Minister to the United States (1921–29). He was born in the Province of Chekiang and educated at Cornell, and, in the law, at St. John's (Shanghai), Toronto, Columbia, and Syracuse. After activity in Chinese railways, he became Minister of Post and Communications, and acting minister of finance, in the cabinet of the first Republic of China (1912), officer of ceremonies at the President's office (1913), and minister from China to Great Britain (1914–21), when he became envoy to the United States. He was also a delegate to the Paris Peace Conference, was chief delegate to the Washington Conference on the Limitation of Armaments and Pacific Far Eastern Questions (1921), acting Minister of Foreign Affairs (1922), and Chinese delegate to the International Opium Conference at Geneva (1924–25). He published *Addresses* and *The Geneva International Opium Conferences.*

SZYMANOWSKI, Karol (1883–). A Polish music composer, born at Timoshevka, Southern Russia. He studied with S. Noskowski in Warsaw, where he made his home and later became professor at the conservatory. Beginning as an imitator of Chopin, with an admixture of impressionism, he rapidly drifted to Futurism, He wrote two operas, *Hagit* (Warsaw, 1922) and *Le Roi Roger* (Warsaw, 1926); three symphonies; a symphonie poem, *Penthesilea;* a concert overture; a piano concerto and a violin concerto; *Demeter*, for contralto, female chorus and orchestra; *Agave* for soprano, chorus, and orchestra; a number of pieces for violin and piano; and piano works, some in the larger forms (three sonatas, three poems, a fantasy).

T

TACNA-ARICA DISPUTE. An international controversy between Chile and Peru that was argued intermittently following the conclusion of the Chilean-Peruvian War and the Treaty of Ancon of 1883. By the treaty, Chile was awarded the province of Tarapaca outright. The provinces of Tacna-Arica, on the other hand, were to remain in Chile's possession for 10 years, upon the conclusion of which a plebiscite was to be held in the territory to decide its ultimate disposition. A payment of 10,000,000 Peruvian *soles* (Chilean dollars) was to be made to the defeated contestant nation. Chile's contention was that the plebiscite provision was inserted in the treaty to allay Peruvian national feeling, it being the intention of the peace commissioners that Chilean sovereignty should remain uncontested, and for that reason no terms were formulated for the holding of the plebiscite.

The year 1893 found Peru demanding the execution of the treaty but proposing such arbitrary conditions, e.g., that only Peruvian citizens be permitted to vote in the plebiscite, that no understanding could be reached. The point became a *cause célèbre* in both countries, political campaigns being waged on it as the single issue. Relations were broken off in 1901, resumed in 1905, severed again, resumed in 1910, and cut off indefinitely in 1911. Chile, meanwhile, had spent great sums in the development of the provinces, commencing irrigation, sanitation, and port-development projects, and spending $25,000,000 on the railroad from Arica to La Paz, Bolivia, alone.

In 1919, aroused by the anti-Peruvian riots in Chilean cities, and the publication of the Chilean-Bolivian Treaty of 1905, by which Bolivia had been promised an outlet to the sea by way of the city of Arica, Peru once more pressed her claims. In 1920 she asked that the question be put on the agenda of the Assembly of the League of Nations, only to withdraw the request soon after. In 1921 Chile once more sought the holding of a plebiscite, but meeting no response except the demand that the whole treaty be reconsidered, broke off negotiations. Meanwhile Bolivia, on the grounds that the question had become a universal one and involved the freedom of the Pacific, interjected herself into the affair. It was not until 1922 that the first hope of a settlement appeared. On Jan. 17, 1922, the United States dispatched identical notes to Chile and Peru for the purpose of effecting an agreement. On July 15, a protocol was signed by representatives of both nations nominating the President of the United States as arbiter; Chile and Peru accepted the protocol as the basis for discussion, and in February, 1923, delegates arrived at Washington, and the long process of investigation, filing of briefs and counterbriefs, was begun; Peru's final brief was not filed until Apr. 12, 1924.

Meanwhile, President Coolidge succeeded President Harding, and in 1925 he decided that a plebiscite should be held under the auspices of a Plebiscitary Commission of three members, one appointed by the United States, and one each by Chile and Peru. Both countries accepted this decision (Peru under protest, however) and on Aug. 4, 1925, the Commission, under the presidency of General J. J. Pershing (U. S.), commenced its work of preparing the ground for a plebiscite. On Feb. 27, 1926, Pershing resigned because of ill health, and was succeeded by Major General Lassiter. In March, the plebiscite was indefinitely suspended due to continued disorders and riots in the provinces, and on June 14, the Commission by a two to one count voted to abandon the plebiscite altogether. The reasons were the absence of suitable plebiscitary conditions, and the obstructionist tactics adopted by Chile in the area. Naturally, the Chilean representative opposed both the decision and the final report that was rendered by the other two members of the commission. On June 18, 1926, the Chilean Ambassador at Washington notified Secretary of State Kellogg that the unexpected outcome of the efforts for a plebiscite automatically ended the arrangement whereby the good offices of the United States had been invoked. A two-year period of deadlock ensued during which no negotiations were carried on.

However, at the Pan-American Conference held at Havana in February, 1928, the delegates of Chile and Peru met and agreed to urge the resumption of diplomatic relations between their governments. On July 9, Secretary Kellogg sent identic notes to both governments urging the same thing. On July 13, diplomatic relations actually were resumed, and in October the respective embassies were reëstablished after a lapse of 17 years. Then, on October 10, the State Department at Washington announced that the Boundary Commission which had been holding sessions in New York for three years, would suspend its activities for four months with the consent of the governments involved, to leave the field free for diplomatic negotiations. These negotiations ended in the reaching of a tentative agreement in 1929, which was presented to President Hoover on May 3. Hoover summarized the points agreed upon, and transmitted the text of a final basis of solution to the contending governments on May 14. On May 17, Hoover announced that both Chile and Peru had accepted the proposals, which were then incorporated into a final treaty on June 3, and ratified by both parties, amidst great rejoicing, within a little over a month. The final arrangement assigned Tacna to Peru and Arica to Chile, with the dividing line beginning at a point designated "Concordia." There were some further minor adjustments, and Chile agreed to pay Peru the sum of $6,000,000. See BOLIVIA; CHILE; PERU.

TACOMA. A city and port of the State of Washington. The population increased from 83,743 in 1910 to 96,965 in 1920 and to 110,500 in 1928, by estimate of the U. S. Bureau of Census.

The population of the metropolitan area in 1928 was 125,000. A zoning ordinance was adopted in 1919, and an active city planning programme was undertaken the following year. Under a comprehensive port-development project, organized in 1918, municipally-owned piers covering an area of 280 acres were built. In 1928 the harbor had 35 docks and wharves with an area of 950,000 square feet. The port was served by more than 60 steamship companies. Fort Lewis, a permanent divisional establishment of the U. S. Army, was developed during the World War, and a psychiatric hospital for war veterans was erected at American Lake in the environs of the city. In 1924 an active building programme was undertaken including new public schools, new buildings for the College of Puget Sound and Annie Wright Seminary, and office, church, hotel, and fraternal structures. By 1928 Tacoma had 38 elementary schools, 6 intermediate schools, and 2 high schools. In 1926 a bond issue of $4,000,000 was approved for the construction of the Cushman power plant on the Skokomish River flowing out of Lake Cushman. A dam, 275 feet high, was built across the canyon through which the Skokomish River flowed, and the plant erected on its bank was capable of developing 50,000 horse power which, with the power developed by the Nisqually River plant, gave the city a total of 88,000 horse power. Between 1926 and 1928, Tacoma installed a new water-supply system, consisting of a 25,000,000-gallon reservoir 5 miles from the city, a 1,000,000-gallon standpipe in the city, and an electrically operated pumping plant furnishing a daily supply of 10,000,000 gallons. Tacoma has the reputation of leading in the production of fir doors, fir veneers, panels, and wooden columns, and has an important refinery for copper. In 1927, 12,335 persons were employed in 322 industrial establishments and received $16,982,714 in wages; the value of products manufactured was $79,881,871. The assessed valuation of property in 1927 was $65,777,000; the net debt was $11,028,000.

TACTICS, MILITARY. See STRATEGY AND TACTICS.

TAFT, HENRY WATERS (1859–). An American lawyer (see VOL. XXI). In 1917–19 he was chairman of the permanent legal advisory board for Greater New York under the selective service regulations. He was a delegate to the Republican National Convention in 1920, and chairman of the coalition campaign committee in the mayoralty election of New York City in 1921. He was president of the New York State Bar Association (1919–20), president of the Association of the Bar of the City of New York, 1923–25, and became chairman of the American Bar Association's committee on jurisprudence and law reform in 1925. He published *Occasional Papers and Addresses* (1920); *Japan and the Far East Conference* (1921); *Law Reform* (1926); *An Essay on Conversation* (1927).

TAFT, WILLIAM HOWARD (1857–). The twenty-seventh President of the United States (see VOL. XXI). He was cochairman of the National War Labor Conference Board in 1918–19, and was president of the League to Enforce Peace, engaged in the promotion and ratification of the Treaty of Peace and the League of Nations. On June 30, 1921, he was appointed Chief Justice of the United States. He became chancellor of the Smithsonian Institution in 1923. To his list of honors were added the honorary LL.D. degree from Cambridge and Aberdeen (1922), and the University of Cincinnati (1925), and the honorary D.C.L. degree from Oxford (1922). In 1922 he was also made an honorary bencher of the Middle Temple (British). His later writings include *Our Chief Magistrate and His Powers* (1916); *Taft Papers on the League of Nations* (1920).

TAGORE, tȧ-gōr′, SIR RABINDRANATH (also written THĀKURA, RAVĪNDRANĀTH (1861–). A Hindu poet (see VOL. XXI), also a musical composer. Of his writings in English, the later works include *Kabir's Poems* (1915); *Stray Birds* and *Hungry Stones* (1916); *Reminiscences, Personality*, and *Nationalism* (1917); *Parrot's Training* and *Mashi and Other Stories* (1918); *The Home and the World* (1919); *Glimpses of Bengal* and *Thought Relics* (1921); *Creature Unity* (1922); *Greater India* (1923); *Gora*, a novel, and *Letters from Abroad* (1924); *Broken Ties*, stories (1925); and *Fireflies*, English translations from Hindu poets (1928). Consult *Rabindranath Tagore, His Life and Work* by Edward John Thompson (1921); *Rabindranath Tagore, a Bibliography*, by Ethel May Kitch (1922); *Rabindranath Tagore: Poet, Patriot, Philosopher*, by K. S. Ramaswami Sastri (1924); and *Rabindranath Tagore, Poet and Dramatist*, by Edward John Thompson (1926).

TAHITI. See PACIFIC OCEAN ISLANDS, *Society Islands*.

TAILLEFERE, GERMAINE (1892–). A French composer, born at Pau-St. Maur, near Paris. While a student at the Paris Conservatoire, her brilliant talent attracted attention, and she was graduated with special distinction. She began her career as a composer as a member of the notorious group known as "Les Six," but soon rebelled against their extravagances and seceded, following her natural inclinations as a rather advanced impressionist. In 1925 she was heard in the United States as a pianist in her own works. She has written a string-quartet; *Ballade* for piano and orchestra; a piano concerto in D; a violin sonata; a ballet, *Le marchand d'oiseaux* (Paris, 1923).

TAKAHASHI, tä′kȧ-hä′shē, KOREKIYO (1845–). A Japanese financier and parliamentarian (see VOL. XXI). He was again Minister of Finance in 1918 and during 1921–22 served as Prime Minister. In 1924 he resigned the peerage in favor of his son and from his seat in the Upper House to contest the seat for Morioka in the Lower House. The following year he resigned as leader of the Seiyukai.

TALC AND SOAPSTONE. Talc and soapstone share with sulphur, petroleum, and copper the distinction of being one of the minerals of which the United States produces more than all the rest of the world. In 1900 the United States produced approximately 90,000 short tons of talc, valued at about $900,000. By 1928 the United States output of talc had increased to 209,976 short tons, valued at $2,537,994, ground talc representing of this amount 195,680 tons, valued at $2,419,569. New York is the largest producer of talc in the United States with 107,321 tons, though California and Vermont also produce considerable amounts. Despite the fact that the United States produces more than all other countries in the world, it is also a large importer of talc, there being received in 1928, 27,049 tons, valued at $579,915. Most of the imported talc comes from Canada, Italy, and France.

Workable soapstone deposits are few and are very difficult to work. In the United States, many deposits are reported in Virginia and in Maine. Deposits also have been reported in various sections of Canada; but, upon examination of a great many of these, the nature of the deposit does not lend itself to quarrying large pieces, and therefore does not present a profitable outlook. As the soapstone business is limited to a very few producers, the U. S. Bureau of Mines does not publish any figures of production. The talc is used for gas-burner tips, while the soapstone is an insulator of heat and electricity. Soapstone bricks are used for the lining of digesters and furnaces in which the sulphate pulp is treated in making Kraft paper. Talc also is used for talc powder, textiles, paper, soap, and rubber.

TALLEY, Marion (Nevada) (1906–). An American coloratura soprano, born in Nevada, Mo. She studied with local teachers in Kansas City, then with Frank Laforge in New York, and spent a year in Europe, perfecting herself in French and Italian. Without any previous stage experience, she was engaged at the Metropolitan Opera House, where she made her début as Gilda in *Rigoletto* (Feb. 17, 1926). Long before her appearance, clever advertising on the part of her press agent had prepared the public to expect something quite out of the ordinary, so that, for the first time in the annals of opera, it happened that for the début of an entirely unknown singer people were clamoring for tickets and blocking traffic, making it necessary for the police to restore order hours before the performance began. Even more surprising, and impossible of explanation, is the sensational success of a singer endowed with no unusual voice, either in quality or range, with little histrionic ability. Three years later, Miss Talley created a second sensation, when she retired from the stage as suddenly as she had appeared. She made her farewell appearance in the title rôle of Thomas's *Mignon* (May 6, 1929) in Cleveland, when the Metropolitan Company was making its annual spring tour. Shortly afterward, she took up her residence on a farm she had purchased in Missouri.

TALMADGE, Constance (1900–). An American actress, born in Brooklyn, N. Y. She began acting in moving pictures in 1916, and soon became very popular. Besides other plays, she appeared in *Intolerance*; *Mrs. Leffingwell's Boots*; *Romance and Arabella*; *In Search of a Sinner*; *Two Weeks*; *A Temperamental Wife*; *The Perfect Woman*; *Mama's Affair*; *Polly of the Follies*; *East is West*; and *The Dangerous Maid*.

TALMADGE, Norma (Mrs. Joseph M. Schenck) (1897–). An American actress and motion-picture producer, born at Niagara Falls, N. Y. She is a sister of Constance Talmadge. She began to act in moving pictures at 14 years of age and soon achieved notable successes, among them being: *The Crown Prince's Double*; *The Social Secretary*; *The Secret of the Storm Country*; *The Ghosts of Yesterday*; *Her Only Way*; *The Forbidden City*; *The Passion Flower*; *The Sign on the Door*; *The Wonderful Thing*; *Smilin' Through*; *Secrets*; *Song of Love*; *Kiki*; *Graustark*; *Camille*.

TANAKA, Baron Giichi (1863–1929). A Japanese soldier and Premier, born in Yamaguchi of the Seiyukai clan, of which he became leader in 1925. He entered the army as a sublieutenant in 1886, was graduated from the Staff College in 1898 and in 1910–13 was director of the Military Affairs Bureau. He became commander of the Second Infantry Brigade at the outbreak of the World War and in October, 1915, was made lieutenant general and vice chief of the General Staff. Later, he was Minister of War in the Hara, Takahashi, and Yamamoto cabinets, and from April, 1927, to July 2, 1929, he was Premier and Minister for Foreign Affairs in a conservative cabinet composed exclusively of members of the Seiyukai. His cabinet's aggressive policy toward China was given as the chief reason for its overthrow by the Japanese liberals. Tanaka was created a baron in 1920. He was posthumously promoted to baron, senior grade, and decorated with the Grand Cordon of the Rising Sun by Emperor Hirohito. See Japan, under *History*.

TANA TUNNEL. See Tunnels.

TANGANYIKA, tän′gȧn-yē′kȧ, **TERRITORY.** Formerly German East Africa, but since 1919 a British mandate teritory, situated in southeastern Africa, with an area of 373,500 square miles, and a native population (April, 1921) of 4,107,000. There were also 14,991 Asiatics and 2447 Europeans on that date. The estimated population in 1927 was: European, 5300; native, 4,885,000; Asiatic, 24,000. Dar-es-Salaam, the capital and chief commercial centre, had about 25,000 inhabitants in 1927; Tanga, 16,400; Tabora, 25,000. Under British rule, because of the inevitable readjustments, industry and trade took some time in regaining their normal status. Imports for 1913 were valued at £2,667,925; in 1921, £1,426,125; in 1927, £3,672,064. Exports for 1913 were £1,777,552; for 1921, £1,089,990; for 1927, £3,340,576. The chief exports are sisal hemp, coffee, groundnuts, cotton, grain, copra, hides. The chief imports are cotton piece-goods, foodstuffs, building materials, coal, machinery, tobacco, spirits. Imports from the United States in 1928 were valued at £308,000, as compared with £263,000 in 1927. Exports to the United States totaled £184,000 in 1928 and £61,000 in 1927.

The victories of the British and Belgian troops in East Africa during the World War left the Territory completely under Allied control. In May, 1919, the Supreme Council turned the area over to Great Britain as a mandate territory, but by agreement with Belgium in September, 1919, the western provinces of Urundi and Ruanda were ceded under mandate to the Belgian Congo in order to give the latter a frontage on Lake Tanganyika. Great Britain retained such areas as were needed to allow for the projected Cape to Cairo Railway, as well as the disputed Ujiji Province which contained the western terminus, Kigoma, of the important Central Railway. In 1921, however, Belgium was given the right to use the railway free of duties. Under the Order in Council of July 22, 1920, the British administrative machinery was set up with a governor and a nominated executive council. By the Covenant of the League of Nations, perfect racial equality in matters of residence and trade was assured, with the result that the Indians, unlike those in the Kenya Colony to the north, were permitted unhampered social and economic liberty. As a result, they rapidly penetrated into all regions of the Territory in the rôle of small traders. By 1921, the British administration was functioning normally; German estates had been sold; the Indian penal and civil codes were introduced; the basis of the currency was made the shilling (Jan. 1, 1922); English names and weights were substituted; and the Kenya Colony system of revenues was installed, i.e., customs duties, trade taxes, native hut and poll taxes. Legislation for the abolition of slavery was enacted in 1922. Revenues for 1917–18 were £336,446 and expenditures £157,285; for 1921–22, £978,192 and £1,807,890; for 1927–28, £1,904,107 and £1,707,196. Budget estimates for 1928–29 were: revenue, £1,842,490; expenditures, £1,832,828. Completion of a 50-mile stretch of railway from Moshi to Arusha in 1929 brought the total railway mileage of the Territory up to 1276 miles.

TANGIER CONTROVERSY. The status of Tangier port, which, because of its strategic position at the entrance to the Mediterranean, was an intimate concern of the foreign offices of France, Spain, and Great Britain, became a serious cause for ill feeling in the years following the World War. Spain's attempts during 1919–21 to effect a Franco-Spanish understanding on the basis of an enlarged Spanish interest in Tangier (and thus negate the policy of internationalization temporarily agreed upon in the Franco-Spanish Treaty of Nov. 27, 1912) were rebuffed, for they conflicted with the French ambition which looked to the expansion of French interest not only over Tangier but the whole of Morocco as well. In 1922 Great Britain, finding that the subject was assuming major importance, interjected herself into the controversy and insisted that the entire question be reopened. In July, 1923, a commission composed of French, Spanish, and British experts met for the purpose of preparing a new agreement. Early it became evident that the question had taken on an international character, when both the United States and Italy indicated their interest, the United States on the general ground that it had figured in the Algeciras Conference and would therefore be concerned in any new understanding, Italy because of her position as a Mediterranean Power. The sittings of the commissions were therefore frequently interrupted, as the experts found it necessary to repair to their home governments for further instructions. In October, Italy, with the approval of Spain, demanded that her delegates be given seats at the conference.

In October, 1923, the American Department of State made public a note addressed to the British, French, and Spanish governments in which the request for the maintenance of the open door in the settlement of the status of Tangier was reiterated. It was not until Dec. 18, 1923, that the sittings were completed. The provisional agreement as submitted to the governments of Great Britain, Spain, and France, and ratified, effective June 1, 1925, contained the following provisions: The Tangier Zone, an area of 225 square miles around the city of Tangier, whose permanent neutrality was assured, was to continue as a part of Morocco under its own constitution. The Municipality of Tangier was to be under both a Committee of Control, made up of the eight consular officers of the Powers that had signed the Algeciras agreement, and an International Legislative Assembly of twenty-seven members, consisting of representatives of the Powers (Italy here included) and the native Mussulmans and Jews. The customs service, though administered by the Moroccan government, was to be under the control of the international administration. Economic equality at the port was to be observed; the capitulations were to be supplanted by a mixed tribunal of French, Spanish, and British magistrates; no fortifications were to be erected; the signatories of the Algeciras agreement (the United States included) were to be invited to adhere to the new convention as soon as it received the ratification of the three contracting parties.

A number of Powers signatory to the Act of Algeciras, including Italy, declined to adhere to the 1923 Tangier Statute and it was modified by a protocol signed at Paris July 25, 1928, to which Italy was a party. It was conceded generally that Great Britain had won a diplomatic triumph in the new pact over the Mediterranean countries, France, Spain, and Italy, and by the internationlization of the port had made sure of the safety of the route to India. See MORROCCO, under *History*.

TANKS, ARMORED. See STRATEGY AND TACTICS.

TANNENBERG, BATTLE OF. See WORLD WAR, *Eastern Front*.

TARDIEU, tär'dyē, ANDRÉ (1876–). A French public official and author, born in Paris, and educated at the Lycée Condorcet and École Normale Supérieure. A former editor of *Le Temps*, he was a member of the Chamber of Deputies (1914–24, since 1926), High Commissioner of France to the United States (1917–19), Minister of the Liberated Regions (1919–20), Minister Plenipotentiary at the Peace Conference and President of the League of Nations Control Commission during the same period. In the Chamber of Deputies in 1923, he led the Nationalist Party group which found Poincaré too lenient toward the Germans. Three years later, he became Minister of Public Works in Poincaré's cabinet (1926–). His writings include: *Questions diplomatiques de l'année* (1904), crowned by the French Academy in the following year; *La Conférence d'Algésiras*; *Notes sur les États-Unis* (1908); *France and the Alliances* (1909); *Le Prince de Bülow* (1909); *Le Mystère d'Agadir* (1912); *L'Amérique en Armes* (1918); *The Truth about the Treaty* (1921); *France and America* (1927).

TARDIVEAU, RENÉ. See BOYLESVE, RENÉ MARIE AUGUSTE.

TARIFF IN THE UNITED STATES. *Recent Developments in Tariff Legislation in the United States.* The Underwood Tariff of 1913 lowered the rates which had existed under the Payne-Aldrich Bill. The average rate on dutiable goods in 1910 was 42 per cent; in 1915, 33 per cent. The Underwood Tariff Bill also increased the free list. As a result, 63 per cent ad valorem of the goods admitted to the United States in 1915 paid no duty. This was 14 per cent more than in 1910. The construction of a tariff bill is becoming very difficult and complicated. The Underwood Bill covered more than 100 pages and actually enumerated more than 3000 different articles; the list of nondutiable goods also was given. The goods on which duty was to be paid were cited in 14 schedules, the rates ranging from 5 per cent on bar iron to 60 per cent on jewelry, playing cards, and expensive silk goods. The general result of such a voluminous bill was to confuse the average citizen, and Congress itself felt that the guidance and assistance of experts was greatly needed. A Tariff Board had been provided for in the Payne-Aldrich Bill of 1909, but when the Democrats came into power, it was abandoned. So much difficulty was experienced by Congress in the construction of the Underwood Tariff Bill that the Democrats themselves provided in 1916 for a new Tariff Commission, the function of which was to advise the President and Congress on general problems relating to the tariff. It was apparent, however, that the device of a tariff commission had not proved a success. It could not be scientific and it was difficult to keep it clear of political influence. In the presidential campaign of 1928, the Tariff Commission found no friends, for the Democratic Party severely criticized it while the Republican Party passed over its existence in silence.

The Fordney-McCumber Bill of 1922. When the Republicans were swept into power by the election of 1920, it was on the distinct understanding that the tariff rates would be revised upward. Congress had great difficulty in drafting a bill which was under consideration for 20 months. The Senate finally adopted the bill after 2436 amendments had been made to the original. It was not until 1922 that the legislation known as the Fordney-McCumber Bill was passed. The rates of duty are the highest in United States history. Duties were levied on agricultural products, sugar, wool, woolen goods, cotton goods, silk, metals and metal manufactures, tobacco, spirits and beverages, chemicals, jewelry, earthenware and glassware, wood, paper, and many other classes of commodities. High rates were levied on wool, on certain grades of which the duty reached 155 per cent. Rates on cutlery in some instances were as high as 40 per cent ad valorem. The rates on embroidery and cotton lace were 90 per cent. Many of the articles which had been put on the free list by the Democrats in 1913 were made dutiable under the Fordney Bill. The few articles left on the free list included coffee, cocoa, agricultural implements, newsprint, hides, raw cotton, tea, gunpowder, tin, and potash.

Most students of economics and many business men believed that the Fordney-McCumber Bill was a mistake. The United States is a creditor nation. The only way in which foreign debtors can pay it is by sending goods. The price which consumers must pay for protected goods is probably not compensated for by any stimulation which industry may have received from the provisions of this bill. The United States cannot continue to export goods unless imports from other countries are received.

One of the most interesting features of the Tariff Act of 1922 was the flexible tariff provisions. When the President of the United States, "after careful investigation, finds that the rates of duty in the Tariff of 1922 do not in fact equalize the costs of production of any article or articles between the United States and the principal competing foreign country, he shall determine the rates that will so equalize such difference; and 30 days after the proclamation is made, the rates of duty proposed by him shall be in effect on the articles named in the proclamation in lieu of the rates of duty specified in the Tariff of 1922. These rates of duty are to be based upon foreign valuation. He cannot increase or decrease any rate of duty more than 50 per cent of the amount thereof as provided in the Tariff of 1922."

By the act, the Tariff Commission was to make the necessary investigations and recommend the rate to be fixed by the President. It was hoped this device would make the Tariff "scientific," but it soon became evident that what flexibility there was, was flexibility upward. Before the period under review was over, it was seen that the flexibility provision was virtually inoperative and that the rates continued as written into the Act of 1922.

The campaign of 1928 showed that the protection principle was firmly entrenched in the American political system, for even the Democratic Party departed from its historic position when it pointed out that it had no intention of tinkering with the tariff. The extra session of Congress, called for on Apr. 15, 1929, by President Hoover, was to be concerned largely with tariff revision. This was due to the promise rendered to the farmers during the campaign that greater protection would be afforded them; but during February and March (as a result of the hearings held by the House Ways and Means Committee), it was evident that the high-tariff interests were mobilizing their forces for a fight for revision upward all along the line, and this despite the President's request that revision should be "limited." The high protectionists (aided by the farmers and the American Federation of Labor) were insisting upon an American valuation in the assessment of tariffs, as against the foreign valuation provided for in the Act of 1922. To show the extraordinary interest in tariff revision in 1929, it may be pointed out that the House Ways and Means Committee sat for 45 days prior to the meeting of the special session and heard 1200 witnesses.

During the summer and autumn of 1929, the Senate deliberated the House tariff bill. The House schedules were a triumph for the high protectionists and increases were generally upward all along the line. The publication of these schedules brought a widespread revulsion of feeling. Protests were general from the press, farmers, manufacturers, and foreign nations. As many as 38 countries filed protests with the United States State Department, these coming from Great Britain, France, Belgium, Italy, Austria, Spain, Switzerland, Denmark, Norway, Sweden, the Netherlands, and practically all the countries of Latin America. Manufacturers (particularly in the automobile industry) were quick to point out that the high tariff was threatening the stability of American foreign trade. The Senate, more sensitive to public opinion than the House, showed at once that its attitude was going to be highly critical. Senator Borah denounced the tariff as a repudiation of the Republican Party's election pledged to the farmer. The Democratic members were almost solidly aligned in opposition. In October, the Administration met two defeats. Democrats and Progressive Republicans refused to give the President the right to raise or lower rates at the instance of the Tariff Commission, claiming that this was a congressional prerogative. The same group voted to keep the Tariff Commission bipartisan instead of nonpolitical, as the Administration favored it. These were but preliminary skirmishes, but they indicated a senatorial independence that did not promise an easy victory for the House bill.

Tariff in Europe. In Europe, the tendency of freer commercial relations shown before the War was reversed in the post-war period. Import duties were increased to protect new industries and export duties were laid to protect raw materials; but advances were modest, though almost every European country had its protectionist camp. France increased her duties on agricultural products from an average of 22.5 per cent to an average of 23.8 per cent and, on industrial products, from an average of 9.2 per cent to an average of 10.7 per cent. German increases were not much greater and Italian experiences were about the same, while in England, though there was a good deal of talk about protection, the country continued largely in its policy of free trade. The McKenna duties, levied during the War, were still on the statute books in 1929, but these were largely luxury taxes. In England, it appeared that the advance of protection was checked by the country's inability to work out a system of preferential rates within the empire without increasing the cost of living in the home country. Generally, the fear of war and the struggle over raw materials prevented the leveling of tariff barriers in Europe. See UNITED STATES, under *History;* European countries, sections on *History;* also FINANCE AND BANKING.

TARKINGTON, (NEWTON) BOOTH (1869–). An American author (see VOL. XXI). His later writings include: *Penrod* (1914); *The Turmoil* (1915); *Penrod and Sam* (1916); *Seventeen* (1916); *The Magnificent Ambersons* (1918), for which he was awarded the Pulitzer Prize by Columbia University; and *Alice Adams* (1921); *Gentle Julia* (1922); *The Fascinating Stranger* (1923); *The Midlander* (1924); *Growth* (1927); *Plutocrat* (1927); *The World Does Move,* reminiscences (1928); and *Young Mrs. Greeley,* a novel (1929). His plays are for the most part light and entertaining. The most important are: *The Man from Home* (1906); *Master Antonio* (1916); *Clarence* (1919); *The Wren* (1921); *The Intimate Strangers* (1921); *Rose Briar* (1922); *Tweedles and Magnolia* (1923); *Penrod Jashber* (1929).

TASMANIA, tăz-mā′nĭ-ȧ. A state of the Commonwealth of Australia consisting of the Island of Tasmania and several smaller islands. Area, 26,215 square miles; population in 1911, 191,211; in 1921, 213,780; in 1928, 212,043, a decrease of 72 per cent in 7 years. Hobart, the capital, including suburbs, had 52,600 inhabitants in 1928 (38,391 in 1911). Fruit growing is the only agricultural activity to show important increases. Pastoral pursuits are still comparatively unimportant (the wool clip of 1921–22 was smaller than that of 1913). The total mineral production for 1926–27 was valued at £1,301,000, and for 1925–26 £1,475,000. Gold, in 1913 yielded £141,876; in 1927, £20,646. The state's interest in the generating of cheap hydroelectric power augured an early industrial development. A plant created at Great Lake was designed to supply 70,000 horse power. The value of production for 1926–27 was: agricultural and pastoral, £4,815,000; value added by manufacture, £3,593,000. Imports and exports for 1913 were £1,025,081 and £522,865; for 1926–27, £9,406,273 and £9,437,371. Exports were chiefly wool, minerals, timber, fruit, and jam. Revenues and expenditures for 1913–14 were £1,238,085 and £1,235,514; for 1927–28, £2,962,687 and £2,867,605. The public debt on June 30, 1928, amounted to £24,872,785, of which 29 per cent had been spent on railways, 24 per cent on roads and bridges, and 14 per cent on hydroelectric developments. In 1914, the debt was £12,265,012.

TASTE AND SMELL. The outstanding contribution of the decade was the revision of the classification of taste and smell qualities by H. Henning (*Zeitschrift für Psychologie,* vols. lxxiii, lxxiv, or *Der Geruch,* 1916). Experimental psychology had been content, in general, to accept Zwaardemaker's improvement on the old Linnæan classification of odorous qualities, and of the same investigator's results in the matter of olfactory mixtures and compensations. Henning, after trial of over 400 stimuli, proposed a new classification. There are, according to him, six fundamental qualities: fruity (lemon), putrid (H_2S), flowery (violet), resinous (frankincense), scorched (tar), and spicy (nutmeg). [The examples in parentheses are typical only.]

Dimmick has repeated the work of Henning and found that practiced subjects under properly controlled conditions give results which confirm those of Henning (*Psychological Review,* 1927, p. 321).

The treatment of taste on the part of Henning was no less radical. The German psychologist recognized the four fundamental qualities of sweet, sour, bitter, and salt, but insisted that they are connected by series of simple intermediate qualities, whose relation to the pure qualities is akin to that of the intermediate colors to the pure red, yellow, green, and blue of the color square.

TAXATION IN THE UNITED STATES. The most important fact about recent taxation history has been the great increase in revenue derived from it. Previous to the war period, revenue derived from customs played a significant rôle; afterward, such revenues were comparatively unimportant. In 1920, for example, receipts from customs made up one-nineteenth of the total, and while the figure reached its lowest point at that year, for 1927 the proportion was still only one-seventh. The following table shows the ordinary receipts of the Federal government for the years 1914, 1920, 1925, 1926, and 1927:

(Figures in thousands of dollars)

Year	Total	Customs	Internal Revenue Income Tax	Internal Revenue Miscellaneous	Others
1914	734,673	292,320	71,381	308,660	62,272
1920	6,704,414	323,537	3,956,936	1,442,213	981,728
1925	3,607,644	548,522	1,761,659	827,787	529,656
1926	3,908,458	579,717	1,974,104	862,668	491,969
1927	4,023,722	605,672	2,219,952	648,732	549,366

The subdivisions of the receipts under internal revenue for the years 1914, 1920, and 1927 were:

	1914	1920	1927
1. Income tax	$ 60,710,197.52	$3,956,936,003.60	$2,219,952,000
2. Distilled spirits and beverages	226,179,689.76	197,332,105.84	21,196,000
3. Tobacco	79,986,639.68	295,809,355.44	376,170,000
4. Transportation, communication, and insurance	....	307,769,841.36	....
5. Luxuries (autos, candy, furs, etc.)	....	270,971,064.27	66,850,000
6. Estate inheritance	....	103,635,563.24	100,340,000
7. Excise tax on corporations	10,671,077.22	....	8,970,000
Capital stock of corporations, brokers, etc.	....	95,141,732.50	
8. Stamps on legal documents	....	81,259,365.47	32,603,000
9. Admissions to amusements	....	89,710,525.59	17,941,000
10. Miscellaneous	2,461,289.78	9,014,694.50	48,572,000
Total	$380,008,893.96	$5,407,580,251.81	$2,865,683,000

From the accompanying table, it will be noted that in 1914 only the income tax, the taxes on spirits, beverages, and tobacco, and the excise taxes on corporations were in existence. All the rest were war measures. The Federal income tax produced 69.2 per cent of all the revenue raised in 1920; in 1927 the Federal income tax produced 55.1 per cent of all the revenues raised.

Federal Income-tax Laws. The United States had an income tax during the Civil War which was abandoned in 1870. In 1894 the effort was made to reintroduce an income tax, but this could not be accomplished because of constitutional limitations. The Sixteenth Amendment as passed, read, "Congress shall have power to lay and collect taxes on income, from whatever source derived, without apportionment among the several States, and without regard to any census or enumeration." Shortly after, the Income-tax Law of 1913 was approved. The rates included a normal tax of 1 per cent applied to the net income of individuals and corporations. The surtaxes levied on individuals began with a 1 per cent rate on a net income of $20,000, and rose to 6 per cent on the excess of incomes over $500,000. Personal exemptions of $3000 for a single person and $4000 for a married couple were allowed. Corporations were allowed no exemptions. The outstanding features of the tax were: first, provision for collection at the source in order to prevent evasion, a method which gave great dissatisfaction and was abandoned in 1917 on the ground that it was unsuitable for a democratic country; secondly, permission for individuals' deducting only those losses incurred in trade; thirdly, definite limitations on the amounts which corporations could deduct for losses. The Income-tax Law of 1913 was in effect until Dec. 31, 1915, when the Income-tax Law of 1916 went into effect. There were two reasons for the new law: first, the customs duties had fallen off because of the decrease in the amount of goods coming from Europe; secondly, the old law needed to be clarified and changed in a number of ways.

After the entry of the United States into the War, the Income-tax Law of 1917 was passed and became effective as of Jan. 1, 1917. The new law was remarkable in two respects: first, the rates were higher than any country had ever imposed before; secondly, the act was exceedingly complex, because Congress had grafted the new law on the law of 1916 as an amendment. Both the normal and the surtax rates were increased. The normal rate imposed on individuals was 4 per cent, except on incomes between $1000 and $2000, on which the rate was 2 per cent. The normal rate on corporations was increased to 6 per cent. The surtax rates on incomes above $5000 rose progressively from 1 per cent to 63 on the excess of $2,000,000. The new law provided for "information at the source." The act specifically stated that income and excess profit taxes were not to be deducted, nor was interest on money borrowed for the purchase of tax-exempt securities. Dividends of corporations were to be taxed according to the rates obtaining in the year in which the profit or surplus was accumulated. The object of this provision was to make it impossible for corporations to refrain from declaring dividends in any one year in the hope that the rates of taxes would be lower in some future year. This provision was repealed in 1918 because of difficulties of administration.

In order to raise still greater amounts of revenue to meet the demands of the War, the Income Tax Law of 1918 was framed and continued in force until the Revenue Act of 1921 became effective. The normal rates were again raised, both for individuals and corporations, becoming 12 per cent on taxable income both for individuals and corporations, with the exception of a rate of 6 per cent on the first $4000 of the taxable income of a citizen or a resident of the United States. In 1919 the normal rate was reduced to 8 per cent, with 4 per cent on the first $4000 dollars of net income above the personal exemption. To obtain the total tax rate, the graduated surtax rates were added to the normal rate. The Income Tax Law of 1918 smoothed out certain inequalities in the taxing of corporations.

The Revenue Act of 1921. On January 1, the Revenue Act of 1921 went into effect, although some modifications were not put into force until a year later. These modifications included the abolition of the excess-profits tax. One important change in the law of 1921 related to business losses; if the business man suffered a loss in one period, it was permissible, under this new law, to set off that loss against net incomes realized in the two succeeding years. The income-tax rate on corporations was raised from 10 to 12½ per cent. The surtax rates for 1923 and for the first six months of 1924 were somewhat lower than those obtaining in 1921 and 1922.

Revenue Bill of 1924. The Revenue Act of 1924 contained the following provisions: There was a general reduction of 25 per cent on incomes earned in 1923, payable in 1924. The new normal rates on net incomes (less credits) were 2 per cent on incomes less than $4000, and 4 per cent on incomes of $4000 and not more than $8000. Above $8000 the normal rate was 6 per cent. The range of surtax rates was from 1 per cent on incomes between $10,000 and $14,000, to 40 per cent on incomes over $500,000. Heads of families with incomes of $5000 and over were permitted an exemption of $2500 instead of the old rate of $2000. Many excise taxes were repealed, including those on telegraph and telephone messages, candy, yachts and motor boats, carpets, rugs, trunks, purses, and drafts and promissory notes. Theatre tickets costing $0.50 or less were exempted. Taxes on automobiles selling for less than $1000 were exempted from the 3 per cent tax. The rates of estate taxes were increased to a maximum of 40 per cent on amounts of $10,000,000 and over. A new gift tax was imposed with the same rates as the estate tax in order to prevent evasion of the estate tax by the making of personal gifts.

Revenue Act of 1926. Due to Federal economies and a desire on the part of the Administration to lift levies from incomes in the upper brackets, the Revenue Act of 1926 was passed. It was expected that this measure would reduce the Federal income by $325,000,000 annually. The new law reduced inheritance-tax maximums from 40 to 20 per cent, allowed a credit of 80 per cent on inheritance taxes paid to the States, and granted exemptions from Federal taxation for estates from $50,000 to $100,000. In the income-tax schedules, the surtax on incomes between $26,000 and $100,000 was reduced; personal exemption of single persons was raised from $1000 to $1500, and of married persons, from $2500 to $3500. The normal tax rates were reduced from 2 to 1½ per cent on the first $4000; from 4 to 3 per cent on the next $4000; and from 6 to 5 per cent on the remainder. The corporation tax was increased from 12½ to 13 per cent for the year 1927, and 13½ per cent for the years following. The tax on auto trucks was removed; the tax on passenger cars was reduced from 5 to 3 per cent. The gift tax, enacted in 1924, was abolished as were a number of excise and occupation taxes, including auto tires, jewelry, cameras, firearms, and pool and billiard tables. The only new tax imposed was for a 1-mill tax per gallon on beverages made from cereals. As a result of the 1926 revision, the internal-revenue collections increased only slightly, while receipts from customs and miscellaneous sources increased in greater proportions (see above table). There was a further revision in 1928, but it was concerned largely with technical readjustments.

The table below shows the percentage distribution of revenue from income tax, as between corporations and individuals, during recent years.

	Corporation Per cent	Individual Per cent
1922	47	53
1923	59	41
1924	56	44
1925	61	49
1926	55	45
1927	58	42
1928	59	41

For the fiscal year 1928, the income tax yielded $3,863,000,000. For the period July 1, 1928–Mar. 18, 1929, the income tax yielded $1,356,291,606, as compared with $1,324,055,083 for the same period in 1927–28.

The War-Profits and Excess-Profits Tax. Provision was made in the Act of 1916 for the levy of a tax of 12½ per cent on the profits of the manufacture of munitions. In March, 1917, this tax was made a general war-profits tax. In October of the same year, this war-profits tax was replaced by the excess-profits tax. In the following year, a law was provided under which the excess-profits tax appeared in a new form as the war-profits and excess-profits tax. This law was applicable to corporations which had been organized for the sake of profit. The method adopted for arriving at the excess profits was to subtract from the total profits of the year the average rate of profits earned on the invested capital during the three years before the War began (1911–13), provided the rate of return had been as much as 7 per cent, and not more than 9 per cent. Hence, the base of the tax was the excess over an assumed normal profit. The law assumed that after allowance had been made for increases or decreases in working capital, an 8 per cent return of the amount of capital invested was fair in those industries in which the risk was not exceptional. The rates of the tax levied against the excesses were graduated from 20 to 60 per cent. After the War was over, business men felt that this tax was too heavy to be borne, and it was given up at the end of 1921. Aside from its being a matter of history, the chief interest in the tax lies in the effort to determine what might be called a normal return on capital invested.

Capital Stock Tax of Corporations. The revenue act of 1918 provided for a tax on domestic and foreign corporations. In 1921 the act provided for a payment by every domestic corporation of a special excess tax with respect to carrying on business. The corporation was obliged to pay $1 for each $1000 in excess of $5000 of the average value of the capital stock as it was during the preceding year. Foreign corporations were not allowed an exemption, and had to pay at the same rate on all capital invested in the United States. This tax yielded a revenue of $95,000,000 in 1920; but by 1927, levies had been reduced so that the revenue amounted to $8,970,000.

Inheritance Taxes. These were provided for in the Revenue Act of 1916. They were to be levied on estates, after certain deductions had been made, and not on the shares of each heir. In this law, no distinction was drawn between direct and collateral heirs. If the estates were valued at less than $50,000, they were exempt. The rates ranged from 1 to 25 per cent on estates valued at $10,000,000 above the exemption. The law tried to provide against certain contingencies: (1) property which had been taxed once could not be retaxed within five years, so that if estates changed hands rapidly at the death of each successive owner, the property would not be largely consumed by taxes; (2) if property was proved to have been given away within two years before the death of the owner, the gifts were to be judged as made "in contemplation of death" and so were liable to the tax. It was difficult for the State to prove that such transfers of property were made in contemplation of death, and the courts consistently held that the burden of such proof rested on the State. The result was that the State did not often try to show that "transfers of property were in contemplation of death." The Federal inheritance tax yielded $103,635,000 in 1920, and in 1927, $100,340,000.

Taxation in States. The period following 1914 saw four noteworthy developments in State taxation. First, State taxes were increased; secondly, the income tax was increasingly used in different States; thirdly, State inheritance taxes grew; fourthly, returns from automobile taxes increased.

Increase in State Taxation. In 1910 the total receipts from State taxes were approximately $254,000,000. By 1915 this had increased to $352,000,000. In 1920 the grand total of State receipts from taxes was $692,000,000. A part of this great increase was due to the decline in the purchasing power of the dollar. Some part of the increase in 1920 was due to the War, but the Federal government bore the main burden of the War expenditures. Of the total revenue received by the States in 1920, the receipts from taxes comprised about 78 per cent. Of the total receipts from taxes, the general property tax yielded about 45 per cent. Business taxes, including taxes on corporations, licenses, and insurance companies, yielded 23.3 per cent. Inheritance taxes yielded 8.6 per cent and taxes on corporations, 8.1 per cent. Non-business licenses yielded 9.1 per cent of the total income from taxes. The yield from miscellaneous taxes was 5.9 per cent. In 1927 receipts from State taxes totaled $2,819,059,673, and in 1928 the total was $2,775,276,956. By 1926, when receipts totaled $1,655,495,000, the proportion from the general property tax had dropped to 22.7 per cent; special property and other special taxes had dropped to 16.2 per cent. Inheritance taxes yielded 5.5 per cent; income taxes, 2.3 per cent; bank and corporation stock taxes, 4 per cent. Two important items of State expenditure are education and highways. In the table below, the percentages of expenditure for these two items may be compared with the figures given above.

State Income Tax. The use of an income tax by States is not an innovation. Pennsylvania in 1840, Maryland in 1842, Massachusetts as a

PERCENTAGE DISTRIBUTION OF EXPENDITURES, 1910–20–26

	1910	1920	1926
Total State Expenditure	100	100	100
Education	37.6	30.1	25.7
Highways	4.4	22.0	31.4
Other	58.0	47.9	29.9
Total local expenditure	100	100	100
Education	26.6	29.6	20.5
Highways	17.9	18.5	5.0
Other	55.5	51.9	74.5

colony in 1692 and as a commonwealth in 1821, South Carolina in 1868, Georgia in 1863, and other States experimented with income taxes. Interest in this form of taxation was reawakened by its revival. The Wisconsin tax, which went into effect in 1911, has been the best known. Massachusetts reintroduced the income tax in 1916. In 1919 four other States introduced the income tax, and in 1920 New York also put into effect a very thorough-going income-tax law. In 1927, Indiana passed a constitutional amendment allowing a State income tax. The majority of the States which have adopted income taxes used progressive rates.

State Inheritance Tax. There has been an increase in the number of States using inheritance taxation. In 1890 only six States had inheritance taxation, and this was levied only on collateral heirs. The taxation of direct heirs came later. By 1900, 21 States had adopted such taxation; by 1910, 38 States; and by 1928, only Alabama and Florida were without inheritance taxes. Practicaly all the States levying a direct inheritance tax use the progressive principle. Frequently, the rates increase more rapidly with remoteness of relationship. Where the relationship is collateral, the exemptions are usually low. Where the relationship is direct, the exemptions are much higher. During the post-war period, a number of States passed laws providing for reciprocity in exemption for estates of nonresidents. In 1919 State inheritance taxation yielded 8.6 per cent of whole tax yield; in 1926, the proportion was 5.5 per cent.

Automobile Taxes. The returns to the States from the taxation of automobiles was rapidly becoming very important. The returns for all States, from registration, approximated $150,000,000. Automobiles also were taxed in other ways than by registration licenses. In certain States and municipalities, individuals were taxed for licenses to drive for hire. In certain municipalities, there was a set tax on automobiles for the upkeep of roads. A number of States had taxes on gasoline, and while this sort of tax bade fair to yield increasingly large sums, it must be borne in mind also that automobiles entail increasing expenditures for the upkeep of roads and the construction of new highways. New York State passed a gasoline-tax law in 1929. See STATE FINANCES.

Municipal Taxation. In 1926 there were 250 cities with populations of 30,000 or over. These expended among them $3,052,645,000 for that year. The per-capita-cost payment of all cities of 30,000 and over in 1926 was $49.93, as compared with $34.53 in 1915, and $35.58 in 1919. Some of the important per-capita items of expense for these cities in 1926 were (1919 figures in parentheses): Schools, $14.51 ($6.88); general governmental expense, $3.32 ($2.22); police, $7.84 ($2.33); sanitation, $3.91 ($1.76); highways, $3.63 ($2.04). In 1926 the per-capita-cost for charities, hospitals, and corrections was $2.29. Of the total receipts of $2,738,961,000 for 1926, $1,900,850,000 came from taxes. The table that follows shows the per-capita receipts, governmental cost payments, and net debts of 146 cities (all of which had 30,000 or more population in 1903), for the years 1915, 1922, and 1926:

	Receipts	Cost Payments	Net Debt
1915	$30.00	$23.92	$77.86
1922	53.57	42.93	97.57
1926	66.14	50.30	128.13

During the period subsequent to 1914, certain reforms were organized in municipal finance. First, many cities established a budgetary system. The overloading of expenditures by different departments was avoided by establishing a central purchasing department for the city. In New York City, the effort was made to avoid the duplication of records kept by different departments by centralizing the auditing and collecting departments under one control. Secondly, the cities issued large amounts of bonds. Many of them had great difficulty in meeting their interest and principal obligations when they fell due. Municipalities were encouraged to issue bonds during the period of high expenditures by their ability to issue tax-exempt bonds. The grand total of obligations of this sort had become very great and was rapidly increasing.

The limitations which many cities put on their borrowing power do not seem sufficient protection against very heavy municipal indebtedness for future generations. The whole problem of municipal borrowing requires careful analysis and necessitates the formulation of principles of future municipal finance.

For taxation in other countries, see articles on those countries. See also FINANCE AND BANKING; TARIFF.

TAXONOMY. See ZOÖLOGY.

TAYLOR, ALFRED EDWARD (1869–). A British philosopher (see VOL. XXII). He resigned his professorship of moral philosophy at St. Andrews in 1924 to accept a similar chair at the University of Edinburgh. In 1926, he held the Gifford lectureship at St. Andrews. His later works include *Essay in Recent Developments in European Thought* (1920); *St. Thomas Aquinas as a Philosopher* (1924); *Essay on Evolution* (1925); *The Influence of Platonism in Our Debt to Greece and Rome* (1925); *Essays, Catholic and Critical* (1926); *Plato, the Man and His Work* (1927); and *Commentary on Plato's Timæus* (1928).

TAYLOR, HENRY CHARLES (1873–). An American agricultural economist, born at Stockport, Iowa, and educated at Drake University, Iowa State College, the University of Wisconsin, and in Europe. In 1901 he was instructor in commerce at the University of Wisconsin, and from 1908 to 1919, chairman of the department of agricultural economics. From 1919 to 1921, he was chief of the Office of Farm Management in the U. S. Department of Agriculture; in 1921–22, chief of the Bureau of Markets and Crop Estimates; and chief of the Bureau of Agricultural Economics in 1922–25. In the latter year, he became research associate in the Institute for Research in Land Economics, and professor of agricultural economics at Northwestern University. He was the author of *Introduction to the Study of Agricultural Economics* (1905), and *Agricultural Economics* (1915).

TAYLOR, (JOSEPH) DEEMS (1885–). An American composer and critic, born in New York City. He received his musical education from O. Coon in New York. In 1916 he was war correspondent of the New York *Tribune* and from 1917 to 1921, associate editor of *Collier's Weekly.* In 1921 he succeeded James Huneker as music critic for the New York *World,* which post he resigned in 1925 to give his entire time to composition. In 1927 he became editor-in-chief of *Musical America.* His compositions include 2 symphonic poems, *The Siren Song,* and *Jurgen*; the choral works with orchestra, *The Chambered Nautilus* and *The Highwayman*; an orchestral suite, *Through the Looking-Glass*; a rhapsody for chamber orchestra, *Portrait of a Lady*; a pantomime, *A Kiss in Xanadu*; an opera, *The King's Henchman* (New York, Feb. 17, 1927); and songs. He contributed a paper on music to *Civilization in the United States* (1921). Consult *Deems Taylor,* by J. T. Howard (New York, 1927).

TCHEREPNIN, NIKOLAI NIKOLAIEVITCH (1873–). A Russian composer, born at Petrograd. He studied composition under Rimsky-Korsakov at the Conservatory there. In 1901 he became conductor of the Belaiev Symphony Concerts and professor at the Conservatory. During 1908–14 he was conductor for Diaghilev's Ballet Russe in Paris, also making extensive tours of all Europe. The next four years he lived in Petrograd and became director of the Conservatory at Tiflis in 1918, which post he resigned in 1921 to take up his residence permanently in Paris. His works consist of the ballets, *Armidas Pavillon, Narcissus, The Masque of the Red Death* (after Poe); *The Tale of the Princess Oulyba, Dionysius, A Russian Fairy Tale, The Romance of a Mummy*; symphonic poems, *Narcisse et Écho,* and *Le Royaume enchanté*; a prelude to Rostand's *La Princesse Lointaine*; a suite, *Le Jardin Enchanté*; *Scène dans la Caverne des Sorcières* (after *Macbeth*); *Fantaisie Dramatique Gavotte*; *Poème Lyrique,* for violin and orchestra; a piano concerto; a string quartet; several choral works with orchestra; choruses à cappella; piano pieces; songs; and duets.

TCHITCHERIN, GEORGY VASSILIEVICH (1872–). A Russian Communist diplomat and Commissary for Foreign Affairs. After being educated for a career in the diplomatic service under the Czarist régime, he became affiliated with the revolutionary movement and in 1908 was banished from Russia for his activities. He was imprisoned in Great Britain for his anti-war propaganda during the World War, and in 1918 expelled from that country. Returning to Russia, he became People's Commissary for Foreign Affairs, a position which he held until November, 1929. His resignation at that time was attributed to ill health, although he was known to be out of sympathy with the foreign policy of Josif Stalin, leader of the Communist majority. He represented Soviet Russia at the conferences of Genoa and Lausanne.

TEACHERS COLLEGE. See COLUMBIA UNIVERSITY.

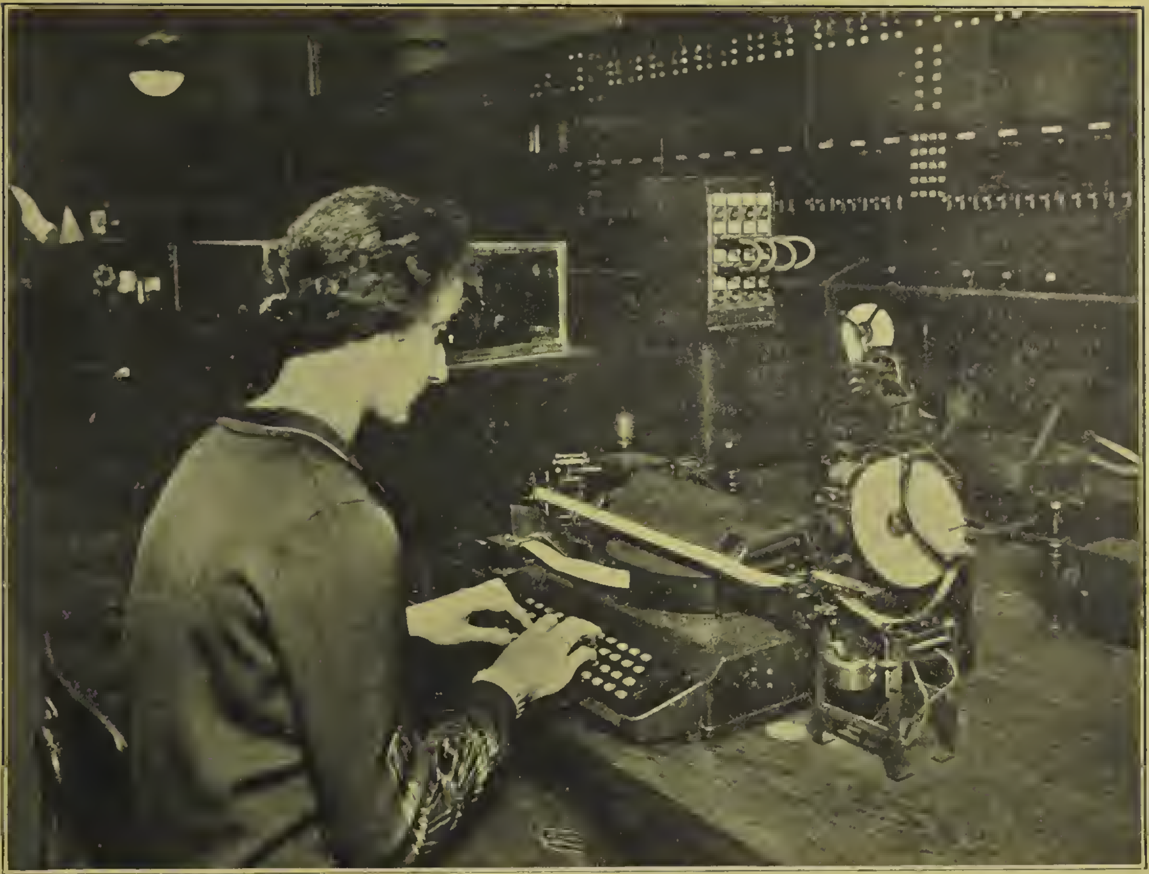
TEASDALE, SARA (MRS. ERNST B. FILSINGER) (1884–). An American poet, born at St. Louis, Mo., and privately educated. She spent several years in travel. Her work has a charming lyric quality and fine rhythmic feeling. Her books include: *Sonnets to Duse and Other Poems* (1907); *Helen of Troy and Other Poems* (1911); *Rivers to the Sea* (1915); *Love Songs* (1917); *Flame and Shadows* (1920); *Dark of the Moon* (1926). She edited *The Answering Voice: One Hundred Love Lyrics by Women* (1917, new ed., 1928); *Rainbow Gold, Poems Old and New* (1922).

TEIRLINCK, HERMAN (1879–). A Belgian poet, novelist, and dramatist, who was born in Brussels. For many years he has been a professor in the University of Brussels and in the Institute of Decorative Arts there. He is a member of the Academy of the Flemish Language. His works, which are in Flemish, include *De Wonderbare Wereld* (1902); *De doolage* (1905); *Mijnheer Serjaanszoon orator didacticus* (1908); *Het ivoren Aapje* (1909); *Johan Doxa* (1917); and the plays *De Drie gratiën* (1909); *Ik Dien* (1924); *De Man zonder Lijf* (1925).

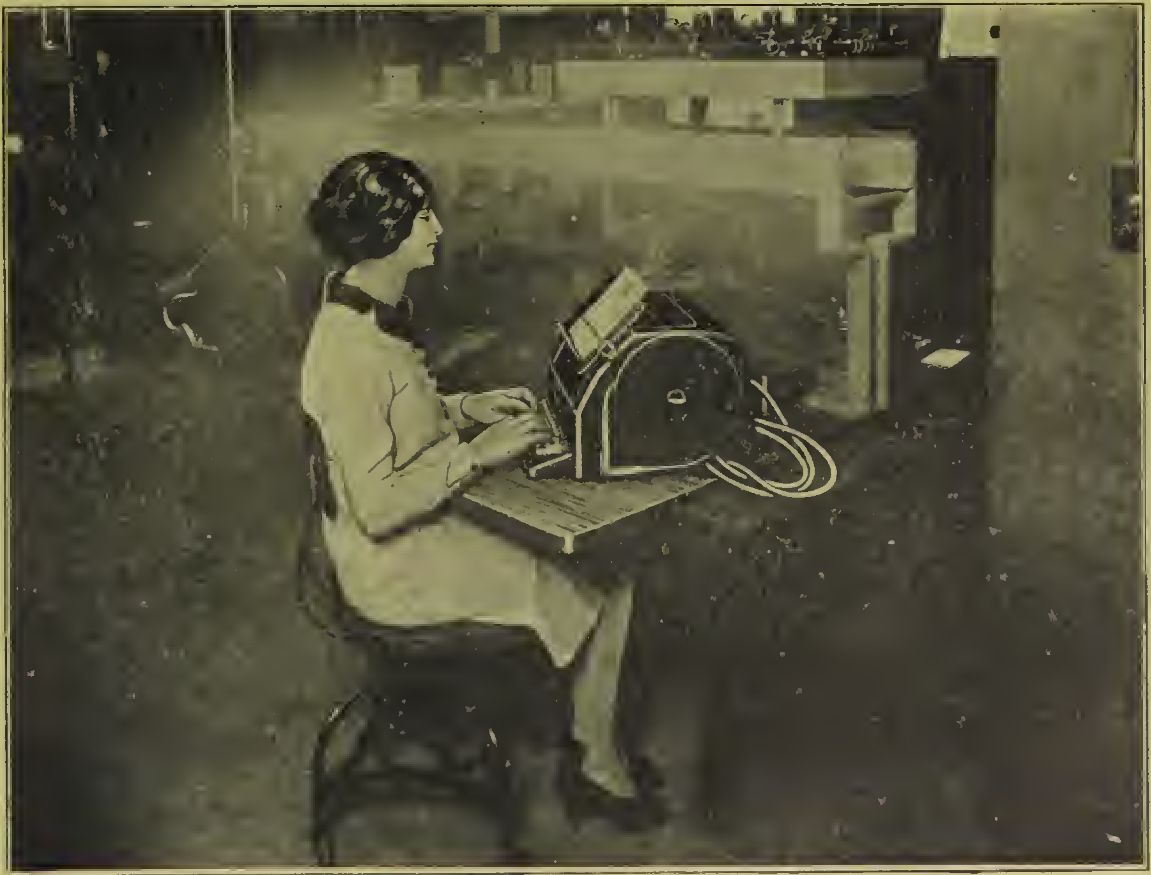
TELEGRAPHY. The World War spurred the engineers of the telegraph companies in the United States and the government telegraph bureaus in Europe to get as much service out of each line of wire as possible. To this end, there was a notable development, both in quantity and quality, of printing telegraph systems and multiplex telegraph systems and the use of vacuum-tube repeaters. During the War, the United States Signal Corps installed a very elaborate telegraph system in France, in which the printing telegraph was very generally used. By 1920 the Western Union Telegraph Company was using printing telegraphs for 80 per cent of its trunk-line traffic, and since that time their use has increased. Printing telegraph systems depend for their operation on the maintenance of absolute synchronism between two rotating elements at the respective ends of the line. This is obtained by special short impulses of current sent two or more times per revolution and by the use of tuning-forks. The printing systems in use are of two types, "continuous synchronism" and "start-stop." In the former, as its name implies, the devices are in continuous operation. In the latter, the device is started for each letter. Sending is accomplished by a machine using a prepared tape which is made up on a machine operated like a typewriter. From 50 to 60 words per minute may be sent by one machine, and by using multiplex combined with printing, as many as 800 messages per hour may be transmitted over one wire. The messages are received ready for delivery and the frequency of errors is reduced.

It became a regular practice to use telephone circuits simultaneously for telegraph purposes. By the use of induction coils to choke out the high-frequency telephone currents and of condensers to stop the direct currents of the telegraph, these two types of currents may be sent over the same wire simultaneously and separated at the receiving end. A single pair of wires may serve for two telegraph circuits and one telephone circuit. By means of carrier currents, the number of telephone conversations may be increased. In submarine cable telegraphy, machine sending and receiving became the usual practice and the use of vacuum-tube repeaters and amplifiers made it possible to carry messages direct from one city terminus to another without manual repeating in between; thus there is direct connection between New York and London.

Coöperation between the telegraph and telephone companies has brought the public the convenience of being able to send a telegraph message from the home to the telegraph office and again have it delivered at the other end by telephone. Thus it is said that "every telephone is a telegraph office." The telegraph companies have acquired the right to use the method of sending facsimiles of photographs or documents over their



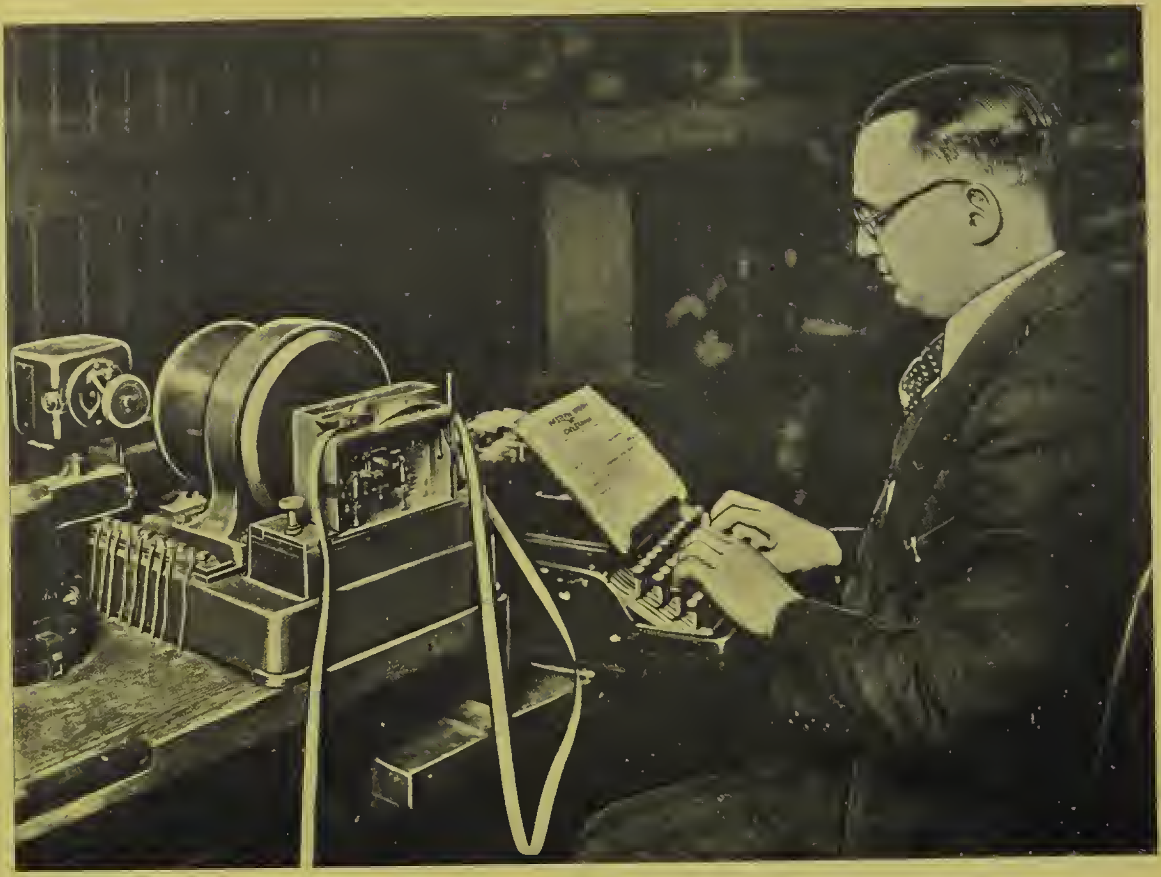
OPERATOR SENDING NEW YORK STOCK EXCHANGE QUOTATIONS RECEIVED FROM THE FLOOR OF THE EXCHANGE FOR AUTOMATIC TRANSMISSION TO TICKERS THROUGHOUT THE UNITED STATES AND CANADA



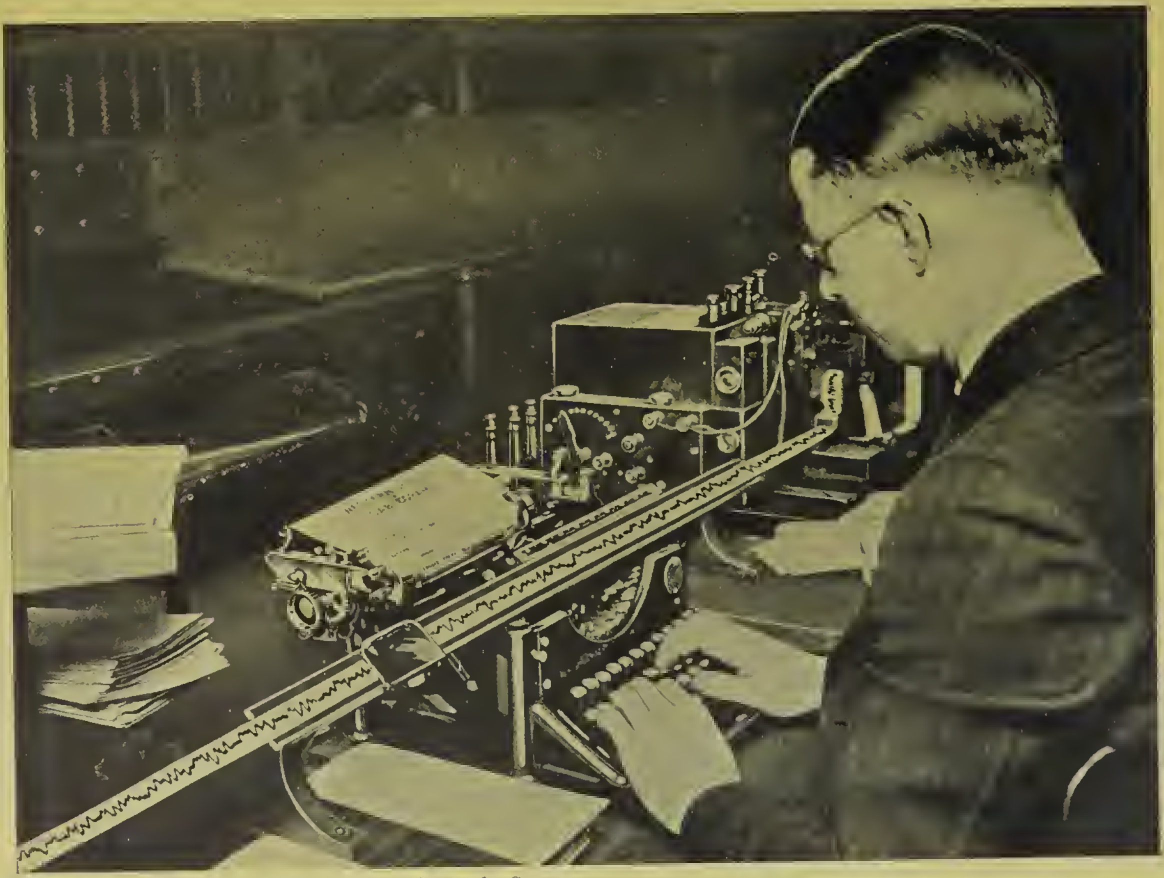
Photographs from Western Union Telegraph Company

SIMPLEX AUTOMATIC TELEGRAPH PRINTER WHERE THE MESSAGES SENT FROM AN ORDINARY KEYBOARD ARE TRANSMITTED AND REPRODUCED ELECTRICALLY AT THE DISTANT STATION

MODERN HIGH-SPEED TELEGRAPHY



OPERATOR PREPARING THE PUNCHED SENDING TAPE FOR INSERTION IN AUTOMATIC TRANSMITTING MACHINE



Photographs from Western Union Telegraph Company

RECEIVING OPERATOR READING AND TRANSCRIBING SIGNALS FROM TAPE OF SIPHON RECORDER. THE WAVY LINE CORRESPONDS TO THE APPROPRIATE LETTERS AND CHARACTERS

SENDING AND RECEIVING TRANSATLANTIC CABLEGRAMS wires, which has become popular with the illustrated newspapers. The enormous increase in the business and interest in the stock exchange has swamped the old ticker system of sending quotations and led to the adoption of a new system capable of handling twice as much business, which was installed in 1929.

Several new oceanic cables have been laid, notably those of the Western Union from New York to London and from Nova Scotia to the Azores, whence branches go to France, Germany, and Spain. These are constructed with the new permalloy wrapping, which enormously increases the speed of operation or capacity and accuracy of transmission of messages. This is on the same principle as the "loading" of telephone circuits with Pupin coils. Thus, it is possible to send eight messages simultaneously or 2000 letters per minute.

SUMMARY, LAND AND OCEAN TELEGRAPHS (NOT INCLUDING WIRELESS): 1927 AND 1922 U. S. DEPARTMENT OF COMMERCE

	1927	1922	Per cent of increase or decrease (–)
Number of companies or systems	25	25	. . .
Miles of pole line, total	256,809	252,991	1.5
Owned	193,578	195,655	–1.1
Leased	63,231	57,336	10.3
Miles of single wire, total	2,152,230	1,853,250	16.1
Overhead, total	1.944,230	1,718,215	13.2
Owned	1,686,574	1,350,392	8.8
Leased	257,656	167,859	53.5
Underground	202,058	131,448	53.7
Submarine, other than ocean	5,942	3,551	67.3
Miles of ocean cable (nautical miles [a])	104,541	76,711	36.3
Number of officers or stations	27,659	27,354	1.1
Estimated number of messages sent, total	229,511,278	191,121,333	20.1
Land			
Ocean	214,403,406	181,518,774	18.1
Number of employees	15,107,872	9,602,559	57.3
Salaries and wages paid	81,498	68,632	18.7
Revenues, total	$99,520,357	$76,161,926	30.7
Expenses, total [b]	$182,997,698	$151,858,086	20.5
Value of plant and equipment	$161,216,941	$127,990,615	26.0
	$426,698,742	$326,661,860	30.6

[a] A nautical mile is equal to 6,080.2 feet, or 1.1515 statute miles.

[b] Operating expenses (maintenance, conducting operations, general and miscellaneous expenses), interest, taxes, all other expenses.

The recent growth of the International Telephone and Telegraph Company has been noteworthy. After securing control of and remodelling the telephone and telegraph system of Spain and several South American and West Indian countries, it acquired control of the All-American Cable Company and the Postal Telegraph, thus getting many cables to South and Central America and a complete land telegraph system in the United States.

Telephone, telegraph, and cable engineers have made an attempt to standardize the terms, definitions, phraseology, and methods of communication, the results of which have been published by the American Institute of Electrical Engineers in its *Standards*.

According to data collected at the quinquennial census of electrical industries taken in 1928, by the U. S. Bureau of Census, the total number of messages transmitted in 1927 by land and ocean telegraphs (not including wireless) amounted to 229,511,273, an increase of 20.1 per cent as compared with 191,121,333 reported for 1922. The mileage of single wire in use in 1927 was 2,152,230 exceeding by 16.1 per cent the mileage reported for 1922, 1,853,250. The increase in mileage of ocean cable was 36.3 per cent, from 76,711 nautical miles (a nautical mile being equal to 1.15 statute miles) in 1922 to 104,541 nautical miles in 1927. Increases of 18.7 per cent and 30.7 per cent are shown for number of employees and for salaries and wages paid, respectively. The total revenues in 1927 amounted to $182,997,698, an increase of 20.5 per cent as compared with $151,838,086 in 1922, while total expenses increased 26 per cent, from $127,990,615 to $161,216,941. The increase in value of plant and equipment was 30.6 per cent, from $326,661,860 in 1922 to $426,698,742 in 1927.

The accompanying table presents combined statistics for land and ocean telegraph systems, for 1927 and 1922. The Western Union Telegraph Company, which operates both land and ocean systems, is counted in this table as two companies.

Bibliography: Recent works in telegraphy include McNicoll, *American Telegraphy Practice*; Kingsbury, *The Telephone and Telegraph Exchanges*; *The Bell Telephone Journal*; and various publications of the Bell Laboratories.

TELEKI, Count Paul (1879–). A Hungarian geographer, professor of Austrian geography on the faculty of economics, Budapest University. He is a fellow of the Hungarian Academy of Sciences, vice president of the Hungarian Geographical Society, and a member of the German and Spanish geographical societies. His work, *The Cartography of the Japanese Islands*, was awarded the Prix-Jomard of the French Geographical Society in 1908.

TELEPHONY. In 1917 there were in the United States 11,716,000 telephones connected to 21,175 central stations by 28,000,000 miles of wire. They were used in that year for 60,000,000 messages per day or about six messages per day per telephone. In 1928 there were 19,000,000 telephones, or about 60 per cent of those of the whole world, and they were used for 76,000,000 messages per day. The capital invested in the telephone industry of the United States is about four billion dollars. The Bell System alone has approximately 430,000 stock holders and 450,000 employees.

Figures recently released by the U. S. Census Bureau on its quinquennial census of telephones show 18,522,767 telephones in the United States on Dec. 31, 1927, an increase of 29.1 per cent since 1922. The number of telephones in every State had increased, the largest increases being for Florida, 103.7 per cent; California, 57.9 per cent; Louisiana, 57.5 per cent; and New Jersey 56.3 per cent.

In the same period, the industry's investment in plant and equipment grew from $2,205,183,000 to $3,548,874,000, a gain of 60.9 per cent. The single-wire mileage increased since 1922, by 71.3 per cent, amounting in 1927 to 63,836,182. The number of employees increased by but 20.3 per cent since 1922, while the number of calls in 1927 showed an increase of 28.3 per cent over 1922.

The World War was a great stimulus to the art of communication because of its importance to the military forces of the nation. This had its effect not only in bringing into regular practical service devices, such as the vacuum-tube repeater, which were previously in an experimental stage, but in expediting coördination of available facilities and improving the reliability and capacity of existing systems. Before the United States' entrance into the War, the vacuum-tube repeater (three-electrode thermionic tube) had been used in long-distance telephony, thereby making possible successful communication between New York and San Francisco (1916). To improve the reliability of the long-distance service and to prevent interruption by storms, most of the wires used in this service were combined into cables containing many pairs of wires, well insulated and protected, and strung on steel cables hung on the poles.

While good communication over long distances could be obtained over open-air lines by the use of repeaters, the introduction of cables called for a greater use of "loading coils." These are induction coils in series with each of a pair of wires at regular intervals in order to counteract the capacity of the wires, which in cables is great, and to increase the efficiency of transmission. Loading coils have been used since 1900, particularly for underground and submarine cables, but the more general use of cables since 1914 stimulated the development both of the quantity and quality of loading coils. New magnetic materials, such as permalloy, were developed for the core, and new forms, such as powdered iron alloy, came into use. For submarine cables permalloy tape is wound spirally around the wires to give continuous loading as distinguished from the "lumped loading" of coils. The increase in the use of telephones in the large cities brought about the development of cables containing 1200 pairs of wires of No. 24 B & S gauge is a cable having an outside diameter of 2⅝ inches, including the lead armor. In 1928 there was installed a cable having 1800 pairs of wires. This is a means of increasing the capacity of the underground duct laid and standardized in size many years before. The insulation of these wires consists of very thin paper of a special character, having very low specific inductive capacity and low losses.

Automatic telephone exchanges had been in service in isolated installations of moderate size for some years, but in the interval since 1920, their development and increased use has been remarkable. The independent companies used them first in locations where the service was not very complicated, such as towns with one central station. In 1921 the Bell System installed its first automatic central in Omaha and on Jan. 1, 1929, there were 3,500,000 dial or machine-switching telephones, or 18 per cent of the total. The earlier installations, by independent companies, were of the so-called step-by-step system, but these were largely superseded by the panel-type which became the standard of the Bell system.

The principal and outstanding features of the panel system include a device on the subscriber's instrument for transmitting a series of a definite number of successive impulses of current corresponding to the number of the party called. A line finder, at the central station called, is a selector whose function is to find a terminal of a particular line on which a call originates out of a group with which it is associated, and to connect a "first selector" and a "sender" to that line. A comparatively large number of subscribers' lines may be served by a comparatively small number of line finders. The line finder finds the calling line and connects the selector and sender thereto. The sender switch receives the electrical impulses from a subscriber's dial on a decimal basis, stores them, and translates them to a nondecimal basis corresponding to the particular group of lines and trunks involved in the path of the call. The sender replaces the intelligence of the operator. The selector switch, controlled by the sender, has the duty of selecting a particular group of trunks and one trunk of that group. It has the same function as the switchboard plug and cord, which in a manual station can be plugged by the operator into any one of a number of jacks which are the terminals of trunks or lines. There are "district selectors," "incoming selectors," and "final selectors" in the circuit, in the order named, from the calling line to the called line. The district selector selects a trunk to the proper exchange, either the home or a distant exchange. The incoming selector selects a trunk to the outgoing board of the same exchange. The final selector selects the terminals of the line of the called party. The accompanying figure is an elementary diagram of the circuit and the principal devices in a circuit using the panel type of machine switching, from Morehouse, Croft, and Charlesworth, in the *Transactions* of the *American Institute of Electrical Engineers* (1923).

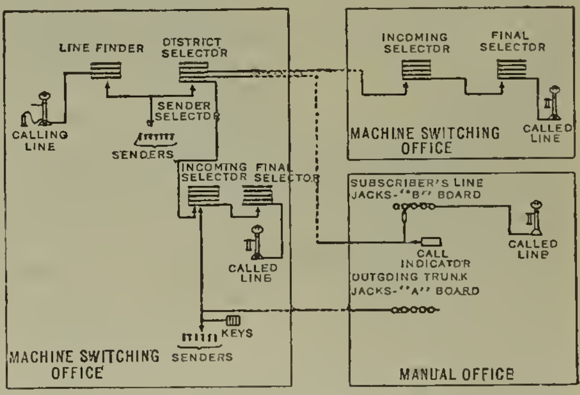
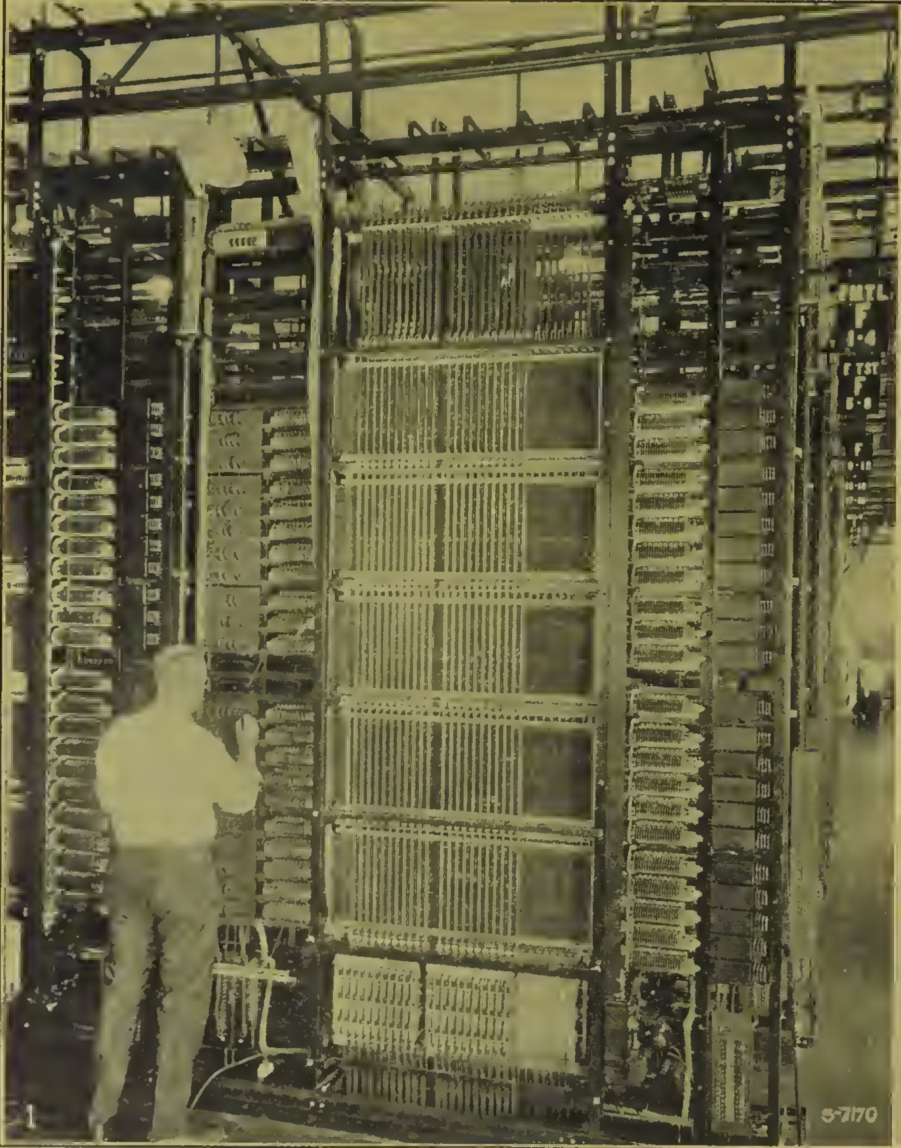


Diagram showing connections from machine switching to machine switching, machine switching to manual, and manual to machine switching

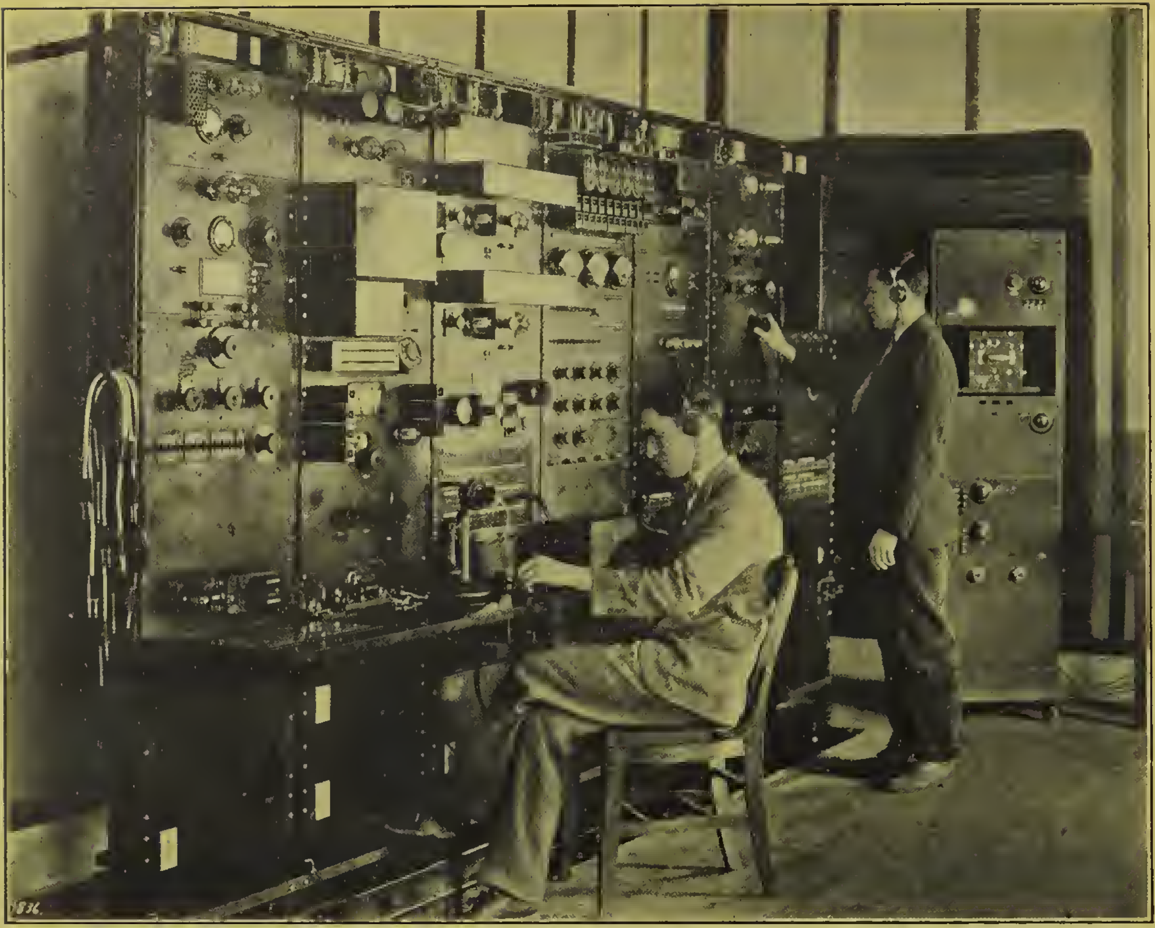
Transatlantic Telephony. Telephone conversations across the Atlantic Ocean inaugurated a regular commercial service in 1925, which since that time has found increased usefulness. At first it was only possible to communicate between New York and London, but the service has been extended until now it is possible to converse from any point in the United States, some points in Canda, and Mexico City to any place in eastern Europe. On Sept. 10, 1929, this service which



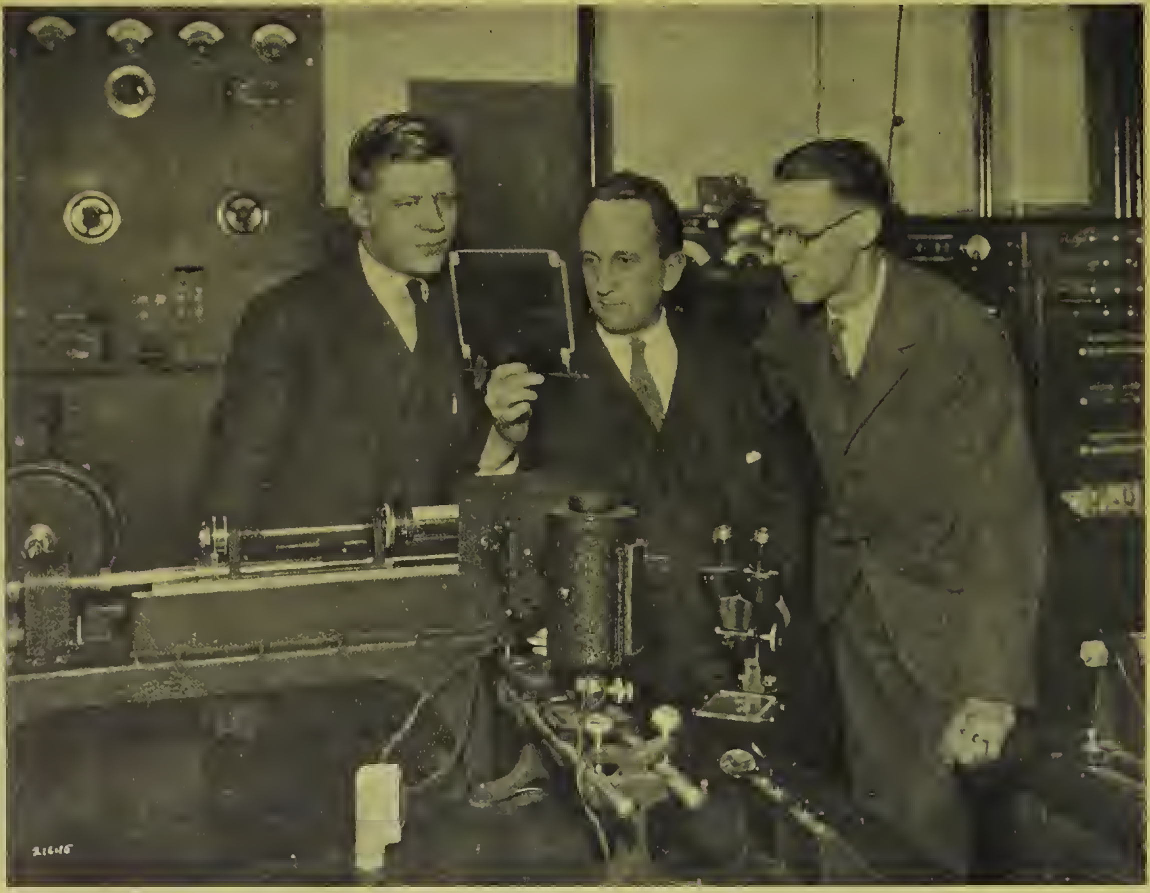
Photographs from American Telephone and Telegraph Company

1. Interior of a telephone central office for dial telephones. This particular system is called the panel system, due to arrangement of a large number of terminals in the series of panels as shown in the centre of the photograph.
2. Modern telephone cable for underground conduit.
3. Desk equipment—combined receiving and transmitting instruments.

AMERICAN TELEPHONE PRACTICE



TRANSATLANTIC RADIO TELEPHONE RECEIVING STATION AT HOULTON, MAINE



Photographs from American Telephone & Telegraph Co.

RECEIVING APPARATUS OF TELEPHOTOGRAPHY

Examining a newly-developed negative of a picture transmitted from Chicago to New York. Seven minutes are required for the electrical transmission of pictures by wire.

had been restricted to certain hours was placed on 24-hour basis. The messages are sent by wire on land, then by radio from Rocky Point, L. I. to Cupar, Scotland, thence by wire. For westbound mesages, the radio route is from Rugby, England, to Houlton, Me. The original installation makes use of a long radio wave or low frequency, but recently an additional channel using a so-called "short wave" has been installed.

Telephone Cable. On land, there has been a great increase in the use of storm-proof overhead cables and underground cables. A new cable between New York and Chicago has 250 telephone channels and 500 telegraph channels. The practicability of the simultaneous use of the same conductor for telephony and telegraphy has led to a business arrangement between the American Telephone & Telegraph Co. and the telegraph companies, which takes care of the increase of business without new wires and particularly without duplicate pole lines on the same route.

On Sept. 25, 1929, telephone connection was established between New York and Sydney, Australia through wire circuits and radio. The path of the transmission was from the office of the American Telephone & Telegraph Co. in New York City over wire circuit to the company's short-wave transmitter at Lawrenceville, N. J., whence connection was established by radio with Baldock near London, and thence to Rugby by wire. From the Rugby transmission station, the message passed to Sydney, Australia. The distance between the stations was 15,000 miles.

In 1929 notable preparations were being made for a transatlantic cable providing an all-wire voice circuit between the two continents. Engineers at the Bell Telephone Laboratories in New York City were working on the development of the cable system to connect New York with London, which would involve long-distance lines radiating from each of these cities to the other parts of Europe and America. This telephone cable would handle but one conversation at a time and provide an additional channel for the transmission of messages in addition to the radio system, but with greater reliability. The new cable in process of development has a copper wire for an actual conductor in its centre and is wrapped around spirally with an alloy of nickel, cobalt, and iron, known as "perminvar." This serves as loading and overcomes the capacity of the cable which has hitherto retarded the transmission of voice currents and restricted such transmission over cables of limited length. For use in telegraphy, the Bell laboratories had developed an alloy called "permalloy" which was used in several high-speed telegraph cables, but the perminvar possessed a further advantage over permalloy, for it is affected to the same extent by the same variation in current, whether in a weak current or a relatively heavy one. In the telegraph cable, the current either flows or does not flow, but in telephony there is a constant variation or modification of current strength to take care of the modulations of the voice. This was claimed to be possible with a cable loaded with perminvar.

Carrier-current Telephony. This name was given to the method of sending telephone messages by means of radio waves but over the copper conductor by means of modulated high-frequency currents, similar to radio currents but of a frequency of the order of 10,000 to 50,000 cycles and sent over a wire. By this means, one normal voice message and six carrier-current telephone messages could be sent simultaneously over the same line and separated at the receiving end by suitable tuning devices such as are used in radio tuning. This secures privacy and avoids interference. In 1919 Baltimore and Pittsburgh were connected by a cable using this scheme, which provides simultaneous service for five telephone messages and duplex telegraph service over one pair of wires. By means of rectifier (detector) and amplifier tubes, these telephone messages may be sent on further on separate lines. Carrier-current telephony is now being used to send telephone messages over trolley wires and high-tension transmission lines without interfering with the usual service of the lines. In 1921 a telephone cable was put in service between Key West and Havana, a distance of 105 miles, for many years the longest submarine telephone cable in service. By means of carrier currents and multiplex telegraphy, several telephone and telegraph messages may be sent simultaneously, as described above. Messages from anywhere in the United States may be sent over this cable by direct connection.

The subject of inductive interference has been of great interest to the telephone and telegraph engineers. It relates to the unfavorable effects which the large currents and high voltages of power transmission lines have on communication circuits. These effects are threefold: electromagnetic, due to the large currents; electrostatic, due to the high voltages; and stray currents, due to grounds. This matter is still being given careful scientific study by a committee representing all concerned, with the expectation of devising regulations which would obviate the troubles and be fair to all concerned.

Relays. With the increasing distance covered and increasing complexity of systems, it becomes necessary to relay or amplify the messages every few hundred miles. For this purpose, the three-electrode vacuum tube has been most satisfactory and it is now an essential part of a telephone system. One of the feats of this long-distance work was the linking of 106 radio-broadcasting stations during the 1928 political campaign. The same speech was sent from one place to all the stations using wire telephone circuits.

Transmission of Facsimile Messages. In April, 1927, the American Telephone & Telegraph Co. gave a practical demonstration of television in which persons in New York were able to see persons in Washington move and hear them talk. For details see Radio.

Photographs Transmitted by Wire. In 1924 the American Telephone & Telegraph Company gave the first public demonstration of sending photographs by wire between Cleveland and New York and since that time regular commercial service is maintained between a number of cities. The method which involves the sending of facsimile messages or copies of photographs, documents, etc., has been so improved that now the telegraph companies are taking out licenses and supplying their newspaper customers with illustrations. This is accomplished by means of rotating cylinders at the respective ends of the line, held in exact synchronism by impulses of carrier currents. At the sending end, a transparent film picture is on the cylinder and a very fine beam of light is sent through the film and moved along the rotating cylinder in the manner used in talking ma-tional problems with which all the Southern States are obliged to contend: a large rural population combined with a large colored population. Increasing attention has been give to these problems in recent years, and much progress has been made in dealing with them. In 1923 the Legislature passed a measure which reorganized to a large extent the school system. The Department of Education was created to supersede the Department of Public Instruction and the head of the new department was called the Commissioner of Education rather than Superintendent of Public Instruction. The Legislature of 1921 passed a new county board-of-education law, under the provisions of which a county board of education consisting of seven members elected for a term of seven years, one member retiring each year, was created. The same Legislature enacted a measure extending the term of office of the county superintendent to four instead of two years. High schools increased in number and efficiency with improved conditions. They are under the control of the county board of education and operated under a special tax levied by the county, together with a State tax and a supplementary appropriation by the State. In 1923 there were 550 county high schools, 195 of them being standard four-year schools. The State system of elementary schools covers every county in the State. Since much the greater part of the total enrollment in the public schools is in the rural elementary schools, this phase of the State's educational system presents the most important problem and is most difficult of solution. Educational agriculture was organized in the State in 1917-18. At that time, there were courses in 12 schools with an enrollment of 189. This increased in 1923 to 64 schools with an enrollment of 1789. In 1913 the total enrollment in the county schools was 439,854 (371,948 white, 76,222 colored); while 69,399 white and 26,448 colored, a total of 95,487, were enrolled in the city schools. The total enrollment in the schools of the State in the academic year 1925–26 was 653,876; of this number, 600,584 were in the kindergarten and elementary grades and 53,292 in the high schools. According to color, the enrollment was: white, 533,993; colored, 119,883. Expenditure for public day schools in 1925–26 was: current, $17,386,292; outlays, $3,115,194. The percentage of illiteracy in the State decreased from 16.3 in 1910 to 12.6 in 1920: among the native white population, from 11.9 to 9.2; among the Negro, from 33.3 to 23.9 per cent. In the foreign-born white population, it increased from 8.2 per cent to 8.7.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of State governmental departments, $16,075,340 (of which $3,883,158 was aid to local education); for interest on debt, $901,873; for permanent improvements, $10,963,010; total, $27,940,223 (of which $14,136,780 was for highways, $4,532,159 being for maintenance and $9,604,621 for construction). Revenue was $26,534,880. Of this, property and special taxes formed 23.7 per cent; departmental earnings and charges for officials' services, 8.0 per cent; sales of licenses and taxation of gasoline, 43.5 per cent. Property valuation was $1,720,780,504; State taxation thereon, $3,441,561. Net State funded debt on June 30, 1927, was $17,222,176.

Political and Other Events. The State displayed from time to time after 1914 the tendency to shift toward Republican Party allegiance. Governor Hooper, Republican, was renominated in 1914 but was defeated by the Democratic candidate, Thomas C. Rye. In July, 1915, affairs of the city of Nashville went into the hands of a receiver. The city treasurer was arrested, charged with misappropriation of municipal funds. The Grand Jury in June returned indictments against the finance commissioner, the comptroller, and the assistant city treasurer. The latter officer fled to Australia. In 1916 Governor Rye and Senator McKellar were reëlected. In the presidential voting, Wilson received 152,955 votes; Hughes, 116,257. A fire in Nashville, on Mar. 22, 1916, destroyed 600 buildings and caused a loss of more than $1,500,000. Thomas C. Rye was reëlected in 1918, and John K. Shields, Democrat, was reëlected to the Senate. In 1918 A. H. Roberts was elected governor on the Democratic ticket, but in 1920 he was defeated by Alf Taylor, Republican. Taylor served one term and was defeated by Austin Peay, Democrat. For President, in 1920 Harding received 219,829 votes; Cox, 206,558. In 1922 Senator McKellar was reelected. Governor Peay was reëlected in 1924 and 1926. He died in office in 1927, and was succeeded by Henry H. Horton, who was regularly elected governor, as the Democratic candidate, in 1928. The vote for President in 1924 was: Davis, 158,537; Coolidge, 130.882; LaFollette, 10,656. That of 1928 was: Hoover, 195,338; Smith 157,343.

Legislation. In 1917 provision was made for a budget system and for a compulsory system of party primary elections. A general prohibition law also was passed. The Legislature of 1919 abolished the death penalty for murder in the first degree. Women were permitted to vote in presidential elections. A State police force was created, and a workmen's-compensation law was passed. The Legislature of 1923 passed a measure drafted by Governor Peay for the consolidation of the administrative departments under nine appointive heads. In 1925 a law was enacted prohibiting teachers in any schools supported wholly or partly by public funds "to teach any theory which denies the story of the Divine creation as taught by the Bible and to teach instead that man has descended from lower forms of animals." Under this statute was held at Dayton, in 1925, the widely noted trial of John Thomas Scopes, a young teacher of biology in Dayton.

TENNESSEE, UNIVERSITY OF. A nonsectarian, coeducational institution at Knoxville, Tenn., founded in 1794. The colleges of medicine and dentistry, and school of pharmacy are at Memphis, and a junior college at Martin. The student enrollment of the university increased from approximately 1200 in 1916 to 4594 in the autumn of 1928, in addition to which there were 1530 in the summer sessions at Knoxville and Martin. The faculty increased from about 200 members to 308 and the library from 40,000 to 96,173 volumes. In 1917 the State Legislature authorized a bond issue of $1,000,000 for new buildings and improvements, and a tax levy of a half-mill for the support of the institution. The land grant amounted to $400,000 in 1928 and the income for 1927–28 to more than $2,240,000. Among the new buildings erected between 1914 and 1928 were an anatomy laboratory building at Memphis, a home economics laboratory, a practice house for the department of home economics, and two experiment stations, one an insectary and the other an addition to the dairy cottage of the Middle Tennessee Experiment Station. Harcourt A. Morgan, B.S.A., LL.D., succeeded Brown Ayres, Ph.D., LL.D., as president in 1919.

TENNIS. Tennis vies with golf as the world's most popular sport. Practically every country has its national tennis tournaments, sectional competitions, intercity matches and club, college, and school contests. The contests for the Davis Cup, emblematic of the world championship, which began in 1900, have undoubtedly been responsible in large measure for the rapid progress tennis has made. Whereas, in the earlier years of the competition for the cup, only two or three nations participated, now a score or more have their teams entered. The list of winning countries also indicates the broadening trend of the game. The United States won the cup in 1900, 1902, 1913, and the period 1920–26; Great Britain triumphed in the period 1903–06 and in 1912; Australia scored in 1907 and 1908; Australasia was victor in 1909, 1911, 1914, 1915, and France swept the courts in the three years, 1927–29.

René Lacoste, Henri Cochet, and Jean Borotra of France and William T. Tilden, II, of the United States are the world's outstanding tennis players, as judged by their showings in Davis Cup and other international tourneys, as well as in national championship competitions. The most prominent women players since the retirement of Mlle. Suzanne Lenglen of France in 1927, to join the professional ranks, have been Miss Helen Wills of the United States, and Miss Eileen Bennett of England. The Wightman Cup, emblematic of the women's world championship, was won by the English team headed by Miss Bennett in 1928.

In 1929 H. Cochet, the French player, won the Wimbledon championship, the outstanding men's amateur event of the world. Miss Wills of California continued her supremacy among the women, attained when Miss Lenglen retired, by triumphing both at Wimbledon and in America. Tilden gained the United States honors from a brilliant field, and Karel Kozeluh, the Czechoslovakian contestant, defeated Vincent Richards for the United States professional title, the third annual event of its kind.

Court tennis, squash, and racquets, all branches of tennis, have not the wide appeal of the last-named sport, their popularity being confined to the more exclusive clubs in the larger cities of the United States. Pierre Etchebaster of France won the world court-tennis championship in 1928 from George Covey of England. An American team defeated a British aggregation in an international racquets match in New York City in 1928, but two of the losing team, J. C. F. Simpson and C. N. Bruce, later captured the United States doubles title. See OLYMPIC GAMES.

TERAUCHI, MARSHAL. See JAPAN, *History.*

TERMAN, LEWIS MADISON (1877–). An American psychologist born in Johnson County, Ind, and educated at Clark University. After teaching in the California State Normal School in Los Angeles, he went to Stanford University and became professor of education there in 1916. During the World War, he was a member of a board of five psychologists appointed to revise the army mental-test methods for use in schools. He wrote *The Teacher's Health* (1913); *The Hygiene of the School Child* (1914); *The Measurement of Intelligence* (1916); *The Stanford Revision of the Binet-Simon Intelligence Scale* (1916); *The Intelligence of School Children* (1919); *The German Group Test* (1920); *Genetic Studies* of *Genius,* 2 vols. (1925–26). He edited the *Measurement and Adjustment Series.*

TERMIER, PIERRE (1859–). A French mineralogist and member of the Academy of Sciences. At various periods he served as professor in the School of Mines, as Inspector General of Mines, and as director of the Geological Survey of France. He wrote *La joie de connaître; suite de À la gloire de la terre, souvenirs d'un géologue* (1926), and numerous articles on geological subjects.

TERRY, DAME ELLEN ALICIA (1848–1928. An English actress (see VOL. XXII). In 1916 Miss Terry made her only appearance in the films, in a picture called *Her Greatest Performance.* Her last regular stage appearance was made in June, 1919, when she took the part of the nurse in *Romeo and Juliet* at the Lyric Theatre in London. In 1922 the University of St. Andrews, Scotland, granted her the honorary degree of LL.D. and in 1925 she received the Grand Cross of the Order of the British Empire. Her 80th birthday was celebrated in February, 1928, and in the following July she died after a brief illness, at Small Hythe, near Tenterden, Kent, recognized everywhere as one of the great women of the stage.

TESCHEN, ZIPS, AND ORAVA QUESTIONS. The disposition of these three districts, the first up to 1918 part of Austria and the second and third of Hungary, occasioned a serious dispute between Poland and Czechoslovakia. The Duchy of Teschen, embracing only an area of 2282 square kilometers (881 square miles), but possessing great mineral wealth of coking and gas coal, and situated on the more important road and railway arteries of Central Europe, occupied a place of first rank. In 1910 there were settled there 233,850 Poles, 115,604 Czechs, and 76,916 Germans. It is important to note that the Polish settlements, largely in the mining areas, dated back only to the last half of the nineteenth century and were made up of immigrants from Western Galicia. Poles were in the majority in the centre and east; in the west, the Czechs were most numerous; while the Germans were settled in the towns (Bielitz, Teschen, etc.), and formed the middle class. Ethnical considerations were therefore far from simple; the problem was further complicated by the economic importance of the duchy. It forms part of the vast Silesian coal field, and there were mined in 1913 7,594,865 tons of coal and 1,146,580 tons of coke.

Such was the basis of the protracted struggle for possession before the Peace Conference, and after. On the grounds of history and economic necessity (Karvin coal supported the great Czech iron and chemical industries at Witkowitz, Moravska, Ostrava, etc., while the Oderberg-Jablunka railway was vitally necessary for the maintenance of communications between Slovakia and the West), the Czechoslovaks could make out a convincing case. The Poles, on the other hand, supported their claims on ethnical grounds, although these were disputed, as the Polish population was relatively unstable. Other considerations had, however, entered into the controversy. On the collapse of Austria in October, 1918, two local Silesian organizations took possession of the duchy and effected a common administration. On Nov. 5, 1918, control was divided between the two, the Czechs establishing themselves in the smaller western portion east of Freistadt, and the Poles in the remainder. In January, 1919, against Czechoslovak protests, Polish troops occupied eastern Teschen. The Czechs, on their side, took Oderberg after a skirmish; an armistice on February 5 laid down a new line more favorable to Czechoslovakia this time.

In view of all these complications and the inability of an Inter-Allied Commission, at work on the spot, to suggest a solution, the Peace Conference finally decided to permit the two governments to settle the question between themselves. As they were unable to do this, the Supreme Council, on Sept. 27, 1919, ordered plebiscites in the whole duchy as well as in Zips and Orava. By this time, the contested region was filled with soldiers, customs officials, and a general ill will. The tension increased, aided by hostile propaganda in both countries, with the result that rioting and strikes grew in frequency. Amid such a state of affairs the holding of the plebiscite was found impracticable and the Inter-Allied Commission so reported to the Supreme Council (July, 1920). An appeal to the contesting powers again revealed a deadlock. This time, in the interests of European peace, the Supreme Council called upon the Council of Ambassadors to effect a settlement (July 11, 1920). On July 28, in accordance with the decision of the Supreme Council, the Council of Ambassadors announced its findings for Teschen, Zips, and Orava. The boundary as finally laid down gave Czechoslovakia the Oderberg-Jablunka line and all territory west of it, including the mines of Ostrau-Karvin and the city of Freistadt. The town of Teschen was to remain with Poland, which also acquired the German enclave of Bielitz in the midst of a rich agricultural region. The necessity for dividing a region that was economically and culturally a unit was unfortunate, but the nationalistic fevers awakened by the World War made any other solution impossible. The contest was finally closed December, 1923, when, on the appeal of Poland, the Permanent Court of International Justice reviewed the proceedings and pronounced in favor of the boundary line of July, 1920.

Involved in the same controversy was the disposition of the counties of Zips and Orava (formerly of Hungary). Northwest Zips and northeast Orava were claimed by Poland on historical and ethnical grounds. In 1910, there were in Orava 2000 Magyars, 1528 Germans, 59,096 Slovaks, and 16,120 "others" (the Magyar way of referring to Poles); in Zips there were 18,658 Magyars, 38,432 Germans, 97,077 Slovaks, 12,327 Ruthenes, and 5629 "others." Both countries were ocupied by Czechoslovakia in November, 1918, on the ground that the inhabitants of the highlands were not ethnically Polish; but the difficulties attending the Teschen solution prevented a settlement there. The decision of the Council of Ambassadors of July 28, 1920, gave Poland northeastern Orava, with the line of demarcation south of the main Carpathian divide, and northwestern Zips, with the line north of the divide. Economically, the partition seemed justified because of the close connection between the frontier villages and Galicia, but on ethnical grounds, there appeared more reason for union with Czechoslovakia. See POLAND, under *History*.

TEWFIK, tū′fik, AHMED PASHA (1845–). A Turkish statesman, born at Constantinople. He served in the army for many years, resigning in 1870 to enter the translation bureau of the Government. During the Russo-Turkish War, he acted as political agent for the army and later became Turkish Minister at Athens. In 1884, he was Ambassador at Berlin, and was recalled in 1895 to be Minister of Foreign Affairs. He was Grand Vizier in 1909, 1912, and 1918, and the government which he formed in 1918 excluded all the members of the Committee of Union and Progress. He resigned in March, 1919, but returned to power in October, 1920, remaining until November, 1922, when the Sultan, Mohammed VI, was deposed. He then fled to Egypt.

TEXAS. The first State in size (265,896 square miles) and the fifth in population; capital, Austin. The population increased from 3,896,542 in 1910 to 4,663,228 in 1920, or by 19.7 per cent; estimated population, 1928, 5,487,000. The white population increased from 3,204,848 (1910) to 3,918,165 (1920); Negro, from 690,049 to 741,694; native white, from 2,964,864 to 3,557,646; and foreign-born white, from 239,984 to 360,519. Urban population mounted from 938,104 to 1,512,689; rural from 2,958,438 to 3,150,539. The growth of the principal cities was as follows: San Antonio (q.v.), 96,614 in 1910, 161,379 in 1920; Dallas (q.v.), 92,104 and 158,976; Houston (q.v.), 78,800 and 138,276; Fort Worth (q.v.), 73,312 and 106,482; El Paso 39,279 and 77,560; Galveston 36,981 and 44,255; and Beaumont 20,640 and 40,422.

Agriculture. As Texas is the chief cotton-producting State, agricultural conditions have been much affected by the ravages of the boll weevil, which made its first appearance there in the nineties. The insect continued to spread over the State, but, while the cotton yield was low in the years 1918–21, the production of the State has since more than doubled. This will be noted from a comparison of the acreage and production for several years: in 1913, 12,597,000 acres and 3,945,000 bales; 1918, 11,233,000 and 2,697,000; 1921, 10,745,000 and 2,198,000; 1922, 12,125,000 and 3,290,000; 1926, 18,374,000 and 5,631,000; 1928 (estimated), 17,766,000 and 5,150,000. The number of farms increased 4.4 per cent or from 417,770 in 1910 to 436,033 in 1920, and rose farther to 465,646 in 1925. The acreage of land in farms increased from 112,435,067 in 1910 to 114,020,621 in 1920, but thereafter decreased to 109,674,410 in 1925. The improved land in farms totaled 31,227,503 acres in 1920. The value of farm property doubled, rising from $2,218,645,164 in 1910 to $4,447,420,321 in 1920, but declined to $3,471,867,466 in 1925. The average value per farm was $5311 in 1910, $10,200 in 1920, and $7456 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 182,976 were operated by owners; 1445, by managers; and 281,225, by tenants. The corresponding figures for 1910 were 195,863; 2332; and 219,575. White farmers in 1920 numbered 357,249, and colored farmers, 78,784. White farmers numbered 383,920 in 1925, and colored farmers, 81,726. Farms reported as under mortgage, 69,940 in 1920, numbered 62,106 in 1925. The total number of cattle was 6,156,715 in 1920; 5,845,918 in 1925; there were 1,463,707 dairy cows in 1920; 731,491 in 1925. Sheep numbered 2,573,485 in 1920; 3,137,129 in 1925; swine, 2,225,558 in 1920; 1,166,253 in 1925. The estimated production of the principal farm products in 1928 was as follows: Corn, 99,162,000 bushels; wheat, 22,176,000; oats, 35,751,000; barley, 3,276,000; potatoes, 2,691,000; sweet potatoes, 8,284,000; rice, 7,308,000; hay, 941,000 tons; and peanuts, 78,000,000 pounds. Comparative figures for 1913 are corn, 163,200,000 bushels; wheat, 13,650,000; oats, 32,500,000; barley, 168,000; potatoes, 2,340,000; rice, 9,696,000; and hay, 464,000 tons.

Mining. Through the remarkable development of its oil fields, Texas has become in recent years one of the most important of the mineral-producing States in the value of its products. In 1926 it ranked fourth in value of minerals produced, and third in petroleum. Petroleum production in the period starting with 1914, was as follows: 20,068,184 barrels in 1914, valued at $14,942,848; 24,942,701 in 1915, $13,026,925; 27,644,605 in 1916, $25,760,335; 32,413,287 in 1917, $42,891,555; 38,750,031 in 1918, $74,867,537; 96,868,000 in 1920, $313,781,000; 106,166,000 in 1921, $162,663,000; 166,916,000 in 1926, $308,700,000; 217,389,000 in 1927, $248,550,000; 257,320,000 in 1928, $236,300,000. The great increase in production in these years resulted from the development of important new petroleum fields. The increased value in the two years 1922–23, while due largely to the increase in the output, reflected also the decreased purchasing power of money resulting from inflation, with consequent higher prices. The output of natural gas is very valuable. In 1914 this amounted to 13,433,639 M. cubic feet, valued at $2,469,770; 1916, 15,809,579, $3,143,871; 1920, 37,063,000, $7,042,000; 1921, 44,504,000, $8,893,000; 1926, 175,392,000, $28,165,000. Natural-gas gasoline after 1916 became an important product. In that year, the output was 1,292,811 gallons; in 1918, it was 7,326,122 gallons; 1920, 32,956,028; 1926, 243,093,000; 1927, 320,723,000. In 1928 the total quantity of coal and lignite produced in Texas was 1,182,034 net tons, valued at $1,589,000 of which amount 117,849 tons, valued at $377,000, was bituminous coal and 1,064,185 tons, valued at $1,212,000, was lignite. Texas also produces sulphur, cement, clay, mercury, asphalt, gypsum, and other minerals. The total value of the mineral production in 1927 was $374,503,420, compared with $420,586,730 in 1926; $351,211,629 in 1925; $371,250,979 in 1920; $190,563,015 in 1919; $110,306,367 in 1918; and $30,363,426 in 1914.

Manufactures. Texas has increased greatly in importance as an industrial State, especially in the period since 1914, in which petroleum refining has increased to an extraordinary extent. There were, in 1920, 30 cities having more than 10,000 inhabitants. These formed 23.4 per cent of the State's population, and produced 40.8 per cent of the value of the State's manufactured products. There were in Texas in 1909, 4588 manufacturing establishments; 5724 in 1919; 3603 in 1925; and 4065 in 1927. Persons engaged in manufactories numbered 84,575, 130,911, 106,772, and 116,763, respectively; and capital invested amounted to $216,875,579 in 1909, and $585,776,451 in 1919. The value of products in 1909 amounted to $272,895,635; in 1919, to $999,995,796; in 1925, to $1,237,674,838; and in 1927, to $1,206,579,962. The large increase in the value of products about 1919, was due chiefly to industrial conditions incident to the War, and cannot be used to measure the growth of manufactures between the industrial census of 1914 and that of 1919; but the increase in number of persons engaged in manufactories clearly indicated a decided growth in the manufacturing activities of the State. The refining of petroleum is the first industry in point of value of product. As this industry did not develop to any extent till after 1914, the only available figures are those of 1919, in which year the product amounted to $214,757,000 in value. Slaughtering and meat packing come second in importance, with a value of $42,530,000 in 1909; $125,364,000 in 1919; and $79,208,777 in 1925. The manufacture of cottonseed oil and cake is third, with $29,916,000 in 1909; $102,112,000 in 1919; and $63,308,000 in 1927. Flour-mill and gristmill products, in fourth place, amounted to $32,485,000 in 1909; $73,064,000 in 1919; and $54,528,293 in 1925.

Education. The chief educational problems of Texas come from its great expanse and widely scattered population. In the course of its more recent sessions, the Legislature has passed many laws, which resulted in improved conditions. The Better Class Amendment to the State Constitution, passed in 1918, removed all limit on the rate of local tax which a district may vote for support of its schools. Numerous campaigns for education, carried on from time to time, aroused the entire State to greater interest in all the schools, and particularly in the rural schools. The salaries of public-school teachers were increased on an average of 54 per cent in 10 years, and with this increase came improvement of the qualifications of teachers. With better support, the schools increased the length of their terms. Many improvements were made in rural schools, especially in the direction of consolidation and the transportation of pupils. Considerable advance was made in vocational education under the Smith-Hughes Law, which gives Federal aid to States. A system of free textbooks was introduced, approved, and established; and a plan of classifying and affiliating elementary schools was initiated. A campaign was waged for the passage of a law providing for the establishment of a county unit system of managing schools. Schools for Negroes and Mexicans were greatly improved. Recognition for the work of women on equal terms with that of men progressed. The enrollment in the public schools in 1909–10 was 821,631; in the elementary schools in 1925–26, 1,015,951; and in the high schools, 194,176. The expenditure for public day schools in 1925–26 was: current, $54,197,384; outlays, $10,930,635. The percentage of illiteracy in the State decreased from 11.6 in 1910 to 9.6 in 1920: in the native white population, from 3.7 to 2.5; among the Negro, from 31.4 to 23.4. In the foreign-born white population it increased from 28 per cent to 33.3

Finance. State expenditures in the year ended Aug. 31, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $56,648,830 (of which $22,465,370 was aid to local education); for interest on debt, $202,425; for permanent improvements, $13,923,107; total, $70,774,362 (of which $19,764,148 was for highways, $8,255,390 being for maintenance, and $11,508,758 for construction). Revenues were $78,687,485. Of this, property and special taxes formed 33.6 per cent; departmental earnings and charges for officials' services, 5.0 per cent; sales of licenses and taxation of gasoline, 41.2 per cent.

Property valuation was $3,905,050,651; State taxation thereon, $26,163,839. Net funded State debt on Aug. 31, 1927, was $4,364,488.

Political Events. Texas remained overwhelmingly Democratic until the upset due to the Smith candidacy for President in 1928. The Ku Klux Klan acquired great strength in 1922, and took an important part in deciding elections. In 1914, James E. Ferguson was elected governor. He was reëlected in 1916, and Senator Culberson was reëlected. For President, Wilson received 285,909 votes; Hughes, 69,949. In August, 1917, impeachment charges were filed against Governor Ferguson for alleged misappropriation of public funds. The House voted for the impeachment of the Governor on 21 different counts. The Senate, after trial, removed the governor and disqualified him from holding any office in the State. He had offered his resignation a few hours before. Of the 10 charges sustained, nearly all related to the misuse of trust funds and public money. The governor nevertheless, ran for the office again in 1918. He was defeated by the former Lieutenant Governor, W. P. Hobby, who had succeeded him. Morris Sheppard was reelected to the United States Senate in 1918. Pat M. Neff was elected governor in 1920. For United States Senator in 1922, Earl B. Mayfield won a hotly contested primary with support from the Ku Klux Klan, and was elected. Governor Neff was reëlected. In 1924 Davis, for President, received 484,605 votes; Coolidge, 130,023; La Follette, 42,881. The Ferguson faction elected Myriam A. Ferguson, the removed governor's wife, as chief executive of Texas. Dan Moody, backed by the anti-Ferguson faction, was elected governor in 1926. A resurvey to settle the disputed Oklahoma boundary was ordered in 1926 by the United States Supreme Court. In the 1928 presidential election, Hoover received 367,036 votes; Smith, 341,032. Dan Moody was reëlected governor.

Legislation. The Legislature of 1919 submitted to the people the question of holding a constitutional convention. It also submitted a constitutional amendment for woman suffrage. Both were defeated. In 1921 the Legislature passed an amendment forbidding Japanese and Chinese to hold land in Texas except under certain conditions; also one to make more effective provisions for conserving the State's natural resources. It also proposed a constitutional amendment restricting the suffrage to native-born or naturalized citizens and authorized absentee voting in primary elections. The commission form of government was extended to towns with less than 5000 population, and a constitutional amendment was passed increasing the amount of the pensions paid to Confederate soldiers and sailors and their widows. The Legislature of 1923 enacted a measure substituting electrocution for hanging. It rendered the prohibition law more stringent, and passed an enabling act providing an increase in pensions for Confederate veterans. In 1925 a measure of relief from disabilities was passed for the benefit of ex-Governor Ferguson, whose partisans had control. This amnesty was repealed in 1927. A law limiting child labor was enacted in 1925. Constitutional amendments, submitted in 1927, provided increased taxing power to the Legislature, eliminated fee remuneration for county officers, and revised State salaries. A law enabling the Democrats to exclude Negroes from their primaries was recast in 1927, having been invalidated in its earlier form by the United States Supreme Court.

TEXAS, UNIVERSITY OF. A coeducational State institution, founded in 1881, and opened in 1883. The main university is at Austin, the medical branch at Galveston, and the college of mines and metallurgy at El Paso. The student enrollment increased from 2576 in 1914 to 6209 in 1928. The faculty increased during this period from 191 to 432, and the library from 110,000 to 407,552 volumes. The productive funds of the University aggregated $21,060,521 in 1928. The Genaro Garcia collection of materials in the Latin-American field was secured in 1921 at a cost of $104,539. The department of journalism was opened in 1914; the department of library science in 1918; and the school of business administration, which in 1912–13 was organized as a department of the College of Arts and Sciences, became a separate school in 1922–23. The College of Mines and Metallurgy was created in 1919, following the passage of an act by the State legislature constituting the State School of Mines and Metallurgy, a branch of the University of Texas. In 1925 a biology building was dedicated, and a recitation and classroom building, in the following year. President, Harry Yandell Benedict, Ph.D., LL.D.

TEXAS FEVER. See VETERINARY MEDICINE.

TEXAS TECHNOLOGICAL COLLEGE. A State coeducational institution at Lubbock, Tex., opened in 1925. The student enrollment for the year 1927–28 was 1682; for the summer session of 1928, it was 985; and for the autumn term, 1808, of whom 1095 were men, and 713 women. The curriculum was organized into four separate schools; Liberal arts, with 1122 students, in the autumn of 1928; engineering, with 403; agriculture, with 124; and home economics, with 158. The faculty numbered 127. The appropriations for the college since its founding, amounted to $3,400,000, of which $767,000 represented the regular appropriations for the year ending Aug. 31, 1929. The library in 1928, contained 12,441 volumes. An engineering building was completed on the campus during the year, and a chemistry building was under construction. President. Paul Whitfield Horn, M.A., LL.D.

TEXTILE MANUFACTURING. The American textile industry in 1927, as in earlier census years, according to the United States Census, ranked second among the various manufacturing industries of the country when considered on the basis of the total value of the product. This value was represented by the vast amount of $8,950,437,000, which was the output of 26,843 establishments with the total number of wage earners averaging 1,694,416. In this total production textile fabrics and materials aggregated $4,933,282,000, articles from textile fabrics for personal wear $3,456,304,000 and other textile fabrics $560,888,000. In 1919, a year of abnormal activity, the value of the product attained $9,210,934,000, representing the output of 28,451 establishments with the number of wage earners averaging 1,610,003. The maximum production, however, was attained in 1923, when as the accompanying table (Table I) indicates, 26,763 establishments with 1,715,293 wage earners reported an output valued at $9,462,282,000. All of these years, however, represented a vast gain over 1914 when 23,350 establishments

TABLE I—U. S. CENSUS STATISTICS OF THE TEXTILE INDUSTRIES

NOTE.—The value of the products for the group as a whole, and to some extent also for the subgroups and for several of the individual industries, involves duplication owing to the use of products of one branch as material for another.

Year and industry	Establishments	Wage earners (average number)	Primary horse power	Wages (In thousands of dollars)	Cost of materials (In thousands of dollars)	Value of products (In thousands of dollars)	Value added by manufacture (In thousands of dollars)
The group as a whole:							
1914	23,350	1,505,912	2,717,078	675,783	2,013,738	3,444,810	1,431,072
1919	28,451	1,610,003	3,248,364	1,481,143	5,379,388	9,210,934	3,831,547
1921	25,955	1,509,738	(a)	1,472,352	3,801,090	6,956,466	3,155,375
1923	26,763	1,715,293	3,783,401	1,743,798	5,394,441	9,462,282	4,067,841
1925	24,450	1,628.283	3,986,522	1,654,815	5,349,925	9,126,155	3,776,230
1927	26,843	1,694,416	4,173,438	1,759,958	4,922,716	8,950,473	4,027,757
Textile-mill products:							
1914	5,942	950,880	2,522,862	404,606	1,185,091	1,935,344	750,249
1919	7,143	1,052,327	3,024,486	910,048	3,258,527	5,481,884	2,223,357
1921	7,241	993,557	(a)	896,372	2,136,803	3,896,448	1,759,645
1923	7,816	1,164,638	3,556,440	1,122,752	3,213,272	5,527,558	2,314,286
1925	7,470	1,110,209	3,748,885	1,066,262	3,234,035	5,342,617	2,108,583
1927	7,244	1,119,733	3,906,923	1,099,735	2,762,674	4,933,282	2,170,607
Wearing apparel made from purchased fabrics							
1914	14,953	510,595	117,911	250,114	673,013	1,297,273	624,260
1919	18,778	507,700	131,965	526,955	1,745,931	3,198,147	1,452,216
1921	16,784	473,574	(a)	534,313	1,424,284	2,710,657	1,286,372
1923	16,904	499,413	132,317	568,139	1,852,229	3,443,940	1,591,711
1925	14,883	466,846	119,744	534,824	1,741,618	3,243,850	1,502,231
1927	16,259	511,151	130,587	590,141	1,805,240	3,456,304	1,651,063
Other articles, made from purchased textile fabrics:							
1914	2,455	44,437	76,305	21,063	155,634	212,193	56,559
1919	2,530	49,976	91,913	44,140	374,930	530,903	155,973
1921	1,930	42,607	(a)	41,667	240,003	349,360	109,357
1923	2,043	51,242	94,644	52,908	328,941	490,785	161.844
1925	2,097	51,228	117,893	53,729	374,272	539,689	165,417
1927	3,340	63,532	136,828	70,082	354,802	560,888	206,086
Major industries, 1927:							
Cotton goods	1,347	467,596	2,358,830	380,910	871,592	1,567,401	695,809
Knit goods	1,869	190,283	177,216	188,163	424,099	816,620	392,521
Silk manufactures	1,648	127,643	221,249	140,054	445,391	750,124	304,733
Woolen goods	471	61,790	191,803	72,156	172,700	301,309	128,609
Worsted goods	288	92,571	364,422	101,666	329,408	516,670	187,262
Carpets and rugs, wool, other than rag	65	32,829	65.828	42,041	85,602	166,888	81,287
Cordage and twine	116	15,084	74,924	13,674	56,105	89,172	33,067
Dyeing and finishing textiles	743	73,851	287,212	91,697	210,681	406,047	195,366
Clothing, men's (not including custom-made)	3,562	146,099	34,351	184,613	447,245	932,182	848,937
Shirts	907	57,216	14,916	42,998	129,744	241,650	111.906
Clothing, women's (not cluding custom-made)	7,588	154,459	30,287	211,350	809,520	1,494,401	684.881
Millinery [b]	1,148	33,311	7,920	46,788	103,490	209,495	106,005
Bags, other than paper, not made in textile mills	181	11,164	15,754	9,548	136,748	162,950	26,201

[a] Not called for in schedule for 1921.

[b] The production of untrimmed hats for women is covered, in part, by other industry classifications, namely, "Hats, fur-felt," "Hats, wool-felt," and "Hats and caps, cloth." Custom millinery shops are not included.

TABLE II—TEXTILES SUMMARY

[Price of cotton and wool in cents per pound; silk and rayon in dollars per pound; print cloth in cents per yard. All data are for the calendar year]

Item	1914	1921	1923	1925	1926	1927	1928
Cotton-spindle hours, millions	(a)	(a)	99,508	94,600	97,029	104,450	92,749
Per cent of single-shift capacity	(a)	(a)	98.9	92.9	95.4	104.7	95.5
Cotton manufactures:							
Production, 1000 dollars	701,301	1,330,263	2.010,141	1,819,886	(a)	1,659,519	(a)
Exports, 1000 dollars	48,211	115.539	136,188	146,167	128,767	133,186	134,644
Imports, 1000 dollars	60,313	75,430	100,153	79,271	67,159	66,198	69,295
Wool, 1000 pounds:							
Produced	290,192	283,629	268,196	292,362	311,576	332,014	351,013
Imported	256,501	516,605	388,345	336,646	299,451	264,507	240,360
Per cent activity of machinery: [b]							
Woolen spindles	(a)	72	92	84	73	78	79
Worsted spindles	(a)	82	92	66	69	67	61
Carpet looms	(a)	52	82	72	64	64	65
Wool manufactures:							
Production, 1000 dollars	464,250	888,558	1,312,719	1,199,417	(a)	1,036,143	(a)
Exports, 1000 dollars	12,480	9,903	8,733	5.873	4,979	5,154	6,519
Imports, 1000 dollars	44,101	51,218	69,118	73,901	70,667	78.775	78,391
Raw silk, imports, 1000 pounds	25,650	45,355	49,482	63,764	66,422	74,005	75,489
Silk manufactures:							
Production, 1000 dollars	254,011	583.419	761,322	808,979	(a)	750,124	(a)
Exports, 1000 dollars	2,409	9,672	11,136	18,182	17,788	15.299	18,647
Imports, 1000 dollars	29,960	48,276	44,597	36,719	40,570	42,234	41,298
Rayon, 1000 pounds:							
Yarns and sheets (excluding fabrics), production	2.445	15,000	36,477	51,902	63.648	75,555	97,901
Imports of rayon yarns [c]	2,527	3,276	3,029	5,441	9,351	15,045	12,117

[a] Not available. [b] Based on maximum, single-shift capacity. No comparable figures available for 1914.

[c] Imports for consumption.

with 1,505,912 wage earners had a production valued at $3,444,810,000.

The year 1928 following the census year witnessed decreased activity in practically all branches of the textile industry, except silk manufacture and rayon production, as compared with 1927. In the cotton-spinning industry activity declined from 104.7 per cent of its single-shift capacity in 1927 to 95.5 per cent in 1928. The aggregate number of active spindle hours in 1928 decreased 5.4 per cent for the cotton-growing States and 22.3 per cent for New England. While raw-wool production in the United States for 1928 exceeded that of 1927 by 5.7 per cent, the reported wool consumption of mills decreased 2.5 per cent. Monthly deliveries of raw silk to the mills in 1928 averaged 47,584 bales, a gain of 4 per cent over 1927. Rayon-yarn production amounted to 97,900,000 pounds, a gain of almost 30 per cent over 1927. Production of hosiery in mills decreased and the number of men's and boys' garments cut also showed declines as compared with 1927. Comparative figures for a number of years will be found in Table II.

The broad group of manufacturing enterprises classified as the textile industries in the United States as divided by the Census Bureau fall into three subgroups—industries making or aiding in the manufacture of textile fabrics, those making wearing apparel from purchased fabrics, and those making other commodities from purchased fabrics. Industries in the second and third subgroups use as their principal materials the products of the first subgroup. Within a single industry, however, there is sometimes considerable duplication in value of products owing to a similar cause. The principal divisions of the first subgroup ranked according to value of products in 1927, are cotton manufactures, wool manufactures, knit goods, silk manufactures, and manufactures of vegetable fibres, other than cotton. The production of rayon mills is classified by the Bureau of the Census under the chemical schedule but in the present work is discussed under RAYON.

In all of these various groups there was great activity after 1914, though not maintained in every industry, and this is indicated by Table III which shows the new textile mill construction from that time. It must be remembered that usually new mills constructed in the United States are large affairs, as modern conditions of profitable operation call for large units with improved equipment.

TABLE III—COMPARISON OF NEW TEXTILE MILL CONSTRUCTION IN THE UNITED STATES[a]

(From *Textile World*, New York)

	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913
Cotton	37	23	34	40	39	74	57	46	89	74	29	52	51	24	26	27
Wool	12	10	9	17	15	38	34	36	30	54	24	24	23	19	21	24
Knitting	78	70	52	84	57	73	94	103	59	84	120	97	113	111	110	142
Silk	29	19	37	38	22	26	24	31	71	61	49	86	60	25	51	54
Rayon	8	5	8	11	..	..	..	..	..	..	..	..	..	..	..	..
Miscellaneous	36	46	38	49	53	21	29	26	15	16	27	38	33	40	37	30
Total	200	173	178	239	186	232	238	242	264	289	249	297	280	219	245	277

TABLE IV—COTTON CONSUMPTION OF LEADING COUNTRIES, YEARS ENDED JULY 31

Source: Bureau of the Census

Country	Bales consumed (thousands)[a]								Per cent of total	
	1913	1921	1922	1923	1924	1925	1926	1927	1913	1927
Total	21,963	16,893	19,990	21.325	19,982	22,642	23,949	25,869	100.0	100.0
United States	5,483	4,893	5,910	6,666	5,681	6,193	6,456	7,190	25.0	27.8
United Kingdom	4,644	2,135	2,900	2,825	2,842	3,350	3,121	3,215	21.1	12.4
European Continent	7,514	4,600	5,016	5,304	5,551	6,339	6,910	7,669	34.2	29.7
India	1,843	1,925	1,871	1,751	1,630	1,825	1,697	2,040	8.4	7.9
Japan	1,435	1,885	2,176	2,348	2,037	2,450	2,795	2,750	6.5	10.6
Canada	131	155	205	203	152	190	240	254	.6	1.0
Other countries	913	1,300	1,912	2,228	2,089	2,295	2,730	2,751	4.2	10.6

[a] Bales of 478 pounds lint, except American, which are running bales. Exclusive of linters for the United States.

TABLE V—COTTON SPINDLES: NUMBER IN PRINCIPAL COUNTRIES[a]

For years ended July 31; all figures in thousands. No adjustment of pre-war figures to post-war boundaries has been made.

Country	1900	1914	1926	1927
Total	105,681	146,397	164,210	164,956
United States	19,472	32,107	37,586	36,696
Per cent	18.4	21.9	22.9	22.2
Canada	550	965	1,319	1,319
Mexico	([b])	([b])	830	838
United Kingdom	45,500	56,300	57,286	57,325
Per cent	43.0	38.5	34.9	34.7
France	5,500	7,410	9,511	9,567
Germany	8,000	11,550	10,480	10,800
Russia	7,500	9,160	7,246	6,945
Italy	1,940	4,620	4,833	5,086
Czechoslovakia	([c])	([c])	3,568	3,629
Spain	2,615	2,210	1,817	1,873
Belgium	920	1,530	1,854	1,936
Switzerland	1,550	1,380	1,529	1,518
Poland	([d])	([d])	1,375	1,372
Austria-Hungary	3,300	4,970	1,032[e]	1,025[e]
Other Europe	1,095	1,895	3,502	3,757
India	4,945	6,500	8,510	8,714
Japan	1,274	2,750	5,573	5,952
China	550	1,000	3,436	3,568
Brazil	450	1,250	2,493	2,593
All other	520	800	430	443

[a] Figures for 1900 and 1914 are for active spindles; for 1926 and 1927, for both active and idle.

[b] Not available.

[c] Included in Austria-Hungary.

[d] Included in Russia.

[e] Austria only.

Cotton Manufactures. Cotton goods, cotton small wares, and cotton lace goods form the principal branch of the American textile industry. Of these three, the manufacture of cotton goods naturally is by far the most important, as cotton small wares and lace goods form a comparatively small portion of the total output. The cotton-goods manufacturing industry embraces mills engaged in any of the preliminary processes preparatory to spinning, in spinning, and in weaving piece goods over 12 inches in width. The finishing processes of bleaching, dyeing, and printing are carried on mainly in separate plants. Manufacturers of cotton knit goods are not considered a part of the cotton-goods industry, being classified in the "knit-goods" industry. The number of establishments, persons engaged, amount of wages, cost of material, value of the total product, and value added by manufacture are shown in Table VI.

TABLE VI—THE COTTON-GOODS INDUSTRY
From *Commerce Year Book, 1929*
Source: Bureau of the Census.

Year	Establishments	Wage earners (average number)	Primary horse power	Wages	Cost of materials	Value of products	Value added by manufacture
1899 [a]	973	297,929	789,858	$ 85,126,310	$ 173,441,390	$ 332,806,156	$159,364,766
1909 [a]	1,208	371,182	1,286,105	129,789,717	364,013,504	615,217,702	251,204,198
1914	1,179	379,366	1,563,823	146,129,628	431,602,540	676,569,115	244,966,575
1919	1,288	430,966	1,836,298	355,474,937	1,277,785,597	2,125,272,193	847,486,596
1921	1,328	412,058	([b])	328,226,744	707,442,097	1,278,220,831	570,778,734
1923	1,375	471,503	2,153,299	396,602,644	1,147,372,215	1,901,125,703	753,753,488
1925	1,366	445,184	2,236,363	353,882,870	1,077,152,614	1,714,367,787	637,215,173
1927	1,347	467,596	2,358,830	380,909,543	871,591,901	1,567,400,612	695,808,711
Per cent change from 1925	—1.4	+5.0	+5.5	+7.6	—19.1	—8.6	+9.2

[a] The figures for years 1899 and 1909 are not strictly comparable with those for 1914 and later years, for the reason that the manufacture of cotton lace goods was included partly in the cotton goods and partly in the cotton small-wares branch of the industry at censuses prior to 1914.

[b] Not called for in schedule for 1921.

The 1347 establishments engaged primarily in the manufacture of cotton goods in 1927, according to data collected at the biennial census of manufactures taken in 1928, reported products valued at $1,567,400,612, a decrease of 8.6 per cent as compared with $1,714,367,787 reported for 1925, the previous census year, and a decrease of 26.2 per cent as compared with $2,125,272,193 for 1919, the maximum year.

The production for 1927 was as follows: Woven goods, over 12 inches in width, 8,980,414,774 square yards, valued at $1,183,760,651; cotton yarns for sale, 664,334,562 pounds, $253,663,750; thread, 29,992,472 pounds, $46,409,250; cotton waste for sale, 484,416,320 pounds, $26,808,651; other products, $56,758,310. The leading items entering into the total for woven goods were the following: Sheetings, 1,857,476,174 square yards, valued at $167,888,002; print cloth, 1,583,861,282 square yards, $109,826,442; cord fabric for tires, 179,740,778 square yards, $66,974,970; napped fabrics, 400,097,211 square yards, $55,386,356; twills and sateens, 413,996.565 square yards, $50,336,045; denims, 254,117,955 square yards, $49,791,845; plushes, velvets, and velveteens, 42,689,229 square yards, $45,710,213; ounce duck except tire, 178,807,302 square yards, $43,555,624; towels, towelings, and wash cloths, 169,997,031 square yards, $42,611,371; fabrics (other than shirtings) in chief value of cotton containing rayon, 163,824,938 square yards, $41,644,800; drills, 347,775,666 square yards, $40,668,249; shirtings, made entirely of cotton, 299,453,436 square yards, $38,953,426; reps, poplins, and broadcloths, 264,724,549 square yards, $37,655,931; ginghams, 290,618,626 square yards, $37,128,856; fabrics entirely or in chief value of rayon, 117,052,733 square yards, $36,300,172; lawns, nainsooks, cambrics, and similar muslins, 272,453,611 square yards, $32,100,888.

The 1347 establishments in the cotton industry reporting for 1927 were located in 30 States, as follows: 374 were located in North Carolina, 163 in Massachusetts, 164 in South Carolina, 139 in Georgia, 107 in Pennsylvania, 68 in Alabama, 66 in Rhode Island, 35 in Connecticut, 35 in New York, 26 in Texas, 25 in New Jersey, 21 in Tennessee, 17 in Maine, 17 in New Hampshire, 14 in Mississippi, 11 in Illinois, 11 in Virginia, 9 in Michigan, 8 in Maryland, 7 in Ohio, 5 in Wisconsin, 4 in California, 4 in Kentucky, 4 in Vermont, 3 in Arkansas, 3 in Indiana, 3 in Louisiana, 2 in Missouri, 2 in Oklahoma, and 1 in Delaware.

It will be observed that the industry is confined principally to New England and the cotton-growing States lying along the Atlantic seaboard.

TABLE VII—GEOGRAPHIC DISTRIBUTION OF COTTON–GOODS INDUSTRY IN THE UNITED STATES
Source: Bureau of the Census.

Section and State	Number of establishments			Average number of wage earners (thousands)			Value of products (thousands of dollars)		
	1923	1925	1927	1923	1925	1927	1923	1925	1927
Cotton-growing States	768	809	834	239	247	281	978,283	929,107	900,627
New England States	357	332	302	196	165	156	720,472	607,925	519,219
All other States	250	225	211	37	33	31	202,371	177,336	147,555
Total	1,375	1,366	1,347	472	445	468	1,901,126	1,714,368	1,567,401
North Carolina	351	364	374	81	84	96	326,572	316,069	310,299
Massachusetts	191	178	163	114	96	91	415,923	345,864	284,706
South Carolina	152	162	164	62	66	75	243.469	230,665	231,273
Georgia	129	134	139	47	49	57	201,860	193,424	180,509
Rhode Island	81	75	66	34	29	26	126,701	107,708	90,054
Alabama	61	68	68	20	22	25	86.385	85,983	80,834
Pennsylvania	127	115	107	13	12	12	91,686	79,116	75.001
New Hampshire	17	17	17	19	15	15	66,166	57,869	57,722
Connecticut	48	42	35	15	12	13	61,067	52,100	49,178
Maine	16	16	17	14	12	10	46,702	41,188	34,414

Of the establishments reporting in 1927, 834 (61.9 per cent of the total) were located in the cotton-growing States, 302 (22.4 per cent) in New England, and 211 (15.7 per cent) in other States.

In 1925 the industry was represented by 1,366 establishments, the decrease to 1,347 being the net result of a loss of 121 establishments and a gain of 102. Of the 121 establishments lost, 66 went out of business prior to 1927, 29 reported commodities other than cotton goods as their principal products in 1927 and were therefore transferred to the appropriate industries, and 26 were idle throughout the year. Of the 102 establishments gained, 6 had manufactured other classes of commodities as their principal products in 1925 and 96 reported for the first time at the 1927 census.

Table VII shows a decreased number of mills in New England and "All other States," while the number in the South increased.

Of a total production in the cotton-goods industry valued at $1,567,401,612 in 1927, the output of Southern mills accounted for 57.5 per cent, the production of New England mills for 33.1 per cent, and that of mills in other States for 9.4 per cent. The 1925 output was divided as follows: 54.2 per cent for the cotton-growing States, 35.5 per cent for New England, and 10.3 per cent for all other States.

In value of production, North Carolina superseded Massachusetts in 1927 for the first time in the history of the industry, the share of the former amounting to 19.8 per cent and of the latter to 18.2 per cent. In 1921 Massachusetts manufactured 24.6 per cent of the total output and North Carolina 14.9 per cent. Production in South Carolina, which in 1927 ranked third in importance in the cotton-goods industry, increased in value from 1.5 per cent of the total in 1921 to 14.8 per cent in 1927, and the output of Georgia mills rose from 8.2 per cent in 1921 to 11.5 per cent in 1927.

Spindles. In 1927, the United States had approximately 22.2 per cent of the world's total of cotton spindles (see Table V on page 1552). The geographical distribution of the industry according to the number of spindles for the 10 leading States is shown in Table VII.

At the end of July, 1929 the total number of cotton spindles in the Southern States was 18,847,636, as compared with 13,478,297 in 1914. Southern cotton mills, with still less than half the spindles in America, however, were consuming considerably more than half the cotton manufactured in the country.

The increased spindleage and greater efficiency of cotton mills in the United States enabled that country as regards the consumption of cotton to maintain a higher level than in pre-war years, as compared with other nations where there was a great falling off in consumption, in the United Kingdom and continental Europe. Notwithstanding strikes in the New England cotton mills in 1922, the consumption of cotton increased over the previous year in the United States by 12.6 per cent and has continued since that time. In 1913 the United Kingdom in its manufactures used more than 4,600,000 bales and the Continent approximately 7,500,000 bales; in 1927 they took, respectively, 3,215,000 and 7,669,000 bales. Japan has increased its proportion of the world

TABLE VIII—WOOL-MANUFACTURING INDUSTRIES

Source: Bureau of the Census.

Industry and year	Establishments	Wage earners (average number)	Primary horse power	In thousands of dollars			
				Wages	Cost of materials	Value of products	Valuė added by manufacture
The group as a whole:							
1899	1,414	159,108	270,561	57,934	181,159	296,990	115,831
1909	1,124	202,029	393,668	87,963	322,441	507,167	184,726
1914	979	195,285	435,474	93,358	298,063	464,250	166,186
1919	1,016	196,404	522,917	198,586	759,193	1,234,657	475,464
1921	961	190,894	([a])	209,573	463,849	888,558	424,709
1923	1,004	237,454	615,601	280,153	748,556	1,312,719	564,163
1925	973	206,110	659,331	243,043	756,074	1,199,417	443,343
1927	891	194,827	647,854	224,800	615,784	1,036,143	420,360
Woolen and worsted goods:							
1899	1,221	125,901	234,660	44,850	148,087	238,745	90,657
1909	911	163,192	348.283	69,727	273,439	419,744	146,305
1914	799	158,692	375,573	75,953	246,497	379,484	132,988
1919	852	166,787	466,219	168,109	665.595	1,065,434	399,839
1921	814	162,364	([a])	174,895	400,046	755,584	355,538
1923	851	194,552	538,465	222,985	622,732	1,062,558	439,827
1925	832	165,224	570,295	191,271	620,402	957,790	337,388
1927	759	154,361	556,125	173,822	502,108	817,978	315,870
Woolen goods alone:							
1923	513	72,408	180,657	87,314	201,547	364,288	162,740
1925	503	67,056	193,080	82,436	219,618	361,524	141,906
1927	471	61,790	191,703	72,156	172,700	301,309	128,609
Worsted goods alone:							
1923	338	122,144	357,808	135,671	421,184	698,271	277,086
1925	329	98,168	377,215	108,835	400,784	596.266	195,483
1927	288	92,571	364,422	101,666	329,408	516,670	187,262
Carpets and rugs: [b]							
1899	133	28,411	26,271	11,121	27,229	48,192	20,964
1909	139	33,307	37,194	15,536	39,563	71,188	31,625
1914	97	31,309	42,794	14,716	42,280	69,128	26,848
1919	75	22,933	37,593	24,216	67,118	123,254	56,136
1921	72	22,922	([a])	28,705	50,118	103,881	53,762
1923	79	35,217	53,852	48,528	97,473	199,481	102,008
1925	69	33,886	63,008	43,383	104,196	188,903	84,707
1927	65	32,829	65,828	42,041	85,602	166,888	81,287
Felt goods:							
1923	53	5,735	20,522	6,635	23,895	42,037	18.142
1925	50	5,146	23,478	6,404	26,354	43,776	17,421
1927	50	5,452	23,479	6,653	23,289	41,895	18,606
Wool-felt hats:							
1923	21	1,950	2,762	2,005	4,457	8,643	4,186
1925	22	1,854	2,550	1,986	5,123	8,949	3,826
1927	17	2,185	2,422	2,284	4,785	9,382	4,597

[a] Not called for in schedule for 1921.
[b] Not including carpets and rugs made of rags.

total, while India has remained practically stationary. The actual and relative consumption of all kinds of cotton, in bales of 478 pounds net, by principal consuming countries of the world is shown in Table IV on page 1552.

Looms. In 1927 the approximate number of power looms in the world was 3,183,000. Of these, 786,309 (24.7 per cent) were in the United Kingdom; 760,132 (23.8 per cent) in the United States; 240,799 (7.6 per cent) in Japan (1924); 240,700 (7.6 per cent) in Germany; 182,500 (5.7 per cent) in France; 154,262 (4.7 per cent) in India; and, 139,000 (4.4 per cent) in Italy. The United States and the United Kingdom each had about an equal number, and each had more than three times as many as the nearest competitor. Both together had approximately half the power looms of the world, while the seven countries listed had about 80 per cent.

Wool and Wool Manufacturing. In 1927, as in previous years, Australia led the world as a producer of wool with 924,410,553 pounds, or over 26½ per cent of the total, while Argentina ranked second with 331,000,000 pounds, or about 9.22 per cent; and the United States third with 328,137,000 pounds, or 9.14 per cent of the world supply. After the production and importation of the wool comes the manufacture of the raw material—which includes scouring, carding, spinning, and weaving—into various kinds of cloth, such as worsted goods, woolen goods, carpets and rugs (other than rag), felt goods, and wool-felt hats.

Wool manufacturing according to the census of 1927 ranked second in the value of its product of the five primary textile groups. Raw wool was produced in all of the 48 States, but most of it came from the Middle Western and Far Western States, Texas with 32,725,000 pounds (35,591,000 pounds in 1928) leading, followed by Montana with 24,166,000 pounds (26,626,000 pounds in 1928), and Wyoming with 25,317,000 pounds (26,488,000 pounds in 1928). Wool manufacturing, on the other hand, centres in the New England and Middle Atlantic States. In 1928 there were in the United States 2,249,896 woolen and 2,544,193 worsted spindles, and 57,842 looms wider than 50 inches reed space, 14,866 less than 50 inches, and 9803 carpet and rug looms. See Tables IX and X.

The wool-manufactures group comprises five industries, of which worsted goods, woolen goods, and carpets and rugs are the most important. Statistics of the Bureau of the Census show that the total value of wool manufactures produced in the United States during 1927 was $1,036,143,000, a decrease of 14 per cent compared with 1925, and of 21 per cent from 1923, the highest year in the history of the industry. Establishments engaged primarily in manufacture of woolen and worsted goods reported products valued at $818,000,000 in 1927, a decrease of 15 per cent compared with 1925.

TABLE IX—WOOLEN AND WORSTED SPINNING SPINDLES IN THE UNITED STATES

Year	Woolen		Worsted	
	Number reporting	Per cent idle	Number reporting	Per cent idle
1913	906,000	23	1,592,000	26
1919	2,153,000	19	2,290,000	23
1920	2,250,000	28	2,331,000	22
1921 [a]	2,298,000	59	2,330,000	43
1922 [a]	2,288,000	27	2,436,000	14
1923 [a]	2,294,000	15	2,554,000	10

[a] January only.

Woolen Goods and Worsted Goods. The establishments engaged primarily in the manufacture of woolen goods and worsted goods in 1927 reported products valued at $817,978,299, a decrease of 14.6 per cent as compared with $957,790,338 reported for 1925, the preceding census year. The items making up the total for 1927 are as follows: Woven goods, 550,267,799 square yards, valued at $571,327,437; yarns for sale, 145,727,627 pounds, $183,429,969; miscellaneous products, valued at $63,220,893. Of the total for woven goods, 284,856,657 square yards, valued at $257,217,778, were produced in woolen mills, and 265,411,142 square yards, valued at $314,109,659 in worsted mills. In addition, woolen goods and worsted goods are made to some extent by establishments engaged primarily in other lines of manufacture. The value of such products reported for 1925 was $9,595,481. The woolen-goods and worsted-goods industries embrace establishments engaged primarily in the manufacture of woolen goods and of worsted goods, respectively. An establishment making both woolen goods and worsted goods is classified by the census *as a whole*, according to the value of its principal product.

Establishments which were engaged primarily in the manufacture of woolen and worsted goods in 1927, were to be found in 33 different States, but the bulk of the industry was located in the northeastern portion of the United States. Of

TABLE X—ACTIVITY OF WOOL MACHINERY

Source: Bureau of the Census.

NOTE.—The percentage of hourly activity represents the ratio of the hours actually run by machinery, taking account of double-shift, part-time, and overtime operation, to the total number of hours which would be possible if all machinery operated at the maximum single-shift capacity; the percentage of machinery active is based on monthly reports, any machine active at any time during the month being counted, and no account being taken of variations in the number of days or hours worked. There are small variations from month to month in the completeness of the reports which may slightly affect the accuracy of the percentages. The following statistics are based on reports from 1134 mills in 1923, 1084 in 1924, 1098 in 1925, 1104 in 1926, 1082 in 1927, and 1070 in 1928.

Year	Per cent of reporting machines active					Hours worked, per cent of maximum single-shift capacity				
	Spinning spindles		Looms			Spinning spindles		Looms		
	Woolen	Worsted	Wide	Narrow	Carpet and rug	Woolen	Worsted	Wide	Narrow	Carpet and rug
1919	84	79	71	72	57	..	..	..	..	..
1920	67	74	64	70	67	..	..	..	..	..
1921	72	84	71	71	56	72	82	70	64	52
1922	83	78	69	72	80	86	79	68	65	77
1923	86	88	81	83	86	92	92	83	76	82
1924	80	69	70	77	75	85	66	69	62	66
1925	79	69	69	72	75	84	66	69	64	72
1926	72	70	62	67	68	73	69	63	61	64
1927	74	68	60	67	66	78	67	62	63	64
1928	73	61	56	62	66	79	61	61	55	65

759 establishments whose production figures in the census, 174 were located in Massachusetts, 146 in Pennsylvania, 95 in Rhode Island, 59 in Maine, 40 in Connecticut, 39 in New Hampshire, 38 in New York, 24 in New Jersey, 18 in Wisconsin, 16 in Vermont, 12 in Ohio, 11 in Minnesota, 9 in Tennessee, 8 in Michigan, 8 in West Virginia, 7 in Oregon, 7 in Virginia, 6 in Indiana, 6 in Kentucky, 6 in North Carolina, 5 in California, 5 in Illinois, 4 in Georgia, 4 in Maryland, and the remaining 12 in 9 other States. In 1925 the industry was represented by 832 establishments, the decrease to 759 in 1927 being the net result of losses and gains. Of the establishments lost, some were idle throughout the year, some went out of business prior to 1927, some reported commodities other than woolen goods and worsted goods as their chief products and were therefore transferred to the appropriate industries, and some reported products valued at less than $5,000 which are not tabulated at the biennial censuses.

Silk-manufacturing Industry. The silk manufacturing industry of the United States not only surpasses that of any other country of the world, but in the value of its production comes immediately after cotton and wool as is indicated in the accompanying table (Table I) at the beginning of this article. The silk industry is discussed elsewhere at more length (See SILK), but a few significant facts may be given here in connection with the other textile manufactures in the present article. The United States does not produce raw silk, but receives its supply principally from Japan, the imports in 1928 being valued at $368,000,000, or an average import value per pound of $4.87. The amount represented in the 1928 imports was 75,500,000 pounds, which made a new record. Raw silk is the leading import of the United States. The growth of the industry has been most striking since 1914 when the production was valued at $254,011,000, a figure that by 1927 had reached $750,124,000. Paterson, N. J., the largest centre of the industry, in 1927 was responsible for a production valued at $106,000,000.

Rayon Industry. Few industries had developed more rapidly and enjoyed a more spectacular growth than that of rayon and particularly in the United States. The development of this industry has presented many features of interest which are discussed in the article RAYON, but in the present connection some of the more significant features may be stated for comparison. In 1914 yarns and sheets (excluding fabrics) produced in the United States amounted to 2,445,000 pounds. In 1928 this production had increased to 97,901,000 pounds. In the previous year, 1927, the value of rayon products was estimated by the Census of Manufactures at $109,888,000, as compared with $88,061,000 in 1925. Rayon not only was used alone in the manufacture of fabrics, but with cotton and wool both for fabrics and various knit goods, such as hosiery.

Miscellaneous Textiles. The United States is forced to depend on its imports for various vegetable fibres which it uses in manufactures. The most important of these are jute, manila fibre, together with sisal and henequen. These fibres figure in the manufacture of cordage and twine, as well as jute, bagging, linen, and part-linen woven goods, and other products. The cordage and twine industry in 1927 had a product valued at $89,172,495 coming from 116 establishments with 15,084 wage earners, who received wages valued at $13,674,081. In 1914, 105 establishments gave employment to 16,769 wage earners, who received in wages $6,995,596 and produced goods valued at $59,761,486. 1919 was a record year in the industry with an output valued at $133,366,476, followed by 1923 with $100,447,564. Binder twine is the most important individual item in this industry and in 1927 amounted to 169,800,000 pounds worth $19,500,000. Rope, cable, and cordage followed binder twine in the order given.

Jute goods and linen goods showed a decline in 1927, as compared with 1925, the output of manufactures of jute amounting to $23,200,000 in 1927; while that of linen goods was valued at $10,400,000. Burlaps imported in 1928 increased to 620,000,000 pounds, as compared with 569,700,000 pounds during 1927, and the importations of jute bags or sacks increased from 38,800,000 pounds in 1927 to 42,200,000 pounds in 1928.

Knit Goods. Under this head, as is apparent from the accompanying tables, there has been developed an important industry. The classification is used to include the output of all establishments whose principal products are made by machine knitting without regard to whether the

TABLE XI—KNIT-GOODS INDUSTRY IN THE UNITED STATES

Source: Bureau of the Census.

Branch and year	Establishments	Wage earners (average number)	Primary horse power	Wages	Cost of materials	Value of products	Value added by manufacture
The industry as a whole:							
1899	1,006	83,691	56,031	$ 24,434,497	$ 51,195,330	$ 95,833,692	$ 44,638,362
1909	1,374	129,275	101,319	44,740,223	110,241,053	200,143,527	89,902,474
1914	1,622	150,520	122,919	59,758,151	146,687,458	258,912,903	112,225,445
1919	2,050	172,572	149,438	125,199,820	427,095,570	713,139,689	286,044,119
1921	2,078	161,880	([a])	132,190,349	360,457,833	634,073,895	273,616,062
1923	2,323	194,244	183,675	168,271,584	484,020,075	848,176,734	364,156,659
1925	1,987	186,668	176,630	168,682,840	453,925,780	809,960,213	356,034,433
1927	1,869	190,283	177,216	188,163,458	424,099,384	816,620,494	392,521,110
Hosiery:							
1923	721	96,957	67,567	78,762,357	222,410,791	390,273,178	167,682,387
1925	683	103,930	67,947	93,382,979	228,141,806	421,180,221	193,038,415
1927	672	112,842	76,431	114,677,845	229,939,536	456,913,137	226,973,601
Knit underwear:							
1923	326	48,552	73,525	39,931,603	106,760,056	182,355,328	75,595,272
1925	298	48,328	70,755	40,144,599	110,773,496	188,570,118	77,796,622
1927	285	46,227	67,455	39,182,748	90,727,744	173,423,491	82,695,717
Knitted outerwear:							
1923	1,128	41,503	28,768	40,824,274	110,188,282	208,757,722	98,569,440
1925	874	27,986	23,586	27,738,485	77,547,876	143,502,293	65,954,417
1927	775	24,662	21,668	26,199,962	64,122,921	125,940,929	61,818,008
Knit cloth:							
1923	148	7,232	13,815	8,753,350	44,660,946	66,790,506	22,129,560
1925	132	6,424	14,342	7,416,777	37,462,602	56,707,581	19,244,979
1927	137	6,552	11,662	8,102,903	39,309,153	60,342,937	21,033,784

[a] Not called for in schedule for 1921.

TABLE XII—U. S. CENSUS STATISTICS OF TEXTILE WEARING APPAREL AND HAT INDUSTRIES [a]

Industry and year	Establishments	Wage earners (average number)	Primary horse power	Wages	Thousands of dollars Paid for contract work	Cost of materials	Value of products	Value added by manufacture
Wearing apparel made from purchased textile fabrics, total:								
1914	14,953	510,595	117,911	250,114	(b)	673,013	1,297,273	624,260
1923	16,904	499,413	132,317	568,139	(b)	1,852.229	3,443,940	1,591,711
1925	14,883	466,846	119,744	534,824	(b)	1,741,618	3,243,850	1,502,231
1927	16,259	511,151	130,587	590,141	(b)	1,805,240	3,456,304	1,651,063
Clothing, men's, not elsewhere specified: [c]								
1914	4,830	173,747	35,252	86,828	37,755	230,032	458,211	228,179
1923	4,607	194,820	52,642	235,487	110,403	584,804	1,178,715	593,911
1925	3,491	141,511	33,207	179,045	93,648	471,501	946,274	474,773
1927	3,562	146,099	34,351	184,613	94,388	447,245	932,182	484,937
men's: [d]								
Work clothing (except shirts), men's: [d]								
1925	509	32,821	11,542	24,803	1,242	85,969	140,964	54,994
1927	556	40,612	11,218	29,946	1,436	85,134	147,289	62,155
Clothing, men's—buttonholes:								
1914	139	672	205	326	1	90	638	548
1923	37	334	105	409	19	103	804	701
1925	30	327	87	347	3	71	658	587
1927	40	412	132	429	(b)	98	918	820
Shirts:								
1914	792	51,972	17,117	19,170	5,974	50,665	95,815	45,150
1923	934	51,672	14,050	37,943	17,364	139,354	241,331	101,977
1925	840	49,864	13,884	35,674	16,019	129,754	225,963	96,209
1927	907	57,216	14,916	42,998	(b)	129,744	241,650	111,906
Collars, men's:								
1914	35	10,100	3,359	4,494	1,045	6,566	18,531	11,965
1923	37	10,449	5,050	7,960	1,467	18,370	42,666	24,297
1925	28	7,187	4,497	5,503	606	11,792	27,588	15,795
1927	24	3,270	3,131	2,967	(b)	5,867	13,264	7,398
Furnishing goods, men's: [e]								
1914	551	22,459	5,840	8,416	1,135	31,593	52,453	20,860
1923	454	18,958	5,470	14,810	3,821	57,237	102,952	45,715
1925	419	21,094	4,977	17,438	4,176	69,861	120,868	51,006
1927	534	25,183	7,190	22,070	(b)	82,839	145,474	62,635
Suspenders, garters, elastic woven goods made from purchased webbing: [f]								
1923	100	3,458	809	2,892	703	13,934	24,297	10,363
1925	93	3,835	876	3,072	627	16,500	27,504	11,004
1927	91	4,061	983	3,529	(b)	16,260	26,985	10,726
Gloves and mittens, made of cloth and of cloth and leather combined: [g]								
1925	139	9,061	4,102	5,709	(b)	17,977	29,532	11,554
1927	131	10,296	4,112	6,670	(b)	17,392	30,202	12,810
Men's hats and caps, cloth:								
1914	580	7,322	1,313	4,508	109	9,268	18,593	9,326
1923	651	7,313	1,782	9,594	926	22,250	42,811	20,561
1925	579	6,552	1,876	9,243	847	22,699	43,823	21,124
1927	568	6,300	1,999	9,126	(b)	20,702	41,214	20,512
Clothing, women's: [h]								
1914	5,564	168,907	27,874	92,574	15,844	252,345	473,888	221,543
1923	7,046	133,195	27,704	176,446	143,749	809,561	1,406,684	597,123
1925	6,127	126,466	24,316	175,045	128,524	724,299	1,293,705	569,406
1927	7,588	154,459	30,287	211,350	147,902	809,520	1,494,401	684,881
Corsets and allied garments:								
1914	167	20,496	6,962	7,977	184	19,587	40,551	20,964
1923	216	16,104	5.901	13,258	132	38,416	78,048	39,632
1925	185	14,525	8,394	12.394	83	37,808	77,115	39,307
1927	222	13,778	7,819	12,402	(b)	35,394	77,218	41,824
Handkerchiefs: [i]								
1927	115	6,659	2,665	5,264	......	18,205	31,588	13,383
Millinery: [j]								
1927	1,148	33,311	7,920	46,788	(b)	103,490	209,495	106,005
Trimmings (not made in textile mills) [i]								
1927	773	9,495	3,864	11,989	......	33,350	64,423	31,073
Men's straw hats: [k] [l]								
1927	48	3,263	1,554	4,232	(h)	11,783	21,718	9,935
Men's fur-felt hats: [l]								
1914	224	21,318	20,774	12,071	20	16.947	37,350	20,403
1925	146	15,156	17,948	20,466	(b)	40,124	80,066	39,942
1927	146	15,927	20,526	22,887	(b)	51,105	99,300	48,195
Men's wool-felt hats: [l]								
1914	30	1,249	3,091	600	(b)	978	1,944	969
1925	22	1,854	2,550	1,986	(b)	5,123	8,949	3.826
1927	17	2,185	2,422	2,284	(b)	4,785	9,382	4,597

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[a] Each industry is classified according to its products or principal value. [b] Not available.

[c] Not including custom-made clothing. Figures for 1925 and 1927 exclude work clothing, men's.

[d] Included in "Clothing, men's, not elsewhere specified" prior to 1925.

[e] Not elsewhere classified. "Gloves and mittens, cloth," included with men's furnishing goods for 1914.

[f] Because of a chango in classification, no comparable figures can be given for 1914. Figures exclude elastic surgical goods.

[g] Not including gloves made in textile mills. This item was under men's furnishings in 1914.

[h] Not elsewhere classified. Custom-tailoring shops are not included, no matter how large.

[i] "Handkerchiefs" and "Trimmings" were first treated as separate industries at the census for 1927. For prior censuses data for "Handkerchiefs" were included in part in "Furnishing goods, men's" and in part in "Millinery and lace goods," and data for "Trimmings" were included in "Millinery and lace goods."

[j] Because of changes in classification whereby women's and children's straw hats were transferred to this industry and lace goods excluded, no comparable figures can be given for previous years. The production of untrimmed hats is covered, in part, by other industry classifications, namely, "Hats, fur-felt," "Hats, wool-felt," and "Hats and caps, cloth."

[k] Because of a change in classification, excluding women's and children's hats, no comparable figures can be given for previous years. [l] Not included in total at top of table.

yarns used are cotton, wool, silk, rayon, or other material. Beginning with the census of manufactures for 1923, the industry has been divided into four branches, namely, hosiery, underwear, outerwear, and knit cloth. Each establishment the output of which figures in the statistics as a whole was assigned to one branch or another, according to the character of its products. Some overlapping occurs among these branches, and most of the establishments manufacture some minor products not normally belonging to the industry.

In 1927 the total value of production in the knit-goods industry as a whole amounted to $816,620,494, an increase of about 1 per cent compared with 1925 and slightly more than three times the value of the 1914 output, but a decline of 4 per cent from the high record of the industry attained in 1923. Hosiery is the only branch of the knit-goods industry in which the value of the output in 1927 exceeded that of 1923. Production in the hosiery branch was valued at $456,913,137 in 1927, an increase of 8.5 per cent over 1925 and of 17 per cent over 1923. The output of the knit-underwear industry in 1927 was 8 per cent less than in 1925 and 5 per cent below 1923. In the outerwear branch, 1927 production fell 12 per cent below that of 1925 and almost 40 per cent below 1923. The value of the output in the knit-cloth branch in 1927 increased 6 per cent over 1925, but declined 10 per cent compared with 1923.

Wearing Apparel. In 1927, according to the census of manufacturers, the United States had 16,259 establishments employing 511,151 wage earners engaged in the production of all classes of textile wearing apparel (other than knit goods, fur-felt hats, wool-felt hats, straw hats, and fur goods), compared with 14,883 establishments and 466,846 wage earners in 1925. These establishments reported a production valued at $3,456,304,000 in 1927, an increase of 6.5 per cent. The cost of the materials used in manufacture declined from 54 per cent of the total value of the finished output in 1925 to 52 per cent in 1927. There is some duplication in this total value due to contract work on material furnished by other establishments. The most important branch of the textile wearing-apparel industry, from the standpoint of value of production is "women's clothing" which in 1927 reported an output valued at $1,494,401,000, an increase of 15 per cent over 1925. The women's-clothing industry is concentrated to a large extent in 8 cities—New York, Chicago, Philadelphia, Cleveland, Boston, St. Louis, Los Angeles, and Baltimore, which together produced 91 per cent of the total production under this head. See Table XII on page 1557.

Clothing Industry. The manufacturers of men's, youths' and boys' clothing (except work clothing), the second largest branch of the wearing apparel industry, reported a production valued at $932,182,000 in 1927, a decrease of 1.5 per cent from 1925. This industry is concentrated to a large extent in 10 cities—New York, Chicago, Philadelphia, Rochester, Baltimore, Cincinnati, Boston, Cleveland, St. Louis, and Milwaukee. These cities for 1927 reported 83 per cent of the total value of products for the industry.

In both the men's and women's clothing branches, there is a considerable amount of contract work. In 1927 establishments in the women's clothing industry paid $147,902,000 for contract work, while establishments producing men's, youths', and boys' clothing paid $94,388,000.

According to the census, the value of production in 1927 showed increases over 1925 in other wearing apparel industries as follows: Men's furnishing goods; fur-felt hats; shirts; men's work clothing, except shirts; wool-felt hats; gloves and mittens made of cloth and of cloth and leather combined; and corsets and allied garments. The output of the men's straw hat and the millinery industries for 1927 apparently showed a decrease in the value of output. The production of the men's collar industry decreased 52 per cent from 1925 and the output of cloth hats and caps, and of suspenders, garters, and elastic woven goods also declined slightly.

There are available data on wearing apparel (not knit) for 1928 in the form of the monthly statistics of garments cut. Reports of 730 identical establishments manufacturing men's and boys' garments to the Census Bureau indicated that the total number of suits cut in 1928, 22,564,000, decreased 7.1 per cent from 24,241,000 in 1927, while the number of overcoats cut, 5,147,000 in 1928, declined 7.7 per cent from 5,579,000 in 1927. The number of separate trousers cut by these establishments totaled 21,800,000, 11.7 per cent less than in 1927.

The Census Bureau also reported that 264 establishments in 1927 produced 72.5 per cent of the total output of the men's-work-clothing industry. In 1928 these establishments reported the following garments cut: Men's and boys' overalls, 48,100,000; children's play suits, overalls ,etc., 3,500,000; work pants and breeches, 13,800,000; coats and all other garments, 1,680,000.

See COTTON; RAYON; SILK; and WOOL.

THARAUD, tä′rō′, JEAN (1877–) and JÉRÔME (1874–). French brothers who wrote novels in collaboration (see VOL. XXII). They were awarded the Grand Prix de Littérature of the French Academy in 1919. Their later works include: *La vie et la mort de Déroulède* (1914); *L'Ombre de la Croix* (1917); *Rabat; ou Les heures Marocaines* (1918); *Un Royaume de Dieu* (1920); *Marrakech* (1920); *Quand Israël est roi*, a history of Hungary from 1867 (1921); *La Randonnée de Samba Diouf* (1922); *L'An prochain à Jérusalem* (1924); *Rendez-vous espagnols* (1925); *Un drame de l'automne*, sketches; *Notre cher Péguy* (1926); and *Mes années chez Barrès* (1928). Many of these books were translated into English. Consult *Le roman nouveau*, by Jules Bertaut (1920) and *Le victorieux XX^{e} Siècle*, by Pierre Moreau (1925).

THEATRE, AMERICAN AND ENGLISH. The World War served neither to unsettle nor greatly to affect the American theatre during the early months of its progress in 1914; but it served rather to feed the theatre emotionally and to demand nothing of it in return. America, having settled upon a determined neutrality, openly endorsed by all business that might be affected by any different policy, was outwardly taking the War in its stride. The business of the theatre throughout the country proceeded with its accustomed casualness.

The times were, however, ripe for change. For too many years, with an amiability characteristic of a satisfied people, American playgoers had accepted what had been provided for them in the way of theatre entertainment without protest. The murmurings of a revolt against an accepted routine, however, were already beginning to be heard. There was a definite hunger for novelty;

also a recurring questioning as to why the Continental theatre should have been permitted so completely to take the leadership of the theatre in the matter of successful and interesting experiment.

A fluttering straw in the wind, giving indications that changes were imminent, was the early production of a melodrama, *On Trial.* This piece, written by Elmer Reizenstein (now Rice), violated most of the rules of dramaturgy that had been handed down variously from the days of Aristotle. Its author, encouraged by Arthur Hopkins, the producer, had dared adopt what was becoming familiarly known in the manufacture of the motion picture (then, as now, admitted struggling through the days of its infancy as an art), as the "flash-" or "cut-back" feature. By its use, a dramatic story could literally be told backward.

Thus, in *On Trial*, a man who had confessed the crime of murder was being forced through a perfunctory examination, which should give the State the proper legal excuse for hanging him. As the first witness called by the defense took the stand and began her testimony, the scene was "blacked out" and the testimony enacted. For each change of witnesses, a return to the courtroom was made, and the trial resumed. When the end of the play was reached, the motivating cause of the murder, occurring years before, had been revealed, sufficient justification for the crime to satisfy the jury had been adduced, and the expected happy ending made possible. As the production of *On Trial* was financially a complete success, a convincing argument against a slavish adherence to any particular form of drama had been given producers, and a certain freedom of movement, at least, had been established in the theatre.

This same season, too, a definite step forward was taken in the matter of establishing a new standard of beauty in stage settings. This, too, was directly traceable to the world conflict, being the creation of Joseph Urban, a War refugee, who had been the scenic designer for the Berg Theatre in Vienna. Landing in America, Urban had become, after some struggle, the artistic director of the Boston Opera House, and made tentative advances in the direction of New York. He was one of a school that plead for imagination and simplicity, as opposed to an attempted realism in scenic design. He was a modern who stopped this side of impressionism, yet advanced far enough to bring a freshened beauty to a fading type of stage picture.

George C. Tyler, as executive head of Liebler & Co., a play-producing firm that had known great prosperity but had fallen upon trying days, had this season risked practically all his firm's diminishing capital on a single production. This was Edward Sheldon's *The Garden of Paradise*, based on the Hans Christian Andersen fairy story, *The Little Mermaid.* Urban was engaged to do the setting, and, this being his introduction to theatrical New York, he gave his best efforts to it. The result was beautifully effective, but the play failed and carried Liebler & Co. to the bankruptcy court in its train. Florenz Ziegfeld, having achieved a mounting reputation at the time for the attractiveness of his annual *Follies* exhibits, bought the settings Urban had made for *The Garden of Paradise.* He used some of them to decorate a roof theatre in which he introduced the *Midnight Frolic.* Others were put into the current *Follies.* More important, Mr. Ziegfeld signed a term contract with Mr. Urban, which gave this artist not only a New York footing, but a prestige upon which he has builded steadily ever since. The Urban influence, antedating that of Leon Bakst and the Diaghliev ballet, has played a definite and significant part in redecorating the stages of the American theatre.

Other War influences followed more rapidly, as the conflict continued. Granville Barker and Lillah McCarthy, leaders of a divisional part of the London theatre, brought their company to New York in late January, 1915, and began with productions of Shaw's *Androcles and the Lion* and *The Man Who Married a Dumb Wife*, by Anatole France, a season which included also Mr. Barker's excessively modern revival of *A Midsummer Night's Dream* (with golden fairies), and a revival of Shaw's *The Doctor's Dilemma.* Emanuel Reicher arrived from Berlin and, despite a lessening interest in neutrality, managed several revivals, notably one of Hauptman's *The Weavers*, that were measurably inspirational.

A year later, the importation of the Diaghliev Ballet Russe, with its impressive corps and its excessively brilliant color schemes, created by Leon Bakst, introduced another startling note in the native theatre. Sir Beerbohm Tree also was forced into a foreign tour that year, presenting a notable revival of *Henry VIII*, and doing several festival performances of Shakespearean excerpts.

Meantime, the New York theatre continued a generally dull routine. It was in 1916, however, that an organization known as the Washington Square Players was born. Amateur in makeup, this organization established a vogue for original productions of one-act plays in an obscurely placed theatre known as the Bandbox. The group later moved into the centre of theatrical activity, but failed when America entered the War and took most of its young men.

Three years later, on the occasion of this band's reorganization, the beginnings of the present Theatre Guild were established. By 1929 the Theatre Guild had received the support of 30,000 subscribers and tenanted its own theatre, built at a cost of $750,000, by popular subscription. It also holds temporary leases on several other theatres, to which a continuing Guild success is transferred when the home theatre is needed for other productions.

A growing apprehension concerning the European conflict, the developing camps of neutrals and allies, served to divert attention from the theatre in 1915–16. Little that was worthy was written or produced. The older stars fell back on revivals, the veteran William Gillette emerging from an inactive past to bring back *Sherlock Holmes* and *Secret Service*, E. H. Sothern going back as far as his father's *Lord Dundreary.* James K. Hackett and Viola Allen revived *Macbeth*, and both the Fiskes and Sir Beerbohm Tree did *The Merry Wives of Windsor.* The late Tom Wise was the Falstaff of the Fiske revival, and Henrietta Crosman the Mistress Ford.

The next two seasons in the theatre were hectic with the excitements of War. Soldier shows, benefits, war dramas dominated and colored the scene. Still, so far removed was America from direct contact with the scene of action that something of the normal routine of the theatre was maintained. It was the season of 1916–17 that welcomed avidly such obvious pieces of the theatre as *Turn to the Right* and *The Thirteenth*

Chair. This, too, was the season that brought Lionel Barrymore back to the stage in association with his brother John. With Constance Collier, the Barrymores produced Du Maurier's *Peter Ibbetson* with considerable success.

Sarah Bernhardt, forced again to replenish the funds with which she had hoped to end her days in comparative peace and plenty, came to America for a short tour with a series of one-act plays, including *La Mort de Cléopâtre*, *L'Holocauste*, *Du Théâtre du Champ D'Honneur*, and *Hécube*. Sir Beerbohm Tree extended his stay through a revival of the Thackeray adaptation, *Colonel Newcome*.

A troupe of Spanish dancers, having stirred Havana, came to New York in a hastily organized revue, *The Land of Joy*, and thus contact was preserved with America's inactive, as well as active, allies. Red Cross benefits were logically a distinguishing feature of the time. Organizing an all-star company to present the Hartley Manners war drama, *Out There*, in which Laurette Taylor had played successfully, George C. Tyler took the aggregation as far west as Chicago and added approximately $750,000 to the war chest of this national charity.

America's comparatively short participation in the War had developed an interest in war plays, but had given playwrights but little time to foster it. The close of the conflict found the stage cluttered with dramas of military conflict and influence of various kinds, and a diminishing interest in war plays on the part of the celebrant public. A natural reaction toward the cheerful and imaginative drama favored the success of a piece called *Lightnin'*, which the late Frank Bacon played for the succeeding five years; a production of Barrie's *Dear Brutus*, with William Gillette the star of the cast; a Winthrop Ames production of Maeterlinck's *The Betrothal*, and an elaborate staging of *The Redemption*, with John Barrymore as its star.

A year later, the actors, reflecting the temper of the times, had started a small war of their own. This was the actors' strike of 1919–20 which, conducted by the Actors' Equity Association, continued for a period of five weeks and was finally settled by arbitration. By the terms of settlement, the actors gained salary adjustments granting them pay for rehearsals after a certain period, pay for extra performances during the run of the play, full pay for such periods as Holy Week and the week before Christmas if they were asked to play, and other minor concessions. The managers also were given certain contract guarantees by Equity and the result of the strike was spoken of as a peace without victory. The actors, however, did most of the smiling.

Significant dramas produced after the ending of the actors' strike included the Arthur Hopkins production of Sem Benelli's *The Jest*, with John Barrymore establishing more firmly his ranking position as the outstanding male star of the American stage; the importation of John Drinkwater's *Abraham Lincoln*, Ethel Barrymore's success with Zoë Akin's *Déclassé*, the production of Eugene O'Neill's first full-length play, *Beyond the Horizon*, and the most successful of the post-war plays, James Forbes' *The Famous Mrs. Fair*.

The trend and content of one theatre season differ but little from those of another. The approach toward, and the retreat from, the boldnesses of the Restoration drama, for example, were subject to the influences of many theatre seasons. Similarly, there was a certain defiance of spirit, a certain demand for freedom of expression, in the drama born of post-war influences, which was eventually to be felt in the theatre; but, through the years from 1920–21, to those of 1923–24, its development was by suggestion rather than statement. It was in 1920–21 that Eugene O'Neill's *Emperor Jones* called renewed attention to his interest in new dramatic forms, but a year later, he swung back to *Anna Christie*, which, aside from a certain frankness of theme, ran true to the traditional melodramatic structure. Arthur Hopkins ventured to test the progressive temper of the times by doing a somewhat fantastically abstract production of *Macbeth*, with a setting by Robert Edmond Jones, and with Lionel Barrymore in the leading rôle. It proved a quick, and, in several respects, a healthy failure. The same season, David Belasco, in the cause of the older theatre, tossed a fortune away with a handsomely staged but artistically frail production of Sacha Guitry's *Debureau*.

There was progress noted in Owen Davis's *The Detour*, much the best study of character the master of melodrama had written; in Gilbert Emery's searching study of misleading character values in a post-war piece called *The Hero;* in Arthur Richman's study of the domestic middle-class struggle in New Jersey called *Ambush*, and in O'Neill's further venture into fantasy that should sting and satirize with *The Hairy Ape*.

A year later, the Theatre Guild had advanced to such a position of financial stability that it felt safe in producing Georg Kaiser's *From Morn to Midnight*, thus strengthening the faith of its following in certain asserted virtues of the Continental theatre and encouraging the more progressive of its (the Guild's) would-be imitators: Mr. Davis followed *The Detour*, a popular failure, with *Icebound*, a moderately popular success which won him a Pulitzer Prize; and Morris Gest, aided by the support and sympathy of art's generous patron, Otto Kahn, imported the famed Moscow Art Theatre from Russia.

Belief in a possible renaissance of the native theatre was considerably stimulated by these events. The new theatre, its adherents insisted, should be a theatre that should be emancipated in matters of traditional romance and sentiment, and revitalized by scenic settings that should strive to excite the imagination in place of merely satisfying the eye or arousing primitive admiration for realistic reproduction. The perfected ensemble work of the Russians became the text of many critical sermons.

Meantime, the old theatre was represented by the hugely popular success of John Colton and Clemence Randolph's *Rain*, in which Jeanne Eagels played for four successive years; John Barrymore's successful début as Shakespeare's *Hamlet*, and John Galsworthy's sanely balanced argument in a racial drama called *Loyalties*.

Mr. Gest continued his ministrations to the artistic soul of the drama in America by importing, again with Mr. Kahn's aid, the Max Reinhardt production of *The Miracle*, which transformed the one-time New Theatre (renamed the Century) into the cathedral-like home of a dramatic sensation at a cost of $400,000, a sum, incidentally, later recovered when *The Miracle* was given certain festival revivals in other American cities.

The advancing newcomers were represented in the theatre the same season by the arrival of Maxwell Anderson with *White Desert*, a rather distinguished failure, and George Kelly with *The Show-off,* a rousing popular comedy success. A number of drama critics, in fact, insisted *The Show-off* should have been given the Pulitzer award in place of *Hell-bent-fer-Heaven,* Hatcher Hughes' drama of religious bigotry in the South, which was that year the main committee's selection.

The most definite success won by the emancipators of the drama from the traditional conventions came in the season of 1924–25, when the Laurence Stallings and Maxwell Anderson *What Price Glory?* blasted the old-time war play of romantic heroics out of the theatre and established a new record in the free employment of soldiers' oaths spoken in mixed company. The strike for freedom was further stimulated by the success of Sidney Howard's *They Knew What They Wanted,* which was given the Pulitzer award and which also carried the cause of an embarrassing but true speech a little farther. The failure of Charles Dillingham to convince the play-going public that it should be interested in the performances of Marilyn Miller as Barrie's deathless *Peter Pan,* was another straw fluttering in the winds of the time, and the interest in a highly modernistic and slightly fantastic drama, *Processional,* written by John Howard Lawson, and produced by the Theatre Guild, was another. *Peter* died peacefully (the memory of Maude Adams still lived), and *Processional* lingered interestingly, though not for long.

The Stallings-Anderson success with *What Price Glory?* inspired the same two to write, and Mr. Hopkins to produce, two other dramas of historic background—one, *First Flight,* relating an experience of the younger Andrew Jackson, and the other, *The Buccaneer,* which followed bold Capt. Harry Morgan through an adventure having to do with the sacking of Panama City. Unfortunately for the successful continuance of the collaboration, neither of these plays proved a success.

Mr. O'Neill continued his experiments and his development as a strongly individualized dramatist by adding *The Fountain* and *The Great God Brown* to his output; George Kelly followed *The Show-off* with a serious drama about an unlovely woman called *Craig's Wife* (the Pulitzer winner); Horace Liveright adventured with a modern-dress production of *Hamlet,* in which Basil Sidney played the prince; and Eva Le Gallienne, realizing an ambition to do things independently in the theatre, established the beginnings of what has since become the Civic Repertory Theatre with revivals of Ibsen's *John Gabriel Borkman* and *The Master Builder.*

By the season of 1926–27, the demand for a revolution of sorts in theatre entertainment had changed to considerable extent the general character of the plays produced, and had emboldened authors to speak their minds and their sex themes plainly; but there was also a leaven of common sense and common taste that held the theatre pretty close to its older levels. Two of the outstanding successes of this year were the Philip Dunning-George Abbott night-club melodrama, *Broadway,* and Maurine Watkin's satire of Chicago criminal courts called *Chicago.* Dreiser's *The American Tragedy,* dramatized by Philip Kearney; Maxwell Anderson's *Saturday's Children,* Robert Emmet Sherwood's humanized historical satire, *The Road to Rome,* also were beloved of the people. Miss Le Gallienne found a success in Sierra's *The Cradle Song* just in time to save her Civic Repertory Theatre, and Walter Hampden produced an Arthur Goodrich-Rose Palmer version of Browning's *The Ring and the Book,* under the title of *Caponsacchi,* with great satisfaction to both himself and his following.

At the same time, the police of New York City saw fit to raid a Bourget-Hornblow version of *The Captive,* together with two other offending dramas; and an oil millionaire named Davis not only paid for many hundreds of performances of a play called *The Ladder,* but gave his show free to the public the greater part of the time. It was not a bad play, but the houses continued empty.

Nor did the season following bring further satisfaction to the defenders of the progressive order. Only the production of O'Neill's *Strange Interlude* violated the older routine of the theatre. This play, revolutionary in thought and form, proved amazingly successful. Mr. Gest, still active in the cause of the Continental progressives, brought Max Reinhardt back with a majority of that famous director's German actors, and again at the Century staged the German version of Shakespeare's *Midsummer Night's Dream, Danton's Tod,* and *Jedermann,* following later with intimate character studies in which Alexander Moissi was featured.

The Theatre Guild also won success with an all-Negro drama, a dramatization by Du Bose Heyward and Mrs. Heyward of the former's novel, *Porgy,* but the more popular successes of the year included those of *Burlesque,* a back-stage melodrama of the cheaper theatres: *Coquette,* a touching domestic tragedy of the South; *The Trial of Mary Dugan,* the courtroom adventures of a *Follies* girl, following the violent death of her paramour, made novel by the treatment of its courtroom setting, and various musical comedies extravagently staged by Florenz Ziegfeld, including *Show Boat, Rosalie,* and *The Three Musketeers.*

The fact that the new theatre, with all its boasted freedom, now offered quite as little satisfying fare as it had offered before, turned the attention of those who had reduced the production of plays to a purely commercial basis toward the onrushing "talkie." The phonograph had been successfully synchronized with the animated screen drama and the novelty was proving a highly profitable combination. The last months of 1928 reverberated with predictions that the legitimate theatre was doomed, that a new type of entertainment was in process of creation, and that the spoken drama was gradually to be eliminated.

Those who held to the conviction that so long as the human urge was for human contact the legitimate drama would endure answered the "talkie" visionaries with a spirit that lacked nothing in earnestness but a little something in confidence. So many amazing things had happened in a startled world that prophets were content to remain unhonored even in their own countries.

So far as the English theatre is concerned, the War naturally settled with depressing suddenness upon all the serious activities in 1914, calling a halt to such promising movements as that of the repertory theatre and to the project of a national theatre as a Shakespeare memorial in London.

"Exceptions to this rule of doldrums," as has been pointed out in an earlier edition of this

Supplement, "were the rebirth, after discouraging struggle, of the Stratford-on-Avon Players, under the sponsorship of Archibald Flower and other Stratford citizens, and the guidance of W. Bridges-Adams, the president, and scarcely appreciated efforts of the Everyman Theatre in Hampstead, and of the Old Vic south of the Thames in London; and the continuation of the Birmingham Repertory Theatre, sole survivor of the promising provinicial movement that included Manchester, Liverpool, and Glasgow before the War. For the most part, however, the chief concern of these theatres was the revival of classic plays.

"Among British playwrights, likewise, the ten-year period was discouragingly fruitless. Bernard Shaw alone preserved the reputation of the group, for, without counting short sketches, he added to his canon such major works as *Heartbreak House,* pungent and bitter commentary on the futility of the War; *Back to Methuselah,* mastodonic summary of human civilization in five parts; and *Saint Joan,* ripest flower of his incisive intellect and imagination. John Galsworthy comes second, with *The Skin Game* and *Loyalties* as his most notable contributions to the depiction of contemporary human psychology on the stage. Of the elder figures, Barrie wrought with his old skill in *The Legend of Leonora* and *Dear Brutus* and less successfully in *Mary Rose,* while Pinero's *The Enchanted Cottage* is almost the sole faint reminder of the position he held through the decades that bounded the turn of the century. No playwright of the first order emerged from among the younger generation unless it be Clemence Dane, whose *A Bill of Divorcement* was not matched by her later *Will Shakespeare.* On the Irish side, Lennox Robinson alone fulfilled the promise of his early days when the Abbey Theatre, with Synge as its most priceless treasure, was holding out hope of a renaissance of English drama. Robinson's output was meagre, but *The Lost Leader* and *The White-Headed Boy* indicated that more would still be heard from him."

The season of 1923–24, however, developed something of a rebirth of interest in the better drama. It was, for one thing, a great year for the veteran stimulator, George Bernard Shaw. His *Saint Joan* had a long and most prosperous run, and even the unwieldly *Back to Methuselah* was not only successfully given at the Court Theatre, but two sections of this five-part play were later revived. Two theatres had Shaw repertory seasons, and those stage societies frequently organized to circumvent the British censor of plays, as well as to experiment and encourage the newer drama, were notably active.

Popular approval was given E. Temple Thurston's *Judas Iscariot,* two Frederick Lonsdale dramas, *The Fake* and *Spring Cleaning,* Noel Coward's unpleasant but exciting *Vortex,* and John Galsworthy's *Old English.* There were the usual unsuccessful attempts to create an interest in American comedies, Owen Davis's *The Nervous Wreck,* George Kelly's *The Show-off,* and W. A. McGuire's *Six-Cylinder Love* suffering comparatively quick failures.

"It must be said that a large portion of the hundreds of new plays brought out seemed hardly worth the pains and money lavished upon them," wrote Louis Henry Jacobson of the season following; "and also that some of them went far past the limit of what the gentle Shaw has cooingly called unpleasant." The dearth of worth-while drama by English writers gave impetus to the success of several American experiments. These included two of Lulu Vollmer's character studies of the South, *Sun-up* and *The Shame Woman,* the former achieving an extended run; the Frank Bacon-Winchell Smith *Lightnin',* the Colton-Randolph *Rain,* and O'Neill's *Emperor Jones.* Of native productions, Sean O'Casey's *Juno and the Paycock* came in for greatest praise. Lonsdale's *The Last of Mrs. Cheyney* was popular, also Ashley Duke's *Man With a Load of Mischief,* and Michael Arlen's *Green Hat.* American musical comedies also had a new popularity with the importation of *Rose-Marie* and *No, No Nanette,* and the Charlot revues were a topical rage.

There has been, during these later years, a marked increase in both the activities of the Little Theatres and the interest in community drama in Britain, thanks to the encouragement of the British Drama League. On two occasions, the British Little Theatres have sent contestants to the American Little Theatre Tournament and in each instance carried away prizes.

Galsworthy's success with *Escape* and Clemence Dane's *Granite* were properly appreciated; *Berkeley Square,* extracted from the Henry James story by James Balderston and J. C. Squire, and Margaret Kennedy's *The Constant Nymph* were popular. The American invasion continued with Craven's *The First Year,* Avery Hopwood's *The Gold Diggers* and *The Best People,* and the Gleason-Taber *Is Zat So?, Lady Be Good,* with the Astaires, *Sunny,* and a colored troupe singing *Blackbirds* and featuring the late Florence Mills, amused London playgoers briefly and irritated English critics generally.

The drama of sex themes has played a part in recent London seasons as it has in those of New York. Plays have been classified as shocking by reviewers and patronized as exciting by a new breed of sensation-seekers. These have included Hopwood's adaptation, *The Garden of Eden,* Miles Malleson's *The Fanatics,* Simon Gantillon's *Maya,* Edouard Bourdet's *La Prisonnière,* and Edgar Middleton's *Potiphar's Wife.* Sidney Howard's *The Silver Cord,* and the Jewish *The Dybbuk* were accepted as impressive drama in London and there was a revived interest in the plays of Strindberg. *Broadway* has been a recent American success, and the Dreiser-Kearney *An American Tragedy* was briefly noticed. Later comedies have included Lonsdale's *The High Road,* Arnold Bennett's *Mr. Prohack,* and the Allen Harper-F. R. Pryor *Marigold.*

Important Productions on the American Stage, 1914–28[1]

Season of 1914–15. *On Trial,* by Elmer L. Reizenstein (now Rice), produced at the Candler Theatre (now the Sam H. Harris), New York, Aug. 19, 1914, by Arthur Hopkins and Cohan and Harris; *The Phantom Rival,* by Franz Molnar, produced at the Belasco Theatre, New York, Oct. 6, 1914, by David Belasco, with Leo Ditrichstein; *Pygmalion,* by George Bernard Shaw, produced at the Liberty Theatre, New York, Oct. 12, 1914, by Liebler and Company, with Mrs. Patrick Campbell; *The Show Shop,* by James Forbes, produced at the Hudson Theatre, New York, Dec. 31, 1914, by Selwyn and Company, with Douglas Fairbanks and George Sidney; *Children of Earth,* by Alice Brown, produced at the Booth Theatre, New York, Jan. 12, 1915, by Winthrop Ames, with Herbert Kelcey and Effie Shannon; *Marie-Odile,* by Edward Knoblauch (now Knoblock), produced at the Belasco Theatre, New York, Jan. 26, 1915, by David Belasco, with Frances Starr; *Androcles and the Lion,* by George Bernard Shaw, produced at Wallack's Theatre, New York, Jan. 27, 1915, by Granville Barker, with O. P. Heggie—

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[1] The plays from 1914–24 are summarized from *Our American Theatre,* by Oliver M. Sayler, with the permission of the publisher, Brentano.

preceded by *The Man Who Married a Dumb Wife*, by Anatole France, with scenery by Robert Edmond Jones; *A Midsummer Night's Dream*, by William Shakespeare, produced at Wallack's Theatre, New York, Feb. 16, 1915, by Granville Barker; *Interior*, by Maurice Maeterlinck, *Licensed*, by Basil Lawrence (Lawrence Langner), *Eugenically Speaking*, by Edward Goodman, and *Another Interior*, a pantomime arranged by Ralph Roeder—four one-act plays produced at the Bandbox Theatre, New York, Feb. 19, 1915, by the Washington Square Players as their first bill; *The Glittering Gate*, by Lord Dunsany, produced at the Neighborhood Playhouse, New York, Mar. 6, 1915, by the Neighborhood Players; *The Doctor's Dilemma*, by George Bernard Shaw, produced at Wallack's Theatre, New York, Mar. 26, 1915, by Granville Barker; *John Gabriel Borkman*, by Henrik Ibsen, produced at the 48th Street Theatre, New York, Apr. 13, 1915, by Emanuel Reicher.

Season of 1915–16. The Stratford-upon-Avon Players, in Shakespearean repertory, with Frank H. Benson and Murray Carrington, appearing in many cities outside New York; *The Boomerang*, by Winchell Smith and Victor Mapes, produced at the Belasco Theatre, New York, Aug. 10, 1915, by David Belasco, with Arthur Byron, Wallace Eddinger, and Martha Hedman; *The New York Idea*, by Langdon Mitchell, revived at the Playhouse, New York, Sept. 28, 1915, by William A. Brady, with Grace George; *The Unchastened Woman*, by Louis K. Anspacher, produced at the 39th Street Theatre, New York, Oct. 9, 1915, by Oliver Morosco, with Emily Stevens; *Major Barbara*, by George Bernard Shaw, produced at the Playhouse, New York, Dec. 9, 1915, by William A. Brady, with Grace George; *The Weavers*, by Gerhart Hauptmann, produced at the Garden Theatre, New York Dec. 14, 1915, by Emanuel Reicher, for the Modern Stage Society; Diaghilev's Ballet Russe, presented with extended repertory, at the Century Theatre, New York, Jan. 16, 1916, by the Metropolitan Opera Company (designers, Leon Bakst, Alexander Benois, Alexander Golovin, etc.); *The Magical City*, by Zoë Akins, produced at the Bandbox Theatre, New York, Mar. 20, 1916, by the Washington Square Players; *Justice*, by John Galsworthy, produced at the Candler Theatre (afterward the Sam H. Harris), New York, Apr. 3, 1916, by John D. Williams, with John Barrymore; *A Night at an Inn*, by Lord Dunsany, produced at the Neighborhood Playhouse, New York, Apr. 22, 1916, by the Neighborhood Players; *The Tempest*, by William Shakespeare, produced at the Century Theatre, New York, Apr. 24, 1916, by John Corbin and Louis Calvert, for the Drama Society; *Caliban, by the Yellow Sands*, by Percy Mackaye, produced at the Stadium of the College of the City of New York, May 25, 1916, by Oliver M. Sayler, Joseph Urban, Robert Edmond Jones, Richard Ordynski, Garnet Holme, Cecil Sharpe, Hazel Mackaye, and Irving Pichel for the New York City Shakespeare Tercentenary Celebration Committee, with Isadora Duncan, John Drew, Edith Wynne Matthison, etc., and 2500 citizens (designers, Joseph Urban and Robert Edmond Jones).

Season of 1916–17. *Bound East for Cardiff*, by Eugene O'Neill, produced at the Provincetown Playhouse, New York, in the autumn of 1916, by the Provincetown Players as their first bill in New York City; *Trifles*, by Susan Glaspell, and *Bushido*, from the Japanese of Takeda Izumo, produced at the Comedy Theatre, New York, Nov. 13, 1916, by the Washington Square Players; *The Inca of Perusalem*, by George Bernard Shaw, *The Queen's Enemies*, by Lord Dunsany, and *Great Catherine*, by George Bernard Shaw—produced Nov. 14, 1916, at the Neighborhood Playhouse by Gertrude Kingston; *The Gods of the Mountain*, by Lord Dunsany, *Six Who Pass While the Lentils Boil* and *Nevertheless*, by Stuart Walker—three short plays produced in the Portmanteau Theatre at the 39th Street Theatre, New York, Nov. 27, 1916, by Stuart Walker; *A Kiss for Cinderella*, by James M. Barrie, produced at the Empire Theatre, New York, Dec. 25, 1916, by Charles Frohman, Inc., with Maude Adams; *A Successful Calamity*, by Clare Kummer, produced at the Booth Theatre, New York, Feb. 5, 1917, by Arthur Hopkins, with William Gillette (designer, Robert Edmond Jones); *The Great Divide*, by William Vaughn Moody, revived at the Lyceum Theatre, New York, Feb. 7, 1917, by Henry Miller, with Henry Miller; *The Rider of Dreams*, *Granny Maumee*, and *Simon the Cyrenian*, three short plays by Ridgely Torrence, produced at the Garden Theatre, New York, Apr. 5, 1917, by Emily Hapgood (designer, Robert Edmond Jones).

Season of 1917–18. *The Deluge*, by Henning Berger, produced at the Hudson Theatre, New York, Aug. 20, 1917, by Arthur Hopkins, with Pauline Lord—revived at the Plymouth Theatre, New York, Jan. 27, 1922, by Mr. Hopkins; *Chu Chin Chow*, by Oscar Asche and Frederick Norton, produced at the Manhattan Opera House, New York, Oct. 22, 1917, by F. Ray Comstock and Morris Gest; *Madame Sand*, by Philip Moeller, produced at the Criterion Theatre, New York, Nov. 19, 1917, by Arthur Hopkins for Klaw and Erlanger, with Minnie Maddern Fiske; Théâtre du Vieux Colombier, of Paris (Jacques Copeau, director), opening a two-year engagement at the Garrick Theatre, New York, Dec. 3, 1917, with *Les Fourberies de Scapin*, by Molière; *Why Marry?* by Jesse Lynch Williams, produced at the Astor Theatre, New York, Dec. 25, 1917, by Selwyn and Company, with Nat C. Goodwin; *The Copperhead*, by Augustus Thomas, produced at the Shubert Theatre, New York, Feb. 18, 1918, by John D. Williams, with Lionel Barrymore; *The Wild Duck*, by Henrik Ibsen, produced at the Plymouth Theatre, New York, Mar. 11, 1918, by Arthur Hopkins, with Alla Nazimova (designer, Robert Edmond Jones).

Season of 1918–19. *Lightnin'*, by Winchell Smith and Frank Bacon, produced at the Gaiety Theatre, New York, Aug. 26, 1918, by John Golden, with Frank Bacon; *Redemption*, by Count Liov Tolstoy, produced at the Plymouth Theatre, New York, Oct. 3, 1918, by Arthur Hopkins, with John Barrymore (designer, Robert Edmond Jones); *Dear Brutus*, by James M. Barrie, produced at the Empire Theatre, New York, Dec. 23, 1918, by Charles Frohman, Inc., with William Gillette; *Molière*, by Philip Moeller, produced at the Liberty Theatre, New York, Mar. 17, 1919, by Henry Miller, with Henry Miller, Blanche Bates, Holbrook Blinn and Estelle Winwood; *The Jest*, by Sem Benelli, adapted by Edward Sheldon, produced at the Plymouth Theatre, New York, Apr. 9, 1919, by Arthur Hopkins, with John and Lionel Barrymore (designer, Robert Edmond Jones); *Papa*, by Zoë Akins, produced at the Little Theatre, New York, Apr. 10, 1919, by F. C. Whitney; *The Bonds of Interest*, by Jacinto Benavente, translated by John Garrett Underhill, first production of the Theatre Guild at the Garrick Theatre, New York, Apr. 14, 1919; *John Ferguson*, by St. John Ervine, produced at the Garrick Theatre, New York, May 12, 1919, by the Theatre Guild, with Augustin Duncan, Dudley Digges, and Rollo Peters.

Season of 1919–20. *Clarence*, by Booth Tarkington, produced at the Hudson Theatre, New York, Sept. 20, 1919, by George C. Tyler with Alfred Lunt; *Déclassée*, by Zoë Akins, produced at the Empire Theatre, New York, Oct. 6, 1919, by Charles Frohman, Inc., with Ethel Barrymore; *The Lost Leader*, by Lennox Robinson, produced at the Greenwich Village Theatre, New York, Nov. 12, 1919, by William Harris, Jr., with Frank Conroy; *Abraham Lincoln*, by John Drinkwater, produced at the Cort Theatre, New York, Dec. 15, 1919, by Lester Lonergan for William Harris, Jr.; *The Famous Mrs. Fair*, by James Forbes, produced at Henry Miller's Theatre, New York, Dec. 22, 1919, by Henry Miller, with Henry Miller and Blanche Bates; *Night Lodging*, by Maxim Gorki, produced at the Plymouth Theatre, New York, Dec. 22, 1919, by Arthur Hopkins; *Beyond the Horizon*, by Eugene O'Neill, produced at the Morosco Theatre, New York, Feb. 3, 1920, matinée, by John D. Williams, with Richard Bennett (designer, Homer Saint-Gaudens); *The Letter of the Law*, by Eugène Brieux, produced at the Criterion Theatre, New York, Feb. 23, 1920, by John D. Williams, with Lionel Barrymore; *Jane Clegg*, by St. John Ervine, produced at the Garrick Theatre, New York, Feb. 23, 1920, by Emanuel Reicher for the Theatre Guild, with Margaret Wycherly (designer, Lee Simonson); *Richard III*, by William Shakespeare, produced at the Plymouth Theatre, New York, Mar. 6, 1920, by Arthur Hopkins, with John Barrymore (designer, Robert Edmond Jones).

Season of 1920–21. *Enter Madame*, by Gilda Varesi and Dolly Byrne, produced at the Garrick Theatre, New York, Aug. 16, 1920, by Brock Pemberton, with Gilda Varesi; *The Bad Man*, by Porter Emerson Browne, produced at the Comedy Theatre, New York, Aug. 30, 1920, by Lester Lonergan for William Harris, Jr., with Holbrook Blinn (designer, Livingston Platt); *The Mob*, by John Galsworthy, produced at the Neighborhood Playhouse, New York, Oct. 9, 1920, by the Neighborhood Players; *The First Year*, by Frank Craven, produced at the Little Theatre, New York, Oct. 20, 1920, by Winchell Smith, for John Golden, with Frank Craven; *The Skin Game*, by John Galsworthy, produced at the Bijou Theatre, New York, Oct. 20, 1920, by Basil Dean, for William A. Brady; *The Emperor Jones*, by Eugene O'Neill, produced at the Provincetown Theatre, New York, Nov. 1, 1920, by the Provincetown Players, with Charles S. Gilpin (designer, Cleon Throckmorton); *Heartbreak House*, by George Bernard Shaw, produced at the Garrick Theatre, New York, Nov. 10, 1920 by Dudley Digges, for the Theatre Guild (designer, Lee Simonson); *Samson and Delilah*, by Sven Lange, produced at the Greenwich Village Theatre, New York, Nov. 17, 1920, by Arthur Hopkins, with Jacob Ben-Ami and Pauline Lord (designer, Robert Edmond Jones); *Mixed Marriage*, by St John Ervine, produced at the Bramhall Playhouse, New York, Dec. 14, 1920, by Augustin Duncan (designer, Rollo Peters); *Deburau*, by Sacha Guitry, adapted by Granville Barker, produced at the Belasco Theatre, Dec. 23, 1920, by David Belasco (designer, Ernest Gros); *Diff'rent*, by Eugene O'Neill, produced at the Provincetown Playhouse, New York, Dec. 27, 1920, by the

Provincetown Players (designer, Cleon Throckmorton); *Miss Lulu Bett*, by Zona Gale, produced at the Belmont Theatre, New York, Dec. 27, 1920, by Brock Pemberton, with Carroll McComas; *The Beggar's Opera*, by John Gay, Nigel Playfair's London production presented at the Greenwich Village Theatre, New York, Dec. 29, 1920, by Arthur Hopkins (designer, C. Lovat Fraser); *Macbeth*, by William Shakespeare, produced at the Apollo Theatre, New York, Feb. 17, 1921, by Arthur Hopkins, with Lionel Barrymore and Julia Arthur (designer, Robert Edmond Jones); *Mr. Pim Passes By*, by A. A. Milne, produced at the Garrick Theatre, New York, Feb. 28, 1921, by Philip Moeller, for the Theatre Guild (designer, Lee Simonson); *The Hero*, by Gilbert Emery, produced at the Longacre Theatre, New York, matinée, Mar. 14, 1921, by Sam Forrest for Sam H. Harris, with Robert Ames—revived at the Belmont Theatre, New York, Sept. 5, 1921; *The Trial of Joan of Arc*, by Émile Moreau, produced at the Century Theatre, New York, Apr. 3, 1921, by Margaret Anglin and Maurice Browne, with Miss Anglin (designer, Ernest de Weerth); *Liliom*, by Franz Molnar, produced at the Garrick Theatre, New York, Apr. 20, 1921, by Frank Reicher for the Theatre Guild, with Joseph Schildkraut (designer, Lee Simonson).

Season of 1921–22. *The Detour*, by Owen Davis, produced at the Astor Theatre, New York, Aug. 23, 1921, by Augustin Duncan for Lee and J. J. Shubert, with Augustin Duncan and Effie Shannon; *Swords*, by Sidney Howard, produced at the National Theatre, New York, Sept. 1, 1921, by Brock Pemberton, with Clare Eames (designer, Robert Edmond Jones); *The Circle*, by W. Somerset Maugham, produced at the Selwyn Theatre, New York, Sept. 12, 1921, by Clifford Brooke for the Selwyns, with Mrs. Leslie Carter and John Drew; *The White-Headed Boy*, by Lennox Robinson, produced at Henry Miller's Theatre, New York, Sept. 15, 1921, by J. B. Fagan for Charles Dillingham, with Arthur Sinclair and Maire O'Neill; *Ambush*, by Arthur Richman, produced at the Garrick Theatre, New York, Oct. 10, 1921, by Robert Milton for the Theatre Guild; *A Bill of Divorcement*, by Clemence Dane, produced at the George M. Cohan Theatre, New York, Oct. 10, 1921, by Basil Dean for Charles B. Dillingham, with Allan Pollock and Katherine Cornell; *The Claw*, by Henri Bernstein, produced at the Broadhurst Theatre, New York, Oct. 17, 1921, by Arthur Hopkins, with Lionel Barrymore (designer, Robert Edmond Jones); *Anna Christie*, by Eugene O'Neill, produced at the Vanderbilt Theatre, New York, Nov. 2, 1921, by Arthur Hopkins, with Pauline Lord and George Marion (designer, Robert Edmond Jones); *The Straw*, by Eugene O'Neill, produced at the Greenwich Village Theatre, New York, Nov. 10, 1921, by George C. Tyler, with Margalo Gilmore and Otto Kruger; *Kiki*, by André Picard and David Belasco, produced at the Belasco Theatre, New York, Nov. 29, 1921, by David Belasco, with Lenore Ulric; Baliev's Chauve-Souris (Letutchaya Muish or the Bat Theatre of Moscow), presented at the 49th Street Theatre, New York, Feb. 3, 1922, and moved to the Century Roof Theatre, June 5, 1922, by F. Ray Comstock and Morris Gest, with Nikita Balieff (designers, Sergei Sudeykin and Nikolai Remisov); *Back to Methuselah*, by George Bernard Shaw, five parts produced in three evenings at the Garrick Theatre, New York, Feb. 26, Mar. 5, and Mar. 12, 1922, by Alice Lewisohn, Agnes Morgan, and Frank Reicher for the Theatre Guild (designer, Lee Simonson); *The Hairy Ape*, by Eugene O'Neill, produced at the Provincetown Playhouse, New York, Mar. 9, 1922, by the Provincetown Players, assisted by Arthur Hopkins, with Louis Wolheim (designers, Robert Edmond Jones and Cleon Throckmorton); *The Truth About Blayds*, by A. A. Milne, produced at the Booth Theatre, New York, Mar. 14, 1922, by Winthrop Ames, with O. P. Heggie (designer, Norman-Bel Geddes); *From Morn to Midnight*, by Georg Kaiser, translated by Ashley Dukes, produced at the Garrick Theatre, New York, May 21, 1922, by Frank Reicher for the Theatre Guild (designer, Lee Simonson).

Season of 1922–23. *Loyalties*, by John Galsworthy, produced at the Gaiety Theatre, New York, Sept. 27, 1922, by Basil Dean for Charles B. Dillingham; *R. U. R.*, by Karel Capek, translated by Paul Selver and Nigel Playfair, produced at the Garrick Theatre, New York, Oct. 9, 1922, by Philip Moeller for the Theatre Guild (designer, Lee Simonson); *Six Characters in Search of an Author*, by Luigi Pirandello, translated by Edward Storer, produced at the Princess Theatre, New York, Oct. 30, 1922, by Brock Pemberton; *The World We Live In* (*The Insect Comedy*), by Josef and Karel Capek, adapted by Owen Davis, produced at Jolson's 59th Street Theatre, New York, Oct. 31, 1922, by John Cromwell for William A. Brady (designer, Lee Simonson); *Rain*, by John Colton and Clemence Randolph, founded on a story by W. Somerset Maugham, produced at the Maxine Elliott Theatre, New York, Nov. 7, 1922, by John D. Williams for Sam H. Harris, with Jeanne Eagels; *Hamlet*, by William Shakespeare, revived at the Sam H. Harris Theatre, New York, Nov. 16, 1922, by Arthur Hopkins, with John Barrymore and Rosalind Fuller (designer, Robert Edmond Jones); *The Merchant of Venice*, by William Shakespeare, revived at the Belasco Theatre, New York, Dec. 21, 1922, by David Belasco, with David Warfield; *Will Shakespeare*, by Clemence Dane, produced at the National Theatre, New York, Jan. 1, 1923, by Winthrop Ames (designer, Norman-Bel Geddes); The Moscow Art Theatre, Constantin Stanislavsky and Vladimar Nemirovitch-Dantchenko, directors, presented at Jolson's 59th Street Theatre, New York, by F. Ray Comstock and Morris Gest Jan. 8, 1923, in a repertory including *Tsar Fyodor Ivanovitch*, by Count Alexei Tolstoy, *The Lower Depths*, by Maxim Gorky, *The Cherry Orchard*, and *The Three Sisters*, by Anton Tchekhoff, *The Brothers Karamazoff* (three scenes), by Fyodor Dostoevski, and *The Lady from the Provinces*, by Ivan Turgenev; *Romeo and Juliet*, by William Shakespeare, produced at Henry Miller's Theatre, New York, Jan. 24 1923, by Frank Reicher for the Selwyns, with Jane Cowl (designer, Rollo Peters); *Icebound*, by Owen Davis, produced at the Sam H. Harris Theatre, New York, Feb. 10, 1923, by Sam Forrest for Sam H. Harris; *You and I*, by Philip Barry, produced at the Belmont Theatre, New York, Feb. 19, 1923, by Robert Milton for Richard G. Herndon, with Lucile Watson and H. B. Warner; *The Devil's Disciple*, by George Bernard Shaw, produced at the Garrick Theatre, New York, Apr. 23, 1923, by Philip Moeller for the Theatre Guild (designer, Lee Simonson).

Season of 1923–24. *Sunup*, by Lula Vollmer, produced at the Provincetown Playhouse, New York, May 24, 1923, by the Players Company, Incorporated; *Tarnish*, by Gilbert Emery, produced at the Belmont Theatre, New York, Oct. 1, 1923, by John Cromwell, Incorporated; *The Shame Woman*, by Lula Vollmer, produced at the Greenwich Village Theatre, New York, Oct. 16, 1923, by the Independent Theatre, Incorporated; Eleonora Duse, presented by F. Ray Comstock and Morris Gest at the Metropolitan Opera House, New York, Oct. 29, 1923, in *The Lady from the Sea*, by Henrik Ibsen, and thereafter at the Century Theatre, New York, Nov. 6, 13, 20, and 27 in *Ghosts*, by Ibsen, *Cosi Sia* (*They Will Be Done*), by Gallarati-Scotti, *La Porta Chiusa* (*The Closed Door*) by Marco Praga, and *La Città Morta* (*The Dead City*), by Gabriele d'Annunzio; *Cyrano de Bergerac*, by Edmond Rostand, produced at the National Theatre, New York, Nov. 1, 1923, by Walter Hampden, with Walter Hampden; *Saint Joan*, by George Bernard Shaw, produced at the Garrick Theatre, New York, Dec. 28, 1923, by Philip Moeller for the Theatre Guild (designer, Raymond Sovey); *Hell-Bent-fer-Heaven*, by Hatcher Hughes, produced at the Klaw Theatre, New York, Dec. 30, 1923, by Augustin Duncan for Marc Klaw, Inc.; *Outward Bound*, by Sutton Vane, produced at the Ritz Theatre, New York, Jan. 7, 1924, by William Harris, Jr.; André Charlot's *Revue of 1924*, presented at the Times Square Theatre, New York, Jan. 9, 1924, by Selwyn and Company; *The Miracle*, by Karl Vollmoeller, Engelbert Humperdinck, and Friedrich Schirmer, produced at the Century Theatre, New York, Jan. 15, 1924, by Max Reinhardt for F. Ray Comstock and Morris Gest (designer, Norman-Bel Geddes); *Fashion*, by Anna Cora Mowatt, revived at the Provincetown Playhouse, New York, Feb. 3, 1924, by Robert Edmond Jones and James Light for the Provincetown Players (designers, Reginald Marsh, Cleon Throckmorton and Robert Edmond Jones); *The Show-Off*, by George Kelly, produced at the Playhouse, New York, Feb. 5, 1924, by Stewart and French; *Beggar on Horseback*, by George S. Kaufman and Marc Connelly, after a play by Paul Apel, produced at the Broadhurst Theatre, New York, Feb. 12, 1924, by Winthrop Ames (designer, Woodman Thompson); *Man and the Masses*, by Ernest Toller, produced at the Garrick Theatre, New York, Apr. 14, 1924, by Lee Simonson for the Theatre Guild (designer, Lee Simonson); Little Theatre Tournament, conducted by Walter Hartwig in cooperation with the New York Drama League at the Belasco Theatre, New York, the week of May 5, 1924, and won by the Little Theatre of Dallas, Tex., with *Judge Lynch*, by W. R. Rogers, Jr.; *Hedda Gabbler*, by Henrik Ibsen, revived at the 48th Street Theatre, New York, May 16, 1924, by Robert Edmond Jones for the Equity Players, Inc., with Clare Eames.

Season of 1924–25. *What Price Glory?*, by Maxwell Anderson and Laurence Stallings, produced at the Plymouth Theatre, New York, Sept. 3, 1924, by Arthur Hopkins; *The Firebrand*, by Edwin Justus Mayer, produced at the Morosco Theatre, New York, Oct. 15, 1924, by Schwab, Liveright, and Mandel; *The Second Mrs. Tanqueray*, by Sir Arthur Wing Pinero, revived at the Cort Theatre, New York, Oct. 27, 1924, by Arthur Hopkins, with Ethel Barrymore; *S. S. Glencairn*, by Eugene O'Neill, produced at the Provincetown Theatre, New York, Nov. 3, 1924; Firmin Gemier, first American visit of the noted French actor, under the direction of Lee Shubert, at the Jolson Theatre, New York, Nov. 10, 1924; *Desire Under the Elms*, by Eugeno O'Neill, produced at the Greenwich Village Theatre, New York, Nov. 11, 1924; *They Knew What They Wanted,* by Sidney Howard, produced at the Garrick Theatre, New York, Nov. 24, 1924, by the Theatre Guild; *Paolo and Francesca,* by Stephen Phillips, produced at the Booth Theatre, New York, Dec. 2, 1924, by Cosmos Stage and ScreenProduction, Inc.; *Candida,* by Bernard Shaw, revived at the 48th Street Theatre, New York, Dec. 12, 1924, by the Actors' Theatre, Inc.; *Old English,* by John Galsworthy, produced at the Ritz Theatre, New York, Dec. 23, 1924, by Winthrop Ames with George Arliss; *Patience, or Bunthorne's Bride,* by W. S. Gilbert, music by Arthur Sullivan, revived at the Provincetown Playhouse, New York, Dec. 29, 1924; *Othello,* by William Shakespeare, revived at the Shubert Theatre, New York, Jan. 10, 1925, by Walter Hampden; *Processional,* by John Howard Lawson, produced at the Garrick Theatre, New York, Jan. 12, 1925, by the Theatre Guild; *The Wild Duck,* by Henrik Ibsen, revived at the 48th Street Theatre, New York, Feb. 24, 1925, by the Actors' Theatre; *The Little Minister,* by Sir James M. Barrie, revived at the Globe Theatre, New York, Mar. 23, 1925, by Charles Dillingham; *The Servant in the House,* by Charles Rann Kennedy, revived at the 48th Street, Theatre, New York, Apr. 7, 1925, by the Actors' Theatre; *Ruint,* by Hatcher Hughes, produced at the Provincetown Playhouse, New York, Apr. 7, 1925; *Cæsar and Cleopatra,* by Bernard Shaw, produced at the Guild Theatre, New York, Apr. 13, 1925, by the Theatre Guild; *Aren't We All,* by Frederick Lonsdale, produced at the Globe Theatre, New York, Apr. 13, 1925, by Charles Dillingham; *Rosmersholm,* by Henrik Ibsen, revived at the 52d Street Theatre, New York, May 25, 1925, by the Stagers: Little Theatre Tournament, conducted by Walter Hartwig in coöperation with the Manhattan Little Theatre Club, at Wallack's Theatre, New York, the week of May 4, 1925, won by the Little Theatre of Dallas, Texas with *The No 'Count Boy,* by Paul Green; *The Critic,* by Richard Brinsley Sheridan, produced at the Neighborhood Theatre, New York, May 8, 1925; *Trelawney of the Wells,* by Sir Arthur Wing Pinero, revived at the Knickerbocker Theatre, New York, June 1, 1925, by The Players Club.

Season of 1925–26. *Outside Looking In,* by Maxwell Anderson, produced at the Greenwich Village Theatre, New York, Sept. 7, 1925, by Messers Macgowan, Jones, and O'Neill; *Arms and the Man,* by Bernard Shaw, revived at the Guild Theatre, New York, Sept. 14, 1925, by the Theatre Guild; *The Vortex,* by Noel Coward, produced at the Henry Miller Theatre, New York, Sept. 16, 1925, by J. P. Bickerton, Jr. (in association with Basil Deau); *The Vagabond King,* a musical version of Justin Huntly McCarthy's *If I Were King,* music by Rudolf Friml, book and lyrics by Brian Hooker, produced at the Casino Theatre, New York, Sept. 21, 1925, by Russell Janney; *The Butter and Egg Man,* by George S. Kaufman, produced at the Longacre Theatre, New York, Sept. 23, 1925, by Crosby Gaige; *Accused,* by Brieux, English version by George Middleton, produced at the Belasco Theatre, New York, Sept. 29, 1925, by David Belasco with E. H. Sothern; *Craig's Wife,* by George Kelly, produced at the Morosco Theatre, New York, Oct. 12, 1925, by Rosalie Stewart; *A Man's Man,* by Patrick Kearney, produced at the 52d Street Theatre, New York, Oct. 13, 1925, by the Stagers; *The Enemy,* by Channing Pollock, produced at the Times Square Theatre, New York, Oct. 20, 1925, by Crosby Gaige; *Lucky Sam McCarver,* by Sidney Howard, produced at the Playhouse, New York, Oct. 21, 1925, by William A. Brady, Jr. and Dwight Deere Wiman (in association with John Cromwell); *Young Woodley,* by John Van Druten, produced at the Belmont Theatre, New York, Nov. 2, 1925, by George C. Tyler and Basil Dean; *The Master Builder* with Eva La Gallienne by Henrik Ibsen, revived at the Maxine Elliott Theatre, New York, Nov. 10, 1925; *Hamlet,* by William Shakespeare, in modern dress, produced at the Booth Theatre, New York, Nov. 9, 1925, by Horace Liveright; *The Last of Mrs. Cheyney,* by Frederick Lonsdale, produced at the Fulton Theatre, New York, Nov. 9, 1925, by Charles Dillingham, with Ina Claire; *Last Night of Don Juan,* by Edmond Rostand, translated by Sidney Howard, produced at the Greenwich Village Theatre, New York, Nov. 9, 1925, by Macgowan, Jones, and O'Neill; *Candida,* by Bernard Shaw, revived at the Comedy Theatre, New York, Nov. 9, 1925, by the Actors' Theatre; *In a Garden,* by Philip Barry, produced at the Plymouth Theatre, New York, Nov. 16, 1925, by Arthur Hopkins; *Androcles and the Lion* and *The Man of Destiny,* by Bernard Shaw, produced at the Klaw Theatre, New York, Nov. 23, 1925, by the Theatre Guild; *The Fountain,* by Eugene O'Neill, produced at the Greenwich Village Theatre, New York, Dec. 10, 1925, by Macgowan, Jones, and O'Neill; *Lysistrata* (Moscow Art), text by Dmitry Smolin, music by Reginhold Gliere, produced at the Jolson Theatre, New York, Dec. 14, 1925, by F. Ray Comstock and Morris Gest; *The Dybbuk,* by S. Ansky (English version by Henry G. Alsberg), produced at the Neighborhood Theatre, New York, Dec. 15, 1925; *Song of the Flame,* by Otto Harbach and Oscar Hammerstein, 2d., music by Herbert Stothart and George Gershwin, produced at the 44th Street Theatre, New York, Dec. 30, 1925, by Arthur Hammerstein; *The Great God Brown,* by Eugene O'Neill, produced at the Greenwich Village Theatre, New York, Jan. 23, 1926, by Macgowan, Jones, and O'Neill; *The Goat Song,* by Franz Werfel, translated by Ruth Langer, produced at the Guild Theatre, New York, Jan. 25, 1926, by the Theatre Guild; *John Gabriel Borkman,* by Ibsen, revived at the Booth Theatre, New York, Jan. 29, 1926; *Shanghai Gesture,* by John Colton, produced at the Martin Beck Theatre, New York, Feb. 1, 1926, by A. H. Woods; *Lulu Belle,* by Edward Sheldon and Charles MacArthur, produced at the Belasco Theatre, New York, Feb. 9, 1926, by David Belasco; *The Wisdom Tooth,* by Marc Connelly, produced at the Little Theatre, New York, Feb. 15, 1926, by John Golden; *Juno and the Paycock,* by Sean O'Casey, produced at the Mayfair Theatre, New York, Mar. 15, 1926, by H. W. Romberg (in association with John Jay Scholl); *Bride of the Lamb,* by William Hurlburt, produced at the Greenwich Village Theatre, New York, Mar. 30, 1926; *The Two Orphans,* by A. D'Ennery and Eugene Cormon, translated by N. Hart Jackson, revived at the Cosmopolitan Theatre, New York, Apr. 15, 1926, by Messrs Shubert (in association with William A. Brady, Jr., and Dwight Seere Wiman); *What Every Woman Knows,* by Sir James M. Barrie, produced at the Bijou Theatre, New York, Apr. 13, 1926, by William A. Brady (in association with Lee Shubert); Little Theatre Tournament, conducted by Walter Hartwig in coöperation with The Manhattan Little Theatre Club, at the Bayes Theatre, New York, week of May 3, 1926, won by The Little Theatre of Dallas, Tex., with *El Cristo,* by Margaret Larkin.

Season of 1926–27. *Broadway,* by Philip Dunning and George Abbott, produced at the Broadhurst Theatre, New York, Sept. 16, 1926, by Jed Harris; *The Captive,* adapted by Arthur Hornblow, Jr., from *La Prisonnière,* by Edouard Bourdet, produced at the Empire Theatre, New York, Sept. 29, 1926, by the Charles Frohman Company; *Deep River,* book and lyrics by Laurence Stallings, music by Frank Harling, produced at the Imperial Theatre, New York, Oct. 4, 1926, by Arthur Hopkins; *Juarez and Maximilian,* by Franz Werfel, produced at the Guild Theatre, New York, Oct. 11, 1926, by the Theatre Guild; *An American Tragedy,* drama by Patrick Kearney from the novel by Theodore Dreiser, produced at the Longacre Theatre, New York, Oct. 11, 1926, by Horace Liveright; *God Loves Us,* by J. P. McEvoy, produced at the Maxine Elliott Theatre, New York, Oct. 18, 1926, by the Actors' Theatre (Kenneth Macgowan, director); *Daisy Mayme,* by George Kelly, produced at the Playhouse, New York, Oct. 25, 1926, by Rosalie Stewart; *Caponsacchi,* by Arthur Goodrich and Rose A. Palmer, based upon Robert Browning's *The Ring and the Book,* produced at the Hampden's Theatre, New York, Oct. 26, 1926, by Walter Hampden; *Three Sisters,* drama by Anton Tchekhoff, produced at the Civic Repertory Theatre; *The Play's the Thing* by Ferenc Molnar, adapted by P. G. Wodehouse, produced at the Henry Miller Theatre, New York, Nov. 3, 1926, by the Charles Frohman Company, with Holbrook Blinn; *The Constant Wife,* by W. Somerset Maugham, produced at the Maxine Elliott Theatre, New York, Nov. 29, 1926, by the Charles Frohman Company, with Ethel Barrymore; *Ned McCobb's Daughter,* by Sidney Howard, produced at the John Golden Theatre, New York, Nov. 29, 1926, by the Theatre Guild; *Beyond the Horizon,* by Eugene O'Neill, revived at the Mansfield Theatre, New York, Nov. 30, 1926, by the Actors' Theatre; *The Desert Song,* music by Sigmund Romberg, book by Otto Harbach, Oscar Hammerstein, 2d, and Frank Mandel, produced at the Casino Theatre, New York, Nov. 30, 1926, by Laurence Schwab and Frank Mandel; *The Pirates of Penzance,* by Gilbert and Sullivan, revived at the Plymouth Theatre, New York, Dec. 6, 1926, by the Gilbert and Sullivan Opera Company; *Chicago,* by Maurine Watkins, produced at the Music Box Theatre, New York, Dec. 30, 1926, by Sam H. Harris; *In Abraham's Bosom,* by Paul Green, produced at the Provincetown Theatre, New York, Dec. 30, 1926, by the Provincetown Players; *The Brothers Karamazov,* based on the Dostoevski novel, by Jacques Copeau and Jean Croue, translated by Rosalind Ivan, produced at the Guild Theatre, New York, Jan. 3, 1927, by the Theatre Guild; *Ghosts,* by Henrik Ibsen, translated by William Archer, revised by Harrison Fiske, revived at the Mansfield Theatre, New York, Jan. 10, 1927, by Charles D. Coburn and Patterson McNutt, with Mrs. Fiske; *The Barker,* by Kenyon Nicholson, produced at the Biltmore Theatre, New York, Jan. 18, 1927, by Charles L. Wagner; *The Cradle Song,* with an interlude in verse, by Gregorio and Maris Martinez, translated into English by John Garrett Underhill, produced at the Civic Repertory Theatre, New York, Jan. 24, 1927, by the Civic Repertory Company; *Saturday's Children*, by Maxwell Anderson, produced at the Booth Theatre, New York, Jan. 26, 1927, by the Actors' Theatre, Inc.; *Trelawney of the Wells*, by Sir Arthur Wing Pinero, revived at the New Amsterdam Theatre, New York, Jan. 31, 1927, by George C. Tyler; *The Road to Rome*, by Robert Emmet Sherwood, produced at the Playhouse, New York, Jan. 31, 1927, by William A. Brady, Jr., and Dwight Deere Wiman; *The Wandering Jew*, by E. Temple Thurston, based on the ancient legend of the Wandering Jew, produced at the Cosmopolitan Theatre, New York, Feb. 1, 1927; *Rio Rita*, by Guy Bolton and Fred Thompson, produced at the Ziegfeld Theatre, New York, Feb. 2, 1927, by Florenz Ziegfeld; *The Legend of Leonora*, by Sir James M. Barrie, revived at the Ritz Theatre, New York, Mar. 29, 1927, by arrangement with Charles Frohman, Inc.; *The Second Man*, by S. N. Behrman, produced at the Guild Theatre, New York, Apr. 11, 1927, by the Theatre Guild; *The Field God*, by Paul Green, produced at the Greenwich Village Theatre, New York, Apr. 21, 1927, by Edwin R. Wolfe, Inc.; Little Theatre Tournament, conducted by Walter Hartwig in coöperation with the Manhattan Little Theatre Club, at the Frolic Theatre, New York, week of May 2, 1927, won by The Welwyn Garden City Society of Welwyn Garden City, England, with *Mr. Sampson*, by Charles Lee.

Season of 1927–28. *Burlesque*, by George Mauker Watters and Arthur Hopkins, produced at the Plymouth Theatre, New York, Sept. 1, 1927, by Arthur Hopkins; *Pickwick*, by Cosmo Hamilton and Frank C. Reilly, based upon *The Pickwick Papers*, by Charles Dickens, produced at the Empire Theatre, New York, Sept. 5, 1927, by Frank C. Reilly; *In Abraham's Bosom*, by Paul Green, revived at the Provincetown Theatre, New York, Sept. 6, 1927, by the Provincetown Players; *Good News*, by Laurence Schwab and B. G. de Sylva, lyrics by B. G. de Sylva and Lew Brown, music by Ray Henderson, produced at the 46th Street Theatre, New York, Sept. 6, 1927, by Laurence Schwab and Frank Maudel; *Four Walls*, by Dana Burnet and George Abbott, produced at the John Golden Theatre, New York, Sept. 19, 1927, by John Golden; *The Trial of Mary Dugan*, by Bayard Veiller, produced at the National Theatre, New York, Sept. 19, 1927, by A. H. Woods; *The Command to Love*, by Rudolph Lothar and Fritz Gottwald, adapted by Herman Bernstein and Brian Marlow, produced at the Longacre Theatre, New York, Sept. 20, 1927, by William A. Brady, Jr., and Dwight Wiman, in association with John Tuerk; *The Letter*, by W. Somerset Maugham, produced at the Morosco Theatre, New York, Sept. 26, 1927, by Messmore Kendall; *An Enemy of the People*, by Henrik Ibsen, revived at the Hampden's Theatre, New York, Oct. 3, 1927, by Walter Hampden; *Porgy*, by Dorothy and Du Bose Heyward, produced at the Guild Theatre, New York, Oct. 10, 1927, by the Theatre Guild; *The 19th Hole*, by Frank Craven, produced at the George M. Cohan Theatre, New York, Oct. 11, 1927, by A. L. Erlanger; *The Good Hope*, by Herman Heijermans, translated from the Dutch by Lilian Saunders and Caroline Heijermans-Houwink, produced at the Civic Repertory Theatre, New York, Oct. 18, 1927, by the Civic Repertory Theatre; *The Ivory Door*, by A. A. Milne, produced at the Charles Hopkins Theatre, New York, Oct. 18, 1927, by Charles Hopkins; *Escape*, by John Galsworthy, produced at the Booth Theatre, New York, Oct. 26, 1927, by Winthrop Ames; *John*, by Philip Barry, produced at the Klaw Theatre, New York, Nov. 2, 1927, by the Actors' Theatre, Inc.; *Coquette*, by George Abbott and Ann Preston Bridgers, produced at the Maxine Elliott Theatre, New York, Nov. 8, 1927, by Jed Harris; *Midsummer Night's Dream*, by William Shakespeare, produced at the Century Theatre, New York, Nov. 17, 1927, by Max Reinhardt; *The Doctor's Dilemma*, by Bernard Shaw, revived at the Guild Theatre, New York, Nov. 21, 1927, by the Theatre Guild; *The Racket*, by Bartlett Cormack, produced at the Ambassador Theatre, New York, Nov. 22, 1927, by Alexander McKaig; *The Plough and the Stars*, by Sean O'Casey, produced at the Hudson Theatre, New York, Nov. 28, 1927, by George C. Tyler; *Electra* of Sophocles, revived at the Gallo Theatre, New York, Dec. 1, 1927, by Margaret Anglin; *Jederman* (*Everyman*), English morality as rewritten by Hugo von Hofmannstahl, music by Einar Nilson, produced at the Century Theatre, New York, Dec. 7, 1927, by Max Reinhardt; *Danton's Tod*, by Georg Buchner, produced at the Century Theatre, New York, Dec. 20, 1927, by Gilbert Miller, Max Reinhardt's production; *Behold the Bridegroom*, by George Kelly, produced at the Cort Theatre, New York, Dec. 26, 1927, by Rosalie Stewart; *Show Boat*, adapted from Edna Ferber's novel of the same name, book and lyrics by Oscar Hammerstein, 2d, music by Jerome Kern, produced at the Ziegfeld Theatre, New York, Dec. 27, 1927, by Florenz Ziegfeld; *Paris Bound*, by Philip Barry, produced at the Music Box Theatre, New York, Dec. 27, 1927, by Arthur Hopkins; *The Royal Family*, by George S. Kaufman and Edna Ferber, produced at the Selwyn Theatre, New York, Dec. 28, 1927, by Jed Harris; *Marco Millions*, by Eugene O'Neill, produced at the Guild Theatre, New York, Jan. 9, 1928, by the Theatre Guild; *Strange Interlude*, by Eugene O'Neill, produced at the John Golden Theatre, New York, Jan. 30, 1928, by the Theatre Guild; *Maya*, by Simon Gantillon, translated by Ernest Boyd, produced at the Comedy Theatre, New York, Feb. 21, 1928, by the Actors' Theatre, Inc.; *The Cherry Orchard*, by Anton Tchekhov, translated by George Calderon, produced at the Bijou Theatre, New York, Mar. 5, 1928, by James B. Fagan; *12,000*, by Bruno Frank, adapted by William A. Drake, produced at the Garrick Theatre, New York, Mar. 12, 1928, by the Garrick Players; *Volpone*, based on Ben Jonson's famous comedy, by Stefan Zweig, translated by Ruth Langer, produced at the Guild Theatre, New York, Apr. 9, 1928, by the Theatre Guild: Little Theatre Tournament, conducted by Walter Hartwig in coöperation with the Manhattan Little Theatre Club, at the Frolic Theatre, New York, week of May 7, 1928, won by the Ardrossan and Saltcoats Players of Ardrossan, Scotland, with *The Old Lady Shows Her Medals*, by Sir James M. Barrie; *She Stoops to Conquer*, by Oliver Goldsmith, prologue by David Garrick, revived at the Erlanger's Theatre, New York, May 14, 1928, by George C. Tyler; *Beaux Stratagem*, by George Farquhar, prologue by Edgar Lee Masters, revived at the Hampden's Theatre, New York, June 4, 1928, by The Players' Club.

Bibliography. The following list gives some of the more significant works on the drama which have appeared recently and which are of interest in connection with the modern theatre: Agate, *Playgoing* (New York, 1927); Anderson, *Box Office* (New York, 1929); Bellinger, *Short History of the Drama* (New York, 1927); Bosworth, *Technique in Dramatic Art* (New York, 1926); Clark, *Study of Modern Drama* (New York, rev. ed., 1928); Dickinson, *Outline of Contemporary Drama* (New York, 1927); Drinkwater, *Art of Theatre-Going* (New York, 1927); Dukes, *Drama* (New York, 1927); Eaton, *Actor's Heritage* (Boston, 1924); Glover, *Drama and Mankind* (Boston, 1924); Hughes, *The Story of the Theatre* (New York, 1928); Jourdain, *Drama in Europe in Theory and Practice* (New York, 1924); Mantle, *Best Plays of 1919–20*, anually to 1928–29 (New York), *American Playwrights of Today* (New York, 1929); Matthews, *Playwrights on Playmaking* (New York, 1923); Moderwell, *Theatre of Today* (New York, 1927); Nathan, *Materia Critica* (New York), 1924), *Hearts of Satan* (New York, 1926), *Art of the Night* (New York, 1928); Stanton, *Theatre Management* (New York, 1929).

THE HAGUE, NETHERLANDS. See HAGUE, THE.

THELEN, MAX (1880–). An American lawyer, born at Rising City, Nebr., and educated in law at the University of California. In 1904 he began the practice of law in San Francisco. He was for many years counsel for several railroads and for the California State Railroad Commission, of which he was a member from 1912 to 1918 (president, 1915–18). During the period of the World War and after, he filled many important positions on advisory boards, on matters relating to railroads, and was Director of Public Service for the United States' Railroad Administration in 1919–20. He was the author of *Leading Railroad and Public Service Commissions* (1912).

THEOSOPHICAL SOCIETY. A society founded in New York City in 1875, by Mme. Helen P. Blavatsky, assisted by Col. Henry S. Olcott, William Q. Judge, and others. The international headquarters were removed in 1879 to Adyar in India, near Madras, where the Society owns a tract of three hundred acres on the Adyar River, with numerous buildings, including a library, printing plant, business offices, auditorium, and residences. The objects of the society, in general, are to study all matters relating to theosophy, to encourage the study of comparative religion, philosophy, and science, and to furnish information in regard to theosophy. During 1926 the international president, Dr. Annie Besant, visited the United States, bringing with her a young Hindu, J. Krishnamurti, whom she claimed to be the chosen vehicle through which the "Messiah" or World Teacher would speak when He should come again. In 1926 the society had over 10,000 members, of whom 8582 were active, and in 1928 there were 257 local lodges in the United States. In 1927 the headquarters of the American Theosophical Society were moved from Chicago, to Wheaton, Ill. The president in 1928 was L. W. Rogers.

THEUNIS, Georges (1873–). A Belgian Senator and former Premier who began his career in the army, but soon tired of garrison duty and left it for the stock exchange of Brussels. He reëntered the army in 1914 with the rank of colonel and was appointed by the Government to buy war supplies in England. At the Armistice, he was appointed Belgian High Commissioner in London and later Belgian delegate in the settlement of the financial and economic questions arising out of the idemnity conferences. In 1920 he was made Finance Minister, and at the end of 1921 Premier, but he did not enter Parliament. The Flemish disaffection and the rift between France and England made this a difficult period, but he sided with France and sent Belgian troops into the Ruhr. In 1924 he attended the Reparation Commission's conference in London and took part in the Dawes Report deliberations. After the March elections of 1925, Theunis resigned and in August, 1925, he headed the delegation which came to the United States to settle the terms of the Belgian war debt. Later, he became a senator.

THÉVENIN, Denis. See Duhamel, Georges.

THIBAUD, tē'bō', Jacques (1880–). A French violinist, born at Bordeaux. He received his first instruction from his father and then entered the Paris Conservatoire, where he studied under Marsick and won the first prize in 1896. After his début at Paris in 1898, he made several very successful tours of Europe and visited the United States for the first time in 1903. In December, 1914, an American tour was suddenly interrupted by the death of his father, and after that he served a year in the French Army. The experiences through which he passed must have made an indelible impression on his mind and affected his whole conception of art. On his reappearance in 1916, he revealed a breadth of conception and an emotional intensity of which his previous performances had given no intimation. From a player of charming elegance and refinement he had, in an incredibly short time, grown into one of colossal power.

THIBAUDET, tē'bō'dā', Albert (1874–). A French literary critic, born at Tournus, Saône-et-Loire, and educated at the Sorbonne. After teaching in various lycées, he became professor of French literature at York, England, and then at Geneva. He was also literary critic for the *Nouvelle Revue française*, the London *Mercury*, the *Journal de Genève*, and the *Dagens Nyheter* (Stockholm). His studies on Barrès, Bergson, and the intellectual currents of the last generation in French letters were genuine and disciplined analyses of modern life. His works include: *La poésie de Stéphane Mallarmé*; *Les heures de l'Acropole*; *Trente ans de vie Française* (4 vols., 1920–23), consisting of *Les idées de Charles Maurras, La Vie de Maurice Barrès*, and *Le Bergsonisme* (2 vols.); *Gustave Flaubert*; *Paul Valéry* (1923); *Étranger*; *ou, Études de littérature anglaise* (1925); and *La république des professeurs* (1927).

THIBAULT, Jacques Anatole. See France, Anatole.

THISELTON-DYER, Sir William Turner. See Dyer, Sir William Turner Thiselton.

THOMAS, Frederick William (1867–). A British Orientalist. He was educated at King Edward's School, Birmingham, and Trinity College, Cambridge, where he was a fellow (1892–98). He served as assistant librarian at India Office from 1898 to 1903. He was chairman of the board of comparative philology at the University of London, president of the Philological Society, and editor of *Epigraphia India* (1916–22). Since 1927 he has been Boden professor of Sanskrit at Oxford.

THOMAS. The Rt. Hon. James Henry (1875–). An English Labor leader and public official, born at Newport, Monmouth. He started work as an errand boy when he was 9 years old, and later was engine cleaner, fireman, and engine driver for the Great Western Ry. Co. He became prominent in the labor unions and was president of the Amalgamated Society of Railway Servants, since merged in the National Union of Railway Men, in 1910, and general secretary (1918–24, and since 1925). He was elected to Parliament in 1910. He was made Privy Councilor in 1917, was president of the International Federation of Trade Unions (1920–24), a member of the General Council of the Trade Union Congress, and its chairman in 1920–21, and was Secretary of State for the Colonies in the Labor government of 1924. After its overthrow, he was active in the Opposition. In June, 1929, he became Lord Privy Seal and unofficially Minister for Employment in Ramsay MacDonald's second Labor cabinet. The latter post was created to deal with what was considered the most pressing problem facing the country. He received an honorary LL.D. from Cambridge (1920) and a D.C.L. from Oxford (1926). He wrote *When Labor Rules* (1920).

THOMAS, Norman Mattoon (1884–). An American Socialist Party leader. He was born at Marion, Ohio, and graduated from Princeton (1905). He completed his theological studies at Union Seminary, New York, and was ordained to the Presbyterian ministry in 1911 after one year's service as associate at the Brick Presbyterian Church. For seven years, he did pastoral work in New York City. He founded and was editor of the *World To-Morrow* (1918–21). In 1921–22 he was associate editor of the *Nation*. He was candidate on the Socialist ticket for Governor of New York in 1924, for Mayor of New York City in 1925 and 1929, and for President of the United States in 1928. He wrote: *The Conscientious Objector in America* (1923); *The Challenge of War* (1925); *Is Conscience a Crime?* (1927); and *What is Industrial Democracy?* (1927).

THOMPSON, William Boyce (1869–). An American banker, born at Virginia City, Mont., and educated at the Columbia University School of Mines. Engaging in business in New York City, he became director and officer in many important financial institutions. From its organization until 1919, he was a director of the Federal Reserve Bank in New York and he founded and endowed the Institute for Plant Research. He headed the American Red Cross Commission to Russia in 1917 and was Envoy Extraordinary from the United States to the first centennial of the Proclamation of Independence of the Republic of Peru. In 1921–22, he served as a member of the advisory committee of the American delegation at the Disarmament Conference.

THOMPSON, William Gilman (1856–1927). An American physician and educator, born in New York. He received a degree in science from the Sheffield Scientific School in 1877 and a medical degree from Columbia in 1881. After postgraduate study in London and Berlin, he returned to New York, teaching medicine at the Columbia University Medical College (1887–98) and at Cornell University Medical College (1889–16). He was also chairman of the industrial hygiene division of the New York State Labor Department. His standard works are *Practical Dietetics* (1909) and *Occupational Diseases* (1915).

THOMPSON, William Hale (1869–). Mayor of Chicago. He was born at Boston, taken to Chicago as a child, and educated in the Chicago public schools. He spent five seasons on cattle ranches in Colorado, Montana, and Wyoming, and was manager of a ranch in Nebraska three years. During 1900–02 he served as alderman from the Second Ward of Chicago and then for two years was county commissioner of Cook County. He was Mayor of Chicago from 1915 to 1923 and in 1926 was elected for a third term, expiring 1931, as an opponent of alleged pro-British interests in the schools. He instigated the actions by the Board of Education which led to the resignation of William McAndrew as superintendent of schools in 1928. From 1916 to 1920, he was a member of the Republican National Committee.

THOMSON, Sir Joseph (John) (1856–). A British physicist (see Vol. XXII). He resigned his professorship of experimental physics at Cambridge in 1918 and became master of Trinity College. From 1916 to 1920, he was president of the Royal Society. He was awarded the Franklin Medal and Scott Medal (Philadelphia) in 1923 and the Mascart Medal (Paris) in 1927. See Chemistry.

THOMSON, Sir St. Clair (1859–). A British surgeon. He was born at Londonderry and educated at King's College (London), and in Paris, Vienna, and Lausanne (M.D., 1891). He is emeritus professor of laryngology and consulting surgeon for diseases of the throat and nose at King's College Hospital, and consulting throat surgeon to the Italian Hospital and Throat and Ear Hospital, Maidstone. A fellow of King's College, he has been president of the Royal Society of medicine and of the Medical Society, and is an honorary member of numerous European medical societies. His works include *Diseases of the Nose and Throat* (3d ed., 1926), *The Cerebrospinal Fluid*, and *Shakespeare and Medicine.*

THOREK, Max (1880–). An American surgeon, born in Hungary, who, having received his degree from Rush Medical College in 1904, settled in Chicago and for a time was connected with the medical department of Loyola University as professor of clinical surgery. He was later chosen president and surgical chief of the new American Hospital and is also one of the consulting surgeons of Cook County Hospital. He has done considerable work in experimental surgery, has written numerous surgical papers, and in 1909 translated into English Krause's *Surgery of the Brain and Spinal Cord.* In 1924 appeared his large monograph, *The Human Testis*, in which are summed up all the developments in the grafting of the male gonad.

THORNDIKE, Edward Lee (1874–). An American educational psychologist (see Vol. XXII). He became in 1921 professor and director of psychology of the Institute of Educational Research. He published after 1914 numerous important monographs and papers on the application of mathematics to educational measurement, new editions of his standard two-volume work on *Educational Psychology, Psychology of Arithmetic* (1922); *Psychology of Algebra* (1923); and *The Measurement of Intelligence* (1926).

THRACE, thrās. Largely a transition land between the Turkish and Balkan peoples, without natural boundaries, and with mixed racial groups. Thrace, like Macedonia to the south, has been one of the storm-centres of the Balkans. The Treaty of Bucharest (1913) placed Greece, on the east, at the Mesta River. Between the Mesta and the Maritza, by the same treaty, Bulgaria acquired the region known as Western Thrace. East of the Maritza, including Adrianople and Kirk Kilissa, and stretching to the Straits, extended the region known as Eastern Thrace, which continued to remain in Turkish hands. Western Thrace, with a total population of 200,500, comprised 44,000 Greeks, 124,000 Turks, 29,500 Bulgars, 3000 others; Eastern Thrace, with a population of 805,369, was made up of 395,515 Greeks, 344,011 Turks, 67,843 Bulgars. For the realization of the Greater Greece, therefore, it was necessary to expand to the south and east to absorb these Greek populations and at the same time complete the encirclement of Constantinople, the barring of Bulgaria from the Ægean, and the shutting off of Turkey from its contacts with Europe. Thus, in the way of Greece stood Bulgaria and Turkey, and largely because these were allied with the Central Powers, was Venizelos convinced that Greece's lot had to be thrown in with the Entente. Bulgaria, of course, was not unaware of where her own interests lay. In 1915, as the price of her entry into the World War, she exacted from Turkey two important strips of territory, one being the Adrianople enclave, particularly Karagach, and the second the left bank of the Maritza; but with the Entente triumphant, the realization of Greek nationalistic hopes seemed assured. By the Treaty of Neuilly (Nov. 27, 1919), Bulgaria was compelled to cede Western Thrace to the Allies for Greece, and Greek sovereignty was circumscribed only in these three respects: (1) Bulgarian freedom of transit of the Ægean was guaranteed; (2) the Maritza might be constituted an international river if Greece and Bulgaria requested it; (3) racial minorities, particularly at Adrianople, were to be protected. While the cession, territorially, was of no great importance—the region has only a length of 80 miles and an average depth of 30—and really left Bulgaria with a strategic boundary line, economically it meant Bulgarian disaster. Bulgaria was deprived of her front on the Ægean, of contact with the ports of Kavalla, Porto Lagos, Dedeagach—in short of the fruits of the First Balkan War—and compelled to be once again a Black Sea country. Bulgarians, in 1919, felt that they were in the same position as they had been in 1911.

Here was the realization of one part of the Greek programme, but it was only a minor part, for Eastern Thrace was the section Venizelos, above all things, desired. Lloyd Geogre had shown himself consistently friendly to the Greek aspirations. By gaining over the powerful British support, Venizelos saw his hopes crowned with success when in 1920 Greek troops received permission to occupy Eastern Thrace. By the Treaty of Sèvres (Aug. 10, 1920), the stamp of permanency seemed to be put on the proceedings, for Turkey was compelled to grant to Greece all of Eastern Thrace to the Chatalja lines (i.e., the western boundaries of the Zone of the Straits). Greece now not only had a firm foothold on the whole Ægean, possessing Adrianople and Kirk Kilissa, but also had an outlet on the Black Sea; but Venizelos fell in November, 1920, and with his passing the star of Greece entered into its decline. The fortunes of Greece in the years 1921–22 are reviewed elsewhere in this work. The destiny of Eastern Thrace depended upon the success or failure of the Greek arms, and with the Turkish Nationalist victory, Greeks were compelled to see their representatives renounce Eastern Thrace and Adrianople to the "Grand National Assembly of Turkey," by the Mudania Agreement of Oct. 11, 1922, Turks immediately occupied the area up to the right bank of the Maritza. By the Treaty of Lausanne (July 24, 1923) Greece was completely humiliated. Not only was she compelled to part with Smyrna and the Dodecanese, but the whole of Eastern Thrace was taken from her to be turned back to Turkey. Greece's frontier stopped at the Maritza, with the exception of the Karagach district opposite Adrianople; Turkish sovereignty was once more proclaimed over Adrianople and Kirk Kilissa. For the prevention of boundary disorders, the Treaty of Lausanne, in an annex, provided for the demilitarization of a special area stretching from the Ægean between Makri and Imbrije Burnu to the Black Sea between Anberler and Serkes Burnu, and including the Greek, Bulgarian, and Turkish boundaries in Eastern Thrace. See GREECE, under *History*, and TURKEY.

THROOP POLYTECHNIC INSTITUTE. See CALIFORNIA INSTITUTE OF TECHNOLOGY.

THUNDER STORMS. See METEOROLOGY.

THURINGIA, thū-rĭn'jĭ-*ȧ*. A Free State of Germany formed, on Dec. 24, 1919, by the union of the following states: Saxe-Weimar, Saxe-Meiningen, Saxe-Altenburg, Schwarzburg-Rudolstadt, Schwarzburg-Sonderhausen, Saxe-Gotha (Coburg had merged with Bavaria), Reuss (formed on Apr. 4, 1919, of the two Republics of Reuss). Total area, 4669 square miles; population in 1925, 1,607,339. Principal towns with their 1925 populations: Weimar, the capital, 45,957; Gera, 81,402; Gotha, 45,780; Jena, 52,649. The German Reich, on Apr. 30, 1920, recognized the union as being consonant with the provisions of Article 18 of the new German constitution of 1919. Elections to the first Diet of Thuringia were held in June, 1920, and this body, on Mar. 11, 1921, adopted the constitution which a Volksrat, or People's Council, made up of representatives of the old legislatures, had drawn up. Like the other states of the Reich, Thuringia has a single-chamber Diet elected by proportional representation. The executive power is vested in a ministry elected by the Diet and made up (1929) of five ministers with portfolio and three councilors of state (without portfolio). There is no president. Legislative power is in part delegated and in part directly applied, for the lectorate may exercise the initiative and referendum. In 1927 there were produced 130,363 tons of wheat, 108,245 tons of rye, 160,338 tons of oats, and 988,433 tons of potatoes. In the same year, nine plants produced 3,470,020 tons of potash. In 1928 there were 182,536 elementary school pupils, 23,211 pupils in private schools, and 76,081 pupils in continuation schools. The ordinary budget for 1928 provided for revenues and expenditures of 129,601,900 marks. See GERMANY.

THUR'STON, E(RNEST) TEMPLE (1879–). An English novelist, born at Halesworth. At the age of 16, he published two volumes of verse, and his first novel, *The Apple of Eden*, was published in 1905. His writings include *Traffic* (1906); *The Realist* (1907); *Sally Bishop* (1908); *The City of Beautiful Nonsense* (1909); *The Greatest Wish in the World* (1910); *The Garden of Resurrection* (1911); *The Antagonists* (1912); *Richard Furlong* (1913); *The Passionate Crime* (1915); *The Five-Barred Gate* (1916); *Enchantment* (1917); *The World of Wonderful Reality* (1920); *The Green Bough* (1921); *The Eye of the Wift* (1922); *May Eve* (1924); *Mr. Bottleby Does Something* (1925); *The Rosetti* (1926); *Come and Listen* (1927), and *Portrait of a Spy* (1928). His plays include: *The Greatest Wish* (1912); *Driven* (1914); *The Cost* (1914); *The Wandering Jew* (1920); *A Roof and Four Walls* (1923); *Judas Iscariot* (1923), and *The Blue Peter* (1924).

TIBET, tĭ-bĕt'. A Chinese outer territory, with an area of 463,200 square miles, and a population estimated at from 2,000,000, to 6,000,000. Lhasa, the capital, had from 15,000 to 20,000 inhabitants in 1929. Agriculture is carried on, but only to a slight extent because of the difficult topography. Pastoral pursuits are more common. Communications, by means of caravan, are maintained with China and India, an active barter in tea, silks, cotton goods, carpets, leathers, dried fruits and household utensils for the native wool, fox skins, musk, salt, and borax, being prosecuted. The British penetration, actuated by a desire to establish relations between India and Tibet and to reach southern China, continues. The political situation remains anomalous. The Chinese government's refusal to accept the terms of the Simla agreement of 1914 which provided for an autonomous Outer Tibet and an Inner Tibet ruled from Peking, and the continued demands of Tibetans for independence, brought about a state of suspicion and hostility which broke out into open war in 1917. Tibetans marched on Chamdo, claimed for both Outer and Inner Tibet, and took it in 1918. An armistice followed, and in the next year the Chinese displayed their desire for peace by proposing a renewal of treaty discussions; but the Chinese government showed its weakness by its inability to put down native uprisings in Inner Tibet, while Great Britain's interest in safeguarding the Indian frontier complicated matters. It is evident that Outer Tibet has practically become a dependency of Great Britain. The Dalai Lama remains at the head of the native government.

TICK ERADICATION. See VETERINARY MEDICINE.

TIDAL THEORY. See ASTRONOMY.

TIETZE, HANS (1880–). An Austrian professor and art historian, who was born at Prague and educated at the University of Vienna.

After teaching art in various capacities at the University of Vienna, he was from 1919 to 1925 head of the museum department of the Austrian Board of Education. He wrote *Methode der Kunstgeschichte* (1913); *Albrecht Altdorfer* (1923); *Vienna,* as a centre of art (1918, 1923, 1927); *Der junge Dürer* (1928).

TIFFANY, Louis Comfort (1848–). An American artist (see Vol. XXII). He established the Louis Comfort Tiffany Foundation for art students at Oyster Bay in 1918 and gave it a $1,000,000 fund, the income from which was to be used for maintenance and operation. The Foundation consisted of his country home, the Museum, Tiffany Chapel, and over 60 acres of land, and he deeded to it his entire collection of paintings, glass, and other art objects. He was awarded gold medals at the Panama-Pacific Exposition in 1915 and the Philadelphia Sesquicentennial in 1926.

TIGERT, John James (1882–). An American educationist. He was born at Nashville, Tenn. (a son of Bishop John James Tigert of the Methodist Episcopal Church, South), and received the degree of B.A. from Oxford University, Eng., as the first Rhodes Scholar from Tennessee (1907). After serving as professor of philosophy at Central College, Mo., he became president of Kentucky Wesleyan College at Winchester (1909–11). He then held professorships of philosophy and psychology at the University of Kentucky (1911–21). From 1921 to 1928, he was U. S. Commissioner of Education. Since July, 1928, he has been president of the University of Florida. During the World War, he went to France with the Y. M. C. A., was with the Army Educational Corps, A. E. F., and was extension lecturer at the University of Beaune. He is the author of *Philosophy of the World War*; *The Child—His Nature and Needs*; and the *Book of Rural Life.*

TILDEN, William T., II, (1893–). An American tennis player, born at Philadelphia, Pa. He won the national singles championship of the United States from William M. Johnston in 1920 and retained the title five years. He was a member of the American Davis Cup team (since 1920). He wrote *Art of Lawn Tennis* (1920); *Singles and Doubles* (1923); *Common Sense of Tennis* (1924); *Match Play* and *The Spin of the Ball* (1925); also *The Phantom Drive, and other Tennis Stories* (1924); and a play, *They All Want Something,* produced in 1926.

TILNEY, Frederick (1875–). An American neurologist, born in Brooklyn and educated at Yale University and the Long Island College Hospital. In 1903 he settled in New York City and was appointed visiting neurologist to Roosevelt and Bellevue hospitals. He became full professor of neurology at Columbia University in 1914. In addition to numerous contributions on neurological subjects to periodical literature, he wrote: *A Study of the Hypophysis Cerebri* (1911); *Morphology and Evolutionary Significance of the Pituitary Body,* with L. F. Warren (1919); *Epidemic Encephalitis,* with H. S. Howe (1920); *The Form and Functions of the Central Nervous System,* with H. A. Riley (1920, 1923); *The Brain From Ape to Man* (2 vols., 1928).

TILSON, John Quillin (1866–). An American lawyer and Congressman. He was born at Clear Branch, Tenn., and graduated from Yale (B.A., 1891; LL.B., 1893). He engaged in the practice of law at New Haven, Conn., in 1898. In the Spanish-American War, he was a second lieutenant in the 6th U. S. Volunteer Infantry and in 1916 served as lieutenant colonel in the 2d Connecticut Infantry on the Mexican border. For two terms (1905–08), he represented New Haven in the Connecticut House as a Republican, being Speaker of that body in 1907. He was elected to the Sixty-first and Sixty-second Congresses as Representative-at-Large from Connecticut and represented the Third Congressional District in the Sixty-fourth to Seventy-first Congresses, inclusive. Since 1925 he has been majority leader of the House.

TIMBER. See Forestry.

TIMMERMANS, Felix (1886–). A Belgian art critic, novelist, and dramatist. A member of the Academy of the Flemish Language, he was one of the leaders of the modern school. His works, which are in Flemish, include the novels *Pallieter, Anna-Marie, Het Kindeken Jesus in Blaanderen;* the play, *En waar de ster bleef stille staan;* and a critical work, *Breughel.* With Edouard Veterman, he wrote the plays *Mijnheer Pirroen* (1924), and *Leontientje* (1926).

TIN. Though the United States consumes considerably more tin than the rest of the world together, it must depend entirely on foreign sources of supply. In 1914 the world production of tin amounted to 116,569 long tons, of which more than one-half came from the Straits Settlements and the Malay Peninsula. The world output of tin decreased from 1917 to 1921, when but 113,462 long tons were produced. Since 1921, however, the tendency of production has been steadily upward. In 1927 world output totaled 156,208 long tons, while preliminary estimates for 1928 place the output at 175,000. Since early in 1927, prices have steadily declined, and it would appear that production was consistently in excess of consumption during the greater part of 1927 and 1928. A powerful financial group was formed in London, early in 1928, for the purpose of stabilizing the tin market. This organization is credited with having taken tremendous tonnages of tin from the open market in order to support a declining market. The ultimate result of this effort was still in doubt early in 1929.

The leading tin-producing countries are the Federated Malay States, Bolivia, Dutch East Indies, Nigeria, and Siam. Features of production trends in recent years include the rapid rise of Bolivia as an important producer. Since 1917 the tin-mining industry of Cornwall, England, has become virtually extinct, following many years of activity. An increasing proportion of the production from the Federated Malay States is from dredging operations which permit low-cost production and this factor has undoubtedly been of great importance in the lowering of price quotations that took place subsequent to 1926. Arrangements were made in 1927 between the Billiton Maatschappij and the chief British interests operating in the Tanganyika-Uganda tin field in central Africa for an extensive programme of prospecting work in this section. Production from this source had increased to 1200 long tons in 1927.

A feature of the tin market in 1928 was the establishment of a National Metal Exchange in New York, modeled after the London Metal Exchange, for the express purpose of trading in tin futures, and to provide "hedging" facilities for tin consumers and traders.

TINAYRE, tē'nār' (MARGUERITE SUZANNE) MARCELLE (*née* CHASTEAU) (1877–). A French novelist (see VOL. XXII), many of whose books were translated into English. Her later works include *La veillée des armes. Le départ, 1914* (1915); *L'Ombre de l'amour* (1916); *Perséphone* (1920); *Les lampes voilées* (1920); *Le bouclier d'Alexandre* (1922); *Priscille Séverac* (1922); *La vie amoureuse de Madame de Pompadour* (1924); *Figures dans la nuit*, short stories (1926); *Une provinciale en 1850* (1927); *Il y a cent ans* (1927); and *Terres étrangères* (1928).

TIRES. See MOTOR VEHICLES; RUBBER.

TIROL. See TYROL.

TITCHENER, EDWARD BRADFORD (1867–1927). An American psychologist (see VOL. XXII). On the twenty-fifth anniversary of his association with the Cornell University laboratory, he was honored with a volume of commemorative *Essays* (1917) written by his former pupils. In 1924 he published *Systematic Psychology*, which incorporated the experimental findings of the Cornell laboratory on perception, movement, and the integration of sensational attributes. Besides scientific papers, the only other work published by Titchener after 1914 was *A Beginner's Psychology* (1915).

TITO, PITTORE ETTORE (1860–). An Italian painter, born at Castellamare di Statia. He studied at the Venice Art Academy, under Favetto, and in France, England, and Germany before becoming a professor in the Instituto Belle Arti at Venice. He became widely known for his pictures of Venetian subjects, winning gold medals at exhibitions in Monaco, Bavaria, Vienna, Rome, and Venice. His works are represented in museums in Rome, Venice, Trieste, Budapest, and other cities.

TITTONI, tēt-tō'nē, TOMMASO (1855–). An Italian statesman and diplomat (see VOL. XXII). At the outbreak of the World War, when he was Ambassador to France, he was in favor of Italian neutrality. After Italy's entry into the War, he resigned from the ambassadorship and became Minister of State in 1916. Premier Nitti gave him the post of Foreign Minister in 1919 and that of first delegate to the Peace Conference, but he was obliged to resign in November because of ill health. He was president of the Senate in 1920, and was appointed delegate to the Council and Assembly of the League of Nations, but his health did not permit him to act. In 1921 he became a member of the Royal Academy of Lincei. His later publications include: *Who Was Responsible for the War?* (1918); *Conflitti politici e riforme Costituzionali* (1919); *Per la guerra e per la pace* (1919); *Modern Italy*, published by the Williamstown Institute of Politics (1922); *Discorsi e scritti* (1924); *International Economic and Political Problems of the Day and Some Aspects of Fascism*, edited by Baron di San Severino from Tittoni's writings and addresses (1926); and *Questioni del Giorno* (1928). He was a chairman of a committee which edited *La Nuova Antologia*, an independent monthly review.

TITULESCO, NICOLAS (1883–). A Rumanian diplomat and professor of law, who was born at Craiova, Rumania, and educated there in the College King Carol 1 and the Faculté de Droit, Paris. He was twice laureate of Paris University and in 1905 became professor of civil rights at the University of Jassy, transferring to the University of Bucharest in 1909. Elected to Parliament in 1912, he became Minister of Finance in 1917, was a delegate to the Paris Peace Conference, and was one of the signers of the Treaty of Trianon. He was again Finance Minister during 1920–22, introducing the income tax and other sweeping changes in taxation. He then served as Ambassador to the Court of St. James (1922–26) and as Minister for Foreign Affairs (1927–29). In the latter year, he was reappointed to the London Embassy. He wrote *La théorie des droits éventuels; La Distribution du Patrimone; L'Impôt sur le Revenu; L'Impôt sur le Capital*, and other treatises on law and finance.

TOBIN, RICHARD MONTGOMERY (1866–). An American banker and diplomat, who was born at San Francisco, Calif., and studied at St. Ignatius College. He was engaged in banking at San Francisco after 1889, being at one time president of the Association of Savings Banks. In the World War, he served at Paris as representative of the U. S. Cable Censorship and in October, 1918, was assigned to additional duty as assistant to the naval attache at the American Embassy. Later, he was attached to the American Commission to Negotiate Peace. Since 1923 he has been Minister to the Netherlands.

TODD, ARTHUR JAMES (1878–). An American sociologist, born at Petaluma, Calif., and educated at the University of California and Yale University and in Paris and Munich. He was connected with settlement and probation work in San Francisco for several years and in 1911 became instructor in sociology at the University of Illinois. In 1914–15 he was professor and head of the department of the University of Pittsburgh, and from 1915 to 1921, professor of sociology and director of the training course for social and civic work at the University of Minnesota. In 1919–21 Professor Todd was also visiting professor of sociology at Northwestern University and in 1921 he accepted a permanent professorship there. He was associate editor of the *Journal* of the American Institute of Criminal Law and Criminology and wrote: *The Primitive Family as an Educational Agency* (1913); *Theories of Social Progress* (1918); *The Scientific Spirit and Social Work* (1919); *Three Wise Men of the East* (1927).

TODD, HENRY DAVIS, JR. (1866–). An American army officer, born at Claverack, N. Y., and graduated at the United States Military Academy in 1890. He entered the artillery division of the Army and was promoted through the grades until he reached the rank of lieutenant colonel of artillery in 1913. He commanded the 33d Division from September 18 to Dec. 7, 1917, the artillery supporting the 1st Division in the St. Mihiel offensive, and the 58th Field Artillery Brigade at the Meuse-Argonne Battle. He was with the 33d Division in Luxemburg as part of the Army of Occupation. In August, 1919, on the demobilization of the 33d Division, he entered the General Staff College in Washington. He was made brigadier general in the Regular Army in 1920 and was assigned to command the coast defenses of Manila Bay on June 3, 1921, and the Hawaiian Separate Coast Artillery Brigade in 1926. In 1927 he was promoted to Major general.

TOGOLAND, tō'gō-lănd. Formerly a German protectorate on the coast of West Africa, between the Gold Coast and Dahomey but, since 1919 partitioned between Great Britain and France as mandate territories. It has an area of 33,700 square miles, of which 21,893 square miles are in the French and the remainder in the British mandated territories, and a population in 1929 estimated at 747,000 natives and 448 Europeans. Lome is the chief port. Products for export are palm kernels and oil, rubber, ivory, and copra, though cotton, coffee, tobacco, and cacao were becoming important. Exports for 1913 were 9,138,000 marks (£456,000) and imports 10,631,000 marks (£531,000). In 1927 imports for French Togoland amounted to 100,715,688 francs and exports to 82,242,713 francs. For 1913–14 the budget balanced at 4,057,136 marks and the colony was self-supporting. The local budget for French Togoland balanced at 33,478,000 francs in 1927. There was also a railway budget of 10,200,000 francs and a public health budget of 6,200,000 francs. The British section was administered from the Gold Coast. Railways totaled 204 miles. In 1913 a cable line linked Germany with Togoland, and a wireless station at Kamina was in direct communication with Berlin. German local officials attempted to keep the territory neutral during the World War, but the offer was refused and local British and French troops invaded the country. Opposition was slight with the result that the colony was completely occupied in August, 1914. Mandates were granted Great Britain and France by the Supreme Council in May, 1919; in July, 1919, the country was partitioned by both interested parties provisionally, and in September, 1920, permanently. France received the port of Lome and the entire seacoast of 32 miles.

TOLEDO. The third city of Ohio. The population increased from 168,497 in 1910 to 243,164 in 1920 and to 313,200 in 1928, by estimate of the U. S. Bureau of the Census. Toledo's 812 manufacturing concerns are so diversified that the city's great industrial development since 1914 can be attributed to no special group. Toledo is, however, the centre of the metal-wheel industry and ranks first in the production of gloves, mittens, and spark plugs, and third in the production of automobiles and canvas goods. In 1927, according to the U. S. Census of Manufactures, 38,727 persons were employed by 562 industrial establishments and received $57,049,356 in wages; the value of products manufactured was $360,114,996. In 1928, 38 new industries located in Toledo, representing an initial investment of $7,640,000, and 82 existing concerns enlarged their plants at a cost of $11,050,000.

The port of Toledo is the largest coal-shipping port in the United States, its cargo having increased from 7,095,593 tons in 1922 to 126,348,605 tons in 1927. The total foreign commerce of the port in 1927 amounted to 2,047,585 tons. In 1929 construction was begun on a new terminal for the Hocking Valley Railroad at Presque Isle, where the Maumee River joins Maumee Bay. More than $6,000,000 was authorized for the construction of four slips for freighters, a concrete dock 14,000 feet long and 200 feet wide, coal-loading and ore-unloading machinery, a grain elevator, a warehouse, and many miles of railroad track.

In 1924 the Summit Street extension, to link the South Side and the business section by a direct route, was completed, and the sewer system was increased by 41 miles to provide intersecting sewers and a pumping station. In 1927 a $1,034,000 street-paving programme was inaugurated, and the following year a transcontinental airport was established on a 515-acre tract 7 miles south of the business section. Building construction has been active since 1924. Among the important buildings erected are the Stephens and the Commodore Perry hotels, Toledo-Paramount Theatre, Toledo Blade Building, Security, Savings Bank & Trust Co. Building, Toledo Hospital, and Masonic Temple. In 1925 the first unit of Toledo's Civic Centre, the new Safety Building, was erected at a cost of approximately $1,000,000. In 1928 the city completed the erection of the Erie Street Market Building for use as an exhibition hall during the winter months and as a produce market in the summer. Through a bequest of $3,000,000 from Edward Drummond Libbey, the Toledo Art Museum was enlarged and a school of music and a school of design erected.

At the election in November, 1928, bond issues amounting to $11,800,000 were approved. Of this total, $5,000,000 was for new schools, $3,000,000 for a new high-level suspension bridge over the Maumee River, $2,850,000 for a new and enlarged municipal university, and $950,000 for a new county infirmary. In June, 1929, the United States Supreme Court reversed the judgment of the United States Circuit Court of Appeals and handed down a decision permitting the elimination of the Miami & Erie Canal between Toledo and Grand Rapids, thus ending some 10 years of litigation. This decision has made it possible for the city to develop over the canal's right-of-way a boulevard leading directly to the business section, to construct a new union station for the 24 railroads that centre in Toledo, and to develop a new large residential section at Maumee. The public-school system has expanded greatly since 1914, more than $6,500,000 being spent on the construction of new buildings. The school enrollment in 1928 was 61,500. Bank clearings in 1928 amounted to $1,103,780,000. The assessed valuation of property in the city in 1927 was $584,523,000; the net debt was $32,966,000.

TOLEDO, UNIVERSITY OF THE CITY OF. A municipal institution at Toledo, Ohio, founded in 1872. The student enrollment increased from 1147 in 1918 to 2034 in 1928, the faculty from 30 to 84 members, and the library from 4558 to 21,000 volumes. The annual income rose from $145,000 to $250,470. A new science building was completed in 1921 and a department of elementary teachers' training was established in 1922. In 1928 the city voted a bond issue of $2,850,000, of which $2,000,000 is for buildings, $350,000 for site and $500,000 for equipment, all to be available in the fall of 1930. President, Henry John Doermann.

TOLL BRIDGES. See BRIDGES.

TOLLER, ERNST (1893–). A German dramatist, born at Samitschin. He attended college at Bromberg, studied at the universities of Heidelberg, Munich, and Grenoble, and entered politics in 1918. He was second chairman of the council of workingmen, soldiers, and peasants during the revolution in Munich (1919) and for his participation was condemned to five years' imprisonment in the fortress of Niederschönfeld. There he wrote the plays which have profoundly stirred audiences in Germany: *Wandlung* (1919); *Masse Mensch* (1921); *Die Ludditen* (1921); and *Der Deutsche Hinkemann* (1922). His later plays *Der entfesselte Wotan* (1923), and *Hopla, wir leben* (1927) have not had the same success. He also has written some verse, *Das Schwalbenbuch* (1923), and the autobiographical volume, *Justiz*.

TOLMAN, Richard Chace (1881–). An American chemist, born at West Newton, Mass., and educated at the Massachusetts Institute of Technology, where he was a Dalton fellow. He also studied at Berlin and Crefeld. He taught at the Massachusetts Institute of Technology, Cincinnati University, the University of California, and the University of Illinois. . During the World War, he was made chief of the dispersoid section of the Chemical Warfare Service with the rank of major and in 1919 was made associate director of the fixed nitrogen research laboratory of the Ordnance Bureau of the United States Army, of which he became director in 1920. Since 1922 he has been professor of physical chemistry and mathematical physics at the California Institute of Technology. He is a member of the National Academy of Sciences. His early investigations had to do with colloids, ionization, and similar subjects in physical chemistry. He later investigated the behavior of smokes and reactions of nitrogen compounds. In addition to various minor publications, he is the author of *Investigations on the Relativity of Motion* (1917) and *Statistical Mechanics with Application to Physics and Chemistry* (1927).

TOMLINSON, H. M. (1873–). A British journalist, essayist, and travel writer. He became a member of the editorial staff of the *Morning Leader* in 1904, was a war correspondent in Belgium and France (1914–15), and official correspondent at the G.H.Q. of the British Armies in France (1915–17), and literary editor of the *Nation* and the *Athenæum* (1917–23). He traveled a great deal, and his first book, *The Sea and the Jungle* (1912), was an account of his trip up the Amazon. As he developed, his prose became almost rhythmic and his descriptive powers were particularly successful in evoking atmosphere. He wrote: *Old Junk*, essays (1919); *London River*, reminiscences of its ships (1921); *Waiting for Daylight*, essays (1922); *Tidemarks*, about his visit to Malaya (1924); *Under the Red Ensign* (1926); *Gifts of Fortune* (1926); *Gallion's Reach*, his first novel (1927); *Essay on Hardy* (1928); and *Illusion: 1915* (1928).

TOMMASINI, Vicenzo (1880–). An Italian composer, born in Rome. He studied there under Pinelli (violin) and Falchi (composition) and later under Max Bruch in Berlin. He is one of the few living impressionists who have not yet crossed the border line into futurism. He wrote the operas, *Medea* (Trieste, 1906), *Amore di Terra Lontana* (not produced), and *Uguale Fortuna* (Rome, 1913); a ballet on themes of Scarlatti, *Le Donne di Buon Umore* (Rome, 1917); the symphonic poems, *Poema Erotico, Il Beato Regno*, and *Paesaggi Toscani;* a prelude to *L'Hymne à la Beauté;* a suite and *Chiaro di Luna*, for orchestra; two string quartets and a violin sonata; choruses a capella; songs; and piano pieces.

TOMSKY, Mikhail Pavlovich (1880–). A Russian Communist leader and public official. He joined the revolutionary movement in Russia in 1905, was arrested and banished to Siberia in 1906, and after repeated escapes, arrests, and banishments, was freed from Siberia in April, 1917. Under the Soviet régime, he served first as editor of *The Metallist* and *Trade Union Messenger*, later becoming chairman of the Trade Union Congress, a member of the Presidium of the Central Executive Committees of the United Soviet Socialist Republics and the Communist Party, and a member of the Political Bureau. As one of the most powerful members of the Soviet leaders, he came into conflict with Stalin in 1928 over the latter's five-year plan for the industrialization of Russia and was removed from his position as chairman of the Trade Union Congress in June, 1929.

TÖNDER. See Schleswig.

TONGO, or Friendly Islands. See Pacific Ocean Islands.

TÕNISSON, Jaan (1868–). A President and Prime Minister of Estonia. He was educated at Tartu University and previous to the World War was a member of the first Russian Duma. A leader in the Estonian agitation for independence, he was president of a delegation which sought to enlist the sympathies of Western European nations on behalf of his country during 1917–18. In 1919–20 he was a member of the Constitutional Assembly and since the latter year has been a member of the Diet, of which he was president in 1923–25. In 1928 he was President and Prime Minister of the Republic. He was owner and editor of *Postimees*, the oldest journal in the country.

TONKING. See French Indo-China.

TORNADOES. See Meteorology.

TORONTO. The capital of the Province of Ontario and in size, the second city of Canada. The population in 1928 was estimated to be 569,899. The area is 35 square miles. The government of the city is vested in a municipal council, consisting of the mayor and four members forming the Board of Control (all five being elected annually by the citizens at large) and 24 alderman (three being elected annually from each of the eight wards into which the city is divided). The council as a whole is the legislative body of the municipality and carries on its work through standing committees. The Board of Control is the executive body and is responsible for the preparation of the annual estimates and the supervision of matters relating to finance, the appointment of officials, the carrying on of public works authorized by the council, and the general administration of the affairs of the city. The department of education is under the control of a board of education elected by the citizens, and the department of police is under a board of police commissioners consisting of the mayor and two judges of the county court.

The Toronto Harbor Commission, which was authorized by the Act of 1911, consists of five commissioners, three of whom are appointed by the City Council and two by the Dominion Government. The improvements which the commission inaugurated in 1913 at an estimated cost of $19,000,000 consist of the reclamation of Ashbridge's Bay, a marsh tract of 1000 acres renamed the Eastern Harbor Terminals; the construction of a ship channel, turning basin, and circulating channel, marginal way wall, and retaining walls on each side of Keating's Channel; the construction of a new harbor head line from York to Yonge streets and the reclamation of the area enclosed by it; the deepening of the whole harbor to a navigable depth of 24 feet with provision for an ultimate depth of 30 feet; and the construction of outside breakwaters and the reclamation of 900 acres of land for park and recreational purposes at the east and west ends of the city and on Toronto Island. By 1929, 1094 acres had been reclaimed; the Boulevard Drive, 50 feet wide, had been completed a distance of approximately four miles; and the Traffic Highway on which the Toronto Transportation Company was operating cars had taken the place of the old Lake Shore Road. Sunnyside Beach, a recreation centre, was opened in June, 1922.

The Canadian National Exhibition, which has been held annually in Toronto since 1878, enlarged its scope during the past few years through the erection of various new buildings. Among these were the Pure Food, the International, the Province of Ontario, the Engineering and Electrical buildings, the Coliseum, and a $1,400,000 live-stock exchange. One of the major features of the 1927 exhibition was the new eastern entrance which was opened by the Prince of Wales and Prince George and was named the Princes' Gates. A record attendance of 2,000,000 persons was reached in 1928. In 1926 an eight-story warehouse with 1,000,000 square feet of floor space was erected in the harbor district at a cost of $6,000,000, and in 1929 the Canadian Bank of Commerce erected a 30-story structure, the tallest in Toronto, at a cost of approximately $5,000,000. The latter building was expected to be the first step in a centralization of financial houses within a definite downtown area.

In 1928 Toronto had 106 public schools with an attendance of 92,707 and 17 separate schools with an attendance of 12,435. The value of all public school properties was $27,213,394 and of separate school properties, $3,167,267. Imports into the harbor of Toronto in 1927 were valued at $242,213,317 and exports at $1,522,000. In 1926, 86,439 persons were employed in 2013 industrial establishments and received $107,734,568 in wages; the value of products manufactured was $489,522,114. In 1928, 9208 building permits were issued representing a value of $51,607,188. The assessed valuation of property in 1928 was $967,371.437; the net debt was $147,476,966.

TORONTO, University of. An institution of higher learning founded in 1827 at Toronto, Ontario, Canada, consisting of seven faculties with four arts colleges, supported by the provincial government. The student enrollment in 1914 was 4000, compared with 5961 in the autumn of 1928. The faculty was increased during the same period from 453 to 659 members and the library from 138,658 bound volumes and 46,648 pamphlets to 220.349 bound volumes and 76,876 pamphlets. Total expenditures in 1927–28 for salaries and maintenance was $2,396,212. The Rockefeller Foundation after 1921 made numerous gifts for the development of the faculty of medicine and in 1928 from this source was received a grant of $250,000 for the school of hygiene. Trinity College and a forestry building were opened in 1925. A faculty of dentistry was established in the same year by taking over the school of dentistry of the Royal College of Dental Surgeons. A hygiene and public health building was completed in 1927, as were an addition to the Press building and a hockey and skating arena. President, Sir Robert A. Falconer, K.C.M.G., M.A. LL.D., D.C.L., D.D., Litt.D.

TORPEDO BOAT. See Vessel, Naval.

TORTS. See Law, Progress of the.

TOSCANINI, tôs′kȧ-nē′nė, Arturo (1867–). An Italian conductor (see Vol. XXII). During the World War, he gave his services freely, conducting innumerable concerts throughout Italy for the benefit of various war activities. In 1918 he gave in Milan a series of 12 symphony concerts, the entire proceeds of which he distributed among Italian musicians who had been reduced to want by the War. In this connection, an incident should not go unrecorded that showed his uncompromising attitude and the moral strength of his artistic convictions. When at one of the earlier concerts hisses were heard at the beginning of an excerpt from Wagner, he immediately stopped the orchestra, faced the audience and, without uttering a word, compelled instant silence. After La Scala, in Milan, had been rebuilt and enlarged, he was made sole artistic director in 1921. Even during his first connection with La Scala as principal conductor (1898–1908), the performances there were on a higher level than those of any other opera house in Italy; but now, as absolute dictator, dominating the entire personnel from the proudest soloist to the humblest stage-mechanic and giving his personal attention to the minutest details, he secured a perfection of ensemble that made La Scala the première operatic institution of the world. Among the recent world-premières given there, two stand forth as musical events of international importance, the production of Boito's *Nerone* (May 1, 1924) and Puccini's *Turandot* (Apr. 25, 1926). During the spring of 1929, he took the entire La Scala company on a tour to Vienna and Berlin, arousing unbounded enthusiasm in both cities. He announced unexpectedly after the final Berlin performance (*Aïda*, May 29) that on that occasion he had made his farewell appearance as an operatic conductor, as he had severed his connection with La Scala in order to devote his entire time to concerts. At the same time, however, he accepted the invitation of Siegfried Wagner to conduct the performances of *Tristan und Isolde* at Bayreuth during the festival of 1930. It was the first time that this honor was conferred upon a foreign conductor.

Supreme as Toscanini stands as an operatic conductor, he is equally great as a symphonic conductor. In fact, all his life he has been active in both fields. His first appearance in concert in the United States occurred during his engagement at the Metropolitan Opera House on Apr. 13, 1913, when he produced Beethoven's *Ninth Symphony*. In 1921 he made a concert tour of this country with his entire La Scala Orchestra. Then he came for four consecutive seasons as guest-conductor of the New York Philharmonic Society (1926–29). For the season 1929–30, he was engaged as one of the three permanent conductors, the others being Mengelberg and Molinari. Consult *Arturo Toscanini*, by T. Nicotra (translated by I. Brandeis and H. Kahn, New York, 1929).

TOTEMISM. See Anthropology; Ethnology.

TOUT, Thomas Frederick (1855–1929). A British historian (see Vol. XXII). Until 1925 he was professor of history at Manchester. In 1923 he was president of the International Historical Congress at Brussels and in 1925, president of the Royal Historical Society. He lectured at Cornell University in 1927–28. He is the author of *Administrative History of Medieval England* (1920, 1928, 1929) and *France and England: Their Relations in the Middle Age and Now* (1922).

TOVEY, Donald Francis (1875–). An English composer, born at Eton. He was a private pupil of S. Weisse (piano), Sir W. Parratt (counterpoint), and J. Higgs (composition). From 1906 to 1912, he gave several of his own works at chamber-music concerts (the

Chelsea Concerts) in London. In 1914 he was appointed Reid professor of music at the University of Edinburgh, where, in 1917, he established the Reid Symphony Concerts. In 1925–26 he made a very successful tour of the United States as pianist. As a composer, he shows decided preference for chamber music, in which field he produced a piano quintet, a piano quartet, a 'cello sonata, clarinet sonata, two string quartets, and three trios. He also wrote a symphony; a suite for string orchestra; a piano concerto; incidental music to Maeterlinck's *Aglavaine et Sélysette;* church music; and piano pieces. An opera, *The Bride of Dionysus*, although published, has not yet been produced (1929).

TOWNER, Horace Mann (1855–). A Governor of Porto Rico, born at Belvidere, Ill., and educated at the University of Chicago. He was admitted to the bar in 1877 and after practicing law for some years became judge in the third judicial district of Iowa. From 1911 to 1923, he served continuously in Congress, and although he was elected for another term in 1923, he resigned to accept the post of Governor of Porto Rico, for which his service as chairman of the Congressional Committee on Insular Affairs had especially prepared him. He resigned in 1929.

TOWN PLANNING. See City Planning.

TOWNSHEND, toun'zend, Sir Charles (Vere Ferrers) (1861–1924). A British soldier (see Vol. XXII). He was promoted to the rank of major general in 1911 and during the World War commanded the 6th Division in Mesopotamia, which withstood the Turkish siege of Kut-el-Amara for nearly five months (1916). He became a Turkish prisoner, although later freed, and was knighted in that year. In 1920, after 40 years of service, he resigned from the army and entered Parliament as an Independent. He wrote the *Life of Field Marshal First Marquis Townshend* and *My Mesopotamia Campaign* (1920).

TOYNBEE, Arnold Joseph (1889–). A British historian who was educated at Winchester and Balliol College, Oxford, where he was a tutor (1912–15). During the World War, he was in the Political Intelligence Department of the Foreign Office. He was a member of the British delegation to the Peace Conference (1919), Koraes professor of Byzantine and modern Greek languages, literature, and history at the University of London (1919–24), and in 1925 he became director of studies in the Royal Institute of International Affairs, and professor of international history in the University of London. In 1925 the first volume (1920–23) of his yearly *Survey of International Affairs* appeared. His writings include *Nationality and the War* (1915); *Chapters on Greece in the Balkans: A History* (1916); *The Western Question in Greece and Turkey* (1922); *Greek Historical Thought* (1924); *The World after the Peace Conference* (1925); and *Turkey* (with K. P. Kirkwood) (1926).

TOYNBEE, Paget (1855–). An English scholar (see Vol. XXII), especially known for his studies of Dante. He was honored by many degrees, and membership in the British and other European academies. His later works include *Supplement to Mrs. Toynbee's Edition of the Letters of Horace Walpole* (3 vols., 1919–1926); *The Letters of Dante*, amended text and translation (1920); *Britain's Tribute to Dante in Literature and Art* (1921); *Dante Studies* (1921); *Horace Walpole's Journal of the Printing Office at Strawberry Hill* (1923); *Horace Walpole's Reminiscences* (1924); *Strawberry Hill Accounts* (1927); *Horace Walpole's Journal of Visits to Country Seats* (1928).

TRACKLESS TROLLEYS. See Motor Vehicles.

TRACTOR, Farm. The tractor is a mechanically propelled prime mover having as its source of self-contained power usually an internal-combustion engine and, in a few special types, a steam engine. The significance of the tractor in agriculture is its utility as a source of tractive energy for field and hauling operations and as a source of belt power for stationary mechanical farm operations. The earlier tractors were large, heavy, and powerful machines actuated by steam engines. They were used almost exclusively for heavy hauling, heavy drawbar work such as the pulling of very large gang plows in the breaking of virgin prairie lands on a large scale, and for heavy farm belt work, such as the operation of threshers and corn shellers, usually on custom work. Steam tractors are still used in agriculture occasionally for operations requiring higher and steadier power. They are used to a certain extent in Europe, for example, for the operation of cable-drawn and cultivating outfits adapted to swampy or other soil conditions which will not permit the operation of a heavy tractor in direct traction.

The internal-combustion-engine tractor is a more recent development and has now largely supplanted the steam tractor for use in agriculture. Kerosene also has largely supplanted gasoline as a fuel, thus materially reducing the cost of operation. Some types are started on gasoline and are switched to kerosene when warm, while other types operate wholly on kerosene. There are a number of types and sizes of internal-combustion-engine tractors, the total number of makes being approximately 50 in 1928 with each manufacturer producing from 1 to 3 models. In a broad general way, this variation corresponds to distinct types of agricultural service. For example, the small garden tractor weighing about 500 pounds, rated at 1.25-4 horse power, is adapted only to certain light garden operations and belt operations requiring a low maximum power. On the other hand, the extremely large tractor weighing in the neighborhood of 30,000 pounds rated at 70–120 horse power, is adapted only to the heaviest of drawbar and belt operations. A great variety of types and sizes of tractors exists between these two extremes. It would seem, therefore, that the variation is due much more to lack of standardization than to the variation in the requirements of agricultural processes.

As a rule, the general characteristics of a tractor for agricultural use are governed largely by the number and size of plows it can pull through average soil at an average depth and speed. While tractors are designed and built to run at speeds varying up to 15 miles or more per hour on actual drawbar work, a plowing speed of about 2½ miles per hour for tractors of 15 drawbar horse power or less is generally considered to be the most efficient speed under average conditions. Small plats usually require only a small garden tractor of 1.25-4 horse power which will pull a 12-inch plow. Truck farming will require a tractor capable of pulling one 14-inch plow. Farms up to 160 acres in size require a tractor capable of pulling at least two plows, while farms of 300 acres or more will require a tractor capable of pulling three or more plows. As a very general average, and depending upon the soil, about eight drawbar horse power is required to pull two 12-inch plows, 10 horse power for two 14-inch plows, 15 to 20 horse power for three to five 14-inch plows, 22 to 30 horse power for five or six 14-inch plows, and 30 to 45 horse power for from six to twelve 14-inch plows.

The propulsion requirements in drawbar work govern the characteristics of the driving mechanism and ground-gripping devices of tractors. Tractors divide, broadly, into wheel and crawler or self-tracklaying types. In the wheel-type tractor, propulsion results from the action of two large drive wheels equipped with ground-gripping lugs and actuated by means of the engine through the medium of gears, clutches, and shafts. In order to secure the greatest traction, it has been found necessary to use certain shapes, sizes, and arrangements of lugs for individual soils or soil conditions. The manner in which the lug presents or transmits the tractive impulse to the soil appears to be a vital factor in the efficiency of the tractor. Apparently the greatest factor in the transmission of tractive force from any lug depends upon the tractor drive wheel taking the fullest advantage of the arching action of the soil, so that with a given width of drive-wheel rim the traction increases to a maximum as the weight carried by the wheel increases up to a certain limiting point.

The highest efficiency is produced with a weight on the wheel just sufficient to force the lug into the soil, and the traction increases with the width of wheel rim under these circumstances. For example, solid angle-iron lugs are best in loose soils having slight arch action, but spade lugs are superior to angle lugs in loose sand with a heavy weight on the wheels. Sharp spade lugs also are better in soil having an appreciable arch action under the wheel rim. The majority of wheel tractors are steered with ordinary steering gear attached to two wheels independent of the drive wheels, although in some special types steering is done with the drive wheels. The majority of tractors are of the wheel type on most farms of average size.

Considerable experience and care are necessary in the operation of wheel tractors, especially when drawing cultivating machinery, since the sudden and severe resistances occuring in cultivation emphasize the rotating tendency of the tractor around its drive-wheel axles and frequently result in accidents and damage. Special types of hitches and release springs have been developed to prevent accidents and breakage of implements and tractor by releasing the tractor or cushioning the shock when obstructions are encountered. Tractor construction also has become better balanced, to conform to the severe requirements of drawing tillage machinery, and the alignment of hitches improved so as to reduce to a minimum the tendency for accidents and breakage to occur.

The crawler or tracklaying tractor is adapted especially for conditions where drawbar work is very heavy or where soil and topographic conditions will not permit the operation of a wheel tractor. Such a tractor consists of an engine and frame mounted on and propelled by a combination of large-geared wheels and very broad, heavy endless chains. These chains are wide and large enough so that the weight of the tractor is distributed over quite a broad area, resulting in a very low unit pressure on the soil, thus permitting operation with ease over soil in which a wheel tractor would sink, or over ditches or rough topography, and with a maximum propulsive efficiency. The crawler tractor is thus a very powerful unit and has been found well adapted to the breaking of virgin swamp and cut-over lands in the United States, to rice-land cultivation, especially in India, and to certain large-scale truck-growing operations in the Southwest where the tillage operations are severe and the tractor is subjected to very heavy loads. For the greater part, therefore, the crawler tractor is a heavy, high-powered unit of relatively high price, as compared with wheel types, although the tendency to develop lighter crawler models is naturally reducing their price.

About the hardest agricultural belt work for which a tractor is adapted is operating the thresher. Such work will require from 10 to 80 horse power, varying with the type of machine and grain, but under most conditions the threshing of wheat and oats will require only from 20 to 30 belt horse power. Others of the larger belt-power applications of the tractor are corn husking and shredding, hay baling, ensilage cutting and blowing, corn shelling, and feed grinding, all of which usually require less power than threshing. While there is considerable controversy as to the extent of the actual utility of the tractor in agriculture, obviously, it has become a factor of considerable importance in farming operations. Its capability of performing timely field operations quickly and on a large scale was officially recognized by the French, British, and Italian governments in their efforts to increase food production during the War. It was extensively used in the United States for belt and drawbar operations on farms even prior to 1917.

As evidence of the continued and increased belief in its utility on farms, especially under conditions where timeliness in the performance of belt and field operations is an important factor, a conservative estimate indicates that there were approximately 325,000 internal-combustion tractors on farms in the United States on Jan. 1, 1923, and approximately 400,000 on Jan. 1, 1924, representing an actual increase of 100,000 and a discard of 25,000 in one year. Since that time, it may be conservatively estimated that there has been an average annual increase in the number of tractors on American farms of between 75,000 and 100,000, and on Jan. 1, 1928, there was a total number of approximately 769,000. According to data collected by the U. S. Department of Commerce at its annual canvass of manufactors of farm equipment, the total production of tractors in 1928 amounted to 171,137, valued at $161,461,462. Of this total, 152,124, valued at $113,730,502, were of the wheeled type, and 19,013, valued at $47,730,960, were of the tracklaying type. Of the tractors sold by manufacturers, 99,491, valued at $98,528,923, were for use in the United States, and 48,806, valued at $42,220,807, were sold for export.

The conditions and requirements of service for different localities and types of farming are so variable as to make it difficult to estimate the average life of a tractor with any accuracy. In some localities, for example, tractor depreciation is high on account of excessive wear of bearings and internal friction-parts of engines due to abrasive dust. This is being overcome to a large extent by the use of boxed bearings, air cleaners on the air intake of the tractor-engine carburetor, and better lubrication. An estimate of from five to seven years of useful life for a tractor in agricultural use would probably be sufficiently conservative for the majority of conditions of normal service.

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TRADE-COMMISSION ACT. See TRUSTS.

TRADE-UNIONISM. The history of trade-unionism in the period following 1914 may roughly be divided into three periods, the stagnation during the World War, the tremendous expansion in the years after the Armistice, and the relative decline in the succeeding few years due to the industrial depression resulting from the War and the peace treaties. For some years before the War, trade-unionism had been steadily growing in most countries. The War brought this growth to a sudden halt. The International Federation of Trade Unions and the Trade Internationals ceased to exist and international relations among trade-unionists were in abeyance. The effect of the War on trade-unionism was, however, by no means uniform in the various countries. While in some countries, as in Germany, trade unions lost in membership and influence, other countries, like Great Britain and the United States, saw a steadily growing development of organized labor. The post-war period witnessed an immediate rebirth of international trade-unionism as well as an unprecedented increase in the membership of the labor organizations of practically all countries, although, where such increase had been due to war prosperity, the membership fell off again once the after-affects of the War made themselves felt. As for mode of organization, the trade or craft union still remained the standard. With the appearance of new industrial problems, however, and with the increasing hold which the idea of industrial democracy had obtained in one form or another on the imagination of the worker, industrial unionism had made rapid progress, although it was still more a potentiality and an aim than an actual system of organization. The industrial world which confronted the trade-unionist of 1929 was more complex than it was in 1914. New industrial problems had come to the fore and with them new attempts at solution. The various forms of industrial democracy which had been advanced and in some cases applied, were entirely a product of the period, and they had taken different shape in the various countries. Another important development was the spread of syndicalism, not only in strictly syndicalist labor organizations, but also within the rank and file of orthodox craft unions. See HOURS OF LABOR; LABOR ARBITRATION; LABOR BANKS; LABOR LEGISLATION; INDUSTRIAL DEMOCRACY; SYNDICALISM.

International Trade-union Organizations. The most important trade-union international before the War was the International Federation of Trade Unions with headquarters at Amsterdam. In 1912 it had a membership of 7,394,461, representing 19 countries. It was a rather loose organization and went to pieces immediately at the outbreak of the World War. During the War, the Inter-Allied Trade Union Conference was held at Leeds in 1916 and the Central Powers and Neutral Conference was held at Berne in 1917. Although both conferences and the three labor bureaus at Amsterdam, Paris, and Berlin made attempts to revive some sort of international labor activity, the International Federation of Trade Unions was as dead as the Socialist International. After the War, at the conference at Amsterdam in July, 1919, the old International was reconstructed. It was an alliance of national trade-union federations and trade internationals or, as they are commonly termed, international trade-union "secretariats." Its objects were the promotion of the interests of the organizations affiliated with it and of the trade-union movement in countries not affiliated with it, the promotion of combined action on all questions of trade-union interests, the prevention of international blacklisting, and the provision of funds for these purposes. In July, 1920, the International declared a boycott of the White government in Hungary, which 20 days later had to be abandoned as unsuccessful. The American Federation of Labor had been one of the constituent organizations which formed the International in 1920. Because of the close alliance between the International Federation of Trade Unions and the Socialist International, Samuel Gompers denounced the former as Socialist and the A. F. of L. withdrew in the autumn of 1921. To 1929, the A. F. of L. had not rejoined the International. The total membership of the new International at the time of its formation was 23,170,000. Due to the heavy losses in the membership of the British, Italian, French, and other affiliated organizations and to the withdrawal of the A. F. of L., the membership sank to 18,923,931 at the end of 1922. For the Syndicalist International, see SYNDICALISM.

At its 1924 meeting at Vienna, the International had in the neighborhood of 19,000,000 members in 19 countries. During 1924–29 the organization gave much attention to the recognition of Soviet Russia, and because of the refusal to coöperate with the Red International, the group was practically divided in two. At the 1927 meeting, the delegates represented but 13,445,553 trade-unionists all of whom came from European countries with the exception of the representation from Palestine, Canada, Argentina, and South Africa. A. A. Purcell, British trade-unionist, failed of reëlection to the presidency because of his Communist sympathies.

The International, by 1927, had became as conservative as the A. F. of L., and its policies were not unlike the American organization. It favored the 8-hour day, universal peace, abolition of child labor, etc. The conventions had become triennial and the organization had moved its headquarters from Amsterdam. Other international bodies were the International Federation of Working Women, the International Federation of Christian Trade Unions, and the Red International, which last was completely under Moscow control. See COMMUNISM; SOCIALISM; LABOR, AMERICAN FEDERATION OF.

United States. American trade-unionism is confronted with specifically American conditions and difficulties which preclude a development along European lines and give the American labor movement a distinct character. In spite of these obstacles, however, American organized labor advanced very far during the 15 years under discussion. From 1914 onward, American public opinion changed its attitude toward organized labor, coming to accept it as a legitimate expression of American democratic ideals. The active support which organized labor gave to the Government in the prosecution of the War increased its prestige greatly. It benefited materially from the war prosperity, as well as from the relative absence of the competition of immigrant labor during the War. With the close of the War, however, unemployment arrived and gave labor a decided setback, from which it has not fully recovered. An offensive for the "open shop," which reached its most intensified form in the great steel strike of 1919, was carried on by the employers' organizations and did serious harm to American trade-unionism. Another blow to labor was the settlement of the Coronado case in 1922. The verdict pronounced the liability of trade-union funds for damages in case responsibility had been established. The new movement for industrial democracy found its chief expression in the United States in the Plumb Plan, a scheme sponsored by the railway unions for tripartite control of the railroads by the State, the owners, and the workers. Perhaps the outstanding event, however, in the American labor movement during the period was the successful organization of the sweated workers in the needle trades into such powerful bodies as the Amalgamated Clothing Workers of America and the International Ladies' Garment Workers' Union and the formation of other groups such as the Amalgamated Textile Workers, the Amalgamated Food Workers, and the American Federation of Teachers.

American Federation of Labor. This organization, comprising most of the trade-unionists in the United States and many of those in Canada, counted a great increase in its membership, 1914–28, although the later years of industrial depression cut in on this advance. From 2,020,671 in 1914, the membership rose steadily to 4,078,740 in October, 1920, after which it showed a falling off. At its Portland Convention in October, 1923, the A. F. of L. reported a membership of 2,926,468. The organization was strictly a federation of craft unions, in spite of the fact that its largest affiliated body, the United Mine Workers of America, with a membership of 400,000, was an industrial union and that there existed within its ranks an active minority in favor of industrial unionism, which, in 1918, led the A. F. of L. into its unsuccessful policy toward unionization of the steel workers and brought about the great steel strike of 1919 with its decisive victory for the "open shop." The A. F. of L., being conservative in policy, did not appeal to the unskilled worker. This conservative tendency manifested itself, aside from the withdrawal from the Amsterdam International, in its consistent opposition to the formation of an American Labor Party and in its friendly relationship with the American Legion. The authority of the official element led by President Gompers and the rigid central control had so far been able to keep down the radical elements, although a steadily growing opposition with new tendencies had appeared. This became apparent in the Montreal Convention in 1920 when a resolution for government ownership of railroads and inland waterways with democratic control was adopted in spite of Gompers' opposition.

The following has been the membership of the A. F. of L. since 1923: 1924, 2,880,000; 1925, 2,878,297; 1926, 2,813,910; 1927, 2,812,407; 1928, 2,896,063. The most significant event in the history of the A. F. of L. in the post-war period was the death of Samuel Gompers on Dec. 13, 1924. He had been the movement's leader, with but one year's interruption, since its founding in 1881. He it was who gave the A. F. of L. its conservative stamp: he opposed affiliation with the Amsterdam International; refused to follow the leader of British trade-unionists in favoring a political party; was on friendly terms with capital and believed that the best interests of labor could be furthered by slow and peaceable advances.

Around this doctrine, A. F. of L. programmes have crystallized. The Federation has devoted itself to advocacy of better pay and shorter hours; of unionization of mechanized industries such as the automobile industry; of condemnation of company unions; and of a clarification of the legal status of unionism, particularly in the equity courts. This has reference to the widespread use of the injunction-power of courts during strikes.

The A. F. of L. has formally gone on record as opposed to the official recognition of Russia and even went so far as to advise withdrawal of support of Brookwood Labor College (in 1928) because that school was giving courses explaining Communist doctrine. The A. F. of L. consistently fought against child labor, but it made no real efforts to unionize women, Negroes, and "white-collar" workers. Its president, following the death of Samuel Gompers, has been William Green, though its leading spirit appears to have been Matthew Woll, the Federation's vice president. See LABOR, AMERICAN FEDERATION OF.

Great Britain. British trade-unionism made important numerical gains after 1914. Its membership rose from 3,918,809 in that year to 8,023,761 in 1919. In the following years, however, the membership fell to about 5,000,000 or 40 per cent of the wage earners, as a result of post-war conditions and unemployment. The Trade Union Congress, the national organization of the British trade-union movement, reported 2,866,077 members in 1914; 6,505,482 in 1920; and 4,352,818 in 1923. Far more significant than their numerical increase was the growth of the influence of the British trade-unionists, which may be measured by the fact that in 1924 the Labor Party, which is primarily the political expression of British trade-unionism, became the governing party. Another feature of this great development was the tendency to form large labor aggregations. The movement for "less unions and more unity" through amalgamation brought the majority of the British trade-unionists into relatively few and large bodies, such as the Miners' Federation (750,000 members), the National Union of Railwaymen (327,000), the General Labor Union (500,000), the Amalgamated Transport Workers (1,000,000), the Amalgamated Engineering Union, and the United Textile Factory Workers' Association. At the outbreak of the War, British labor agreed to a general truce between labor and capital. The miners, who had not abrogated their freedom to act, showed an independent attitude throughout the War. The rebellious spirit of British labor manifested itself, however, through unofficial strikes and through the widespread acceptance of various theories of industrial unionism, syndicalism, and industrial democracy. The establishment of Whitley Councils in various trades by the Government was a concession to this spirit. This unrest did not abate with the Armistice. Guild socialism spread in the years after the War and the miners made their demand in 1919 for the nationalization of mines which resulted in the Coal Commission and the Sankey Report. In 1920, at the time of the Russo-Polish conflict, the trade unions formed councils of action and by this direct method exerted successful pressure on the British government in favor of nonintervention.

But unemployment, dissension between rights and lefts, the unfortunate end of the miners' strike, and the passage of repressive legislation following the end of the general strike (see GREAT BRITAIN, under *History*) contributed to a decline in membership following 1924. At the 1924 Trade Union Congress, 4,328,000 trade-unionists were represented; at the 1927 Congress, 4,163,994; at the 1928 Congress, 3,874,800. During the five years, 1924–29, labor showed an increasing tendency to eliminate the Communists from its body (though it favored recognition of Russia) and to coöperate with capital in the overhauling of industry. The greatest blow struck at organized labor was the passage, by the Conservative government, of the Trades Dispute and Trade Union Act in July, 1927, as a result of the unsuccessful general strike of 1926. This act practically deprived organized labor of the safeguards it had won since the Taft-Vale decision. The act declared: 1. That a strike was illegal if it had any object other than the furtherance of a trade dispute; a strike was illegal if it was calculated to coerce the Government. 2. No trade union might discipline a member for refusal to take part in an illegal strike. 3. Picketing was forbidden. 4. Trade unions might make political levies on their members only if they had consent in writing. 5. Civil servants might not join a general trade-union organization. (Reference was had to the English Trade Union Congress.) 6. Local authorities might not make membership in trade unions a condition for employment. 7. The attorney general might enjoin trade-union funds if they were being used in contravention of the act.

TRAIN. See ARMIES AND ARMY ORGANIZATION.

TRAIN, ARTHUR (CHENEY) (1875–). An American lawyer and writer, born at Boston, Mass., and educated at Harvard University and its law school. He practiced for several years in New York and was assistant district attorney there (1901–08, 1914–15). He was a fiction writer of considerable talent, his books including: *The Man Who Rocked the Earth* (1915); *The Earthquake* (1918); *Tutt and Mr. Tutt* (1920); *The Hermit of Turkey Hollow*, *By Advice of Counsel*, and *As it Was in the Beginning* (1921); *Tut, Tut, Mr. Tutt!* and *His Children's Children* (1923); *On the Trail of the Bad Men* (1925); *Page Mr. Tutt!* (1926); *The Blind Goddess* (1926); *Ambition* (1928); *The Horns of Ramadan* (1928).

TRANSCAUCASIAN SOVIET REPUBLICS, FEDERATION OF. See RUSSIA; ARMENIA; AZERBAIJAN; GEORGIA.

TRANSFORMERS. See ELECTRIC POWER TRANSMISSION AND DISTRIBUTION.

TRANSJORDANIA, EMIRATE OF, or KERAK. A territory inhabited by Arabs, lying to the east of the Jordan and to the north of the Kingdom of Hedjaz. Area, undetermined; population, estimated at 260,000, of whom 220,000 are Arab Moslems, 30,000 Arab Christians, and 10,000 Caucasasians. Amman, the capital, had 2300 inhabitants. Other towns are Kerak (2500), Es Salt (8000), Ma'an (3000), Madeka (2000), Jerash (1500). The country is for the most part desert, except for the 30-mile district between the Jordan and the Hedjaz Railway. The population being largely nomadic, pastoral pursuits are the leading activity. Phosphate deposits have been found, as well as potash, in the Dead Sea. Communications are maintained by a motor road from Amman to Jerusalem and by the portion of the Hedjaz Railway running through the country from Daraa to Ma'an. The estimated revenue for 1928–29 was £240,916; the estimated British grant-in-aid, £40,000. The country played a prominent part in the Crusades, then with the defeat of the Christians fell to a series of independent rulers who came out of Egypt. Under the Ottoman Turks (1517–1918), its part was an obscure one until the building of the Hedjaz Railway made it easily accessible. In April, 1918, it was invaded by the Emir Feisal, and by the Peace Treaty it was made part of the Palestine mandate under the supervision of the British high commissioner. Emir Feisal, as ruler of Syria, was recognized as sovereign in Transjordania, but after his fall, his brother, the Emir Abdullah, was set upon the throne (April, 1921). In May, 1923, local autonomy was formally granted the Territory by the British High Commissioner in Palestine. A treaty for the establishment of a semi-independent constitutional government under Emir Abdullah was signed in Jerusalem Feb. 20, 1928. Numerous Arab leaders protested against features of the treaty providing for a virtual British protectorate. The Legislative Council assembled for the first time in November, 1928. See PALESTINE.

TRANSMISSION AND DISTRIBUTION, OF ELECTRIC POWER. See ELECTRIC POWER TRANSMISSION AND DISTRIBUTION.

TRANSPORT. See VESSEL, NAVAL.

TRANSPORTATION ACT. See RAILWAYS.

TRANSPORT SERVICE, UNITED STATES NAVAL. See WORLD WAR, *Naval Operations*.

TRANSVAAL PROVINCE. See SOUTH AFRICA, UNION OF.

TRANSYLVANIA, trăn′sĭl-vā′nĭ-ȧ. Before the World War, an integral part of Hungary, but since December, 1918, a Rumanian province. Area, 22,312 square miles; population in 1915, 2,678,367. Cluj (Klausenburg), the principal city, had an estimated population of 65,500 in 1920. The inhabitants in 1910 were divided racially as follows: 55 per cent Rumanian, 34.3

per cent Magyar (known locally as Szeklers), 8.7 per cent German (i.e., Saxons). There were also some Ruthenians and Slovaks. Among all these, the Jews numbered about 65,000. The people pursue for the most part agricultural and pastoral activities, the industrial life occupying only a small place. The Rumanians are chiefly peasants, herdsmen, and hillsmen, largely illiterate, and culturally and economically completely dominated by their Magyar overlords. The limit of Transylvania, on the edge of the Rumanian forelands, coincided with a number of important towns in the Bánát, i.e., Arad, Temesvár, and Nágy Varad, and it was to gain these towns, so important as focal points to the surrounding agricultural country, that Rumania sought the inclusion of the Bánát in her territories. On Dec. 2, 1918, a Transylvanian Assembly, perceiving how imminent was the disruption of the Dual Monarchy, declared its union with Rumania. On Jan. 11, 1919, Rumania by royal decree annexed the territory; the subsequent treaties confirmed the transfer. In 1920 the Transylvanian National Council was dissolved and a provincial government was erected. The University of Cluj, founded in 1919, had 1980 students in 1920. See World War, *Balkan Front.*

TREATY OF LONDON (Apr. 26, 1915). See World War, Diplomacy of the; Peace and Peace Movements.

TREBITSCH, Siegfried (1869–). An Austrian poet, novelist, and dramatist, born in Vienna. His works include the plays *Ein Muttersohn* (1911); *Gefährliche Jahre* (1915); *Frau Gittas Sühne* (1920, translated into English by George Bernard Shaw), *Der Geliebte* (1923). *Das Land der Treue* (1926); the novels *Das Haus am Abhang* (1905), *Spätes Licht* (1918); the poem *Wellen und Wege* (1913); the short stories *Weltuntergang* (1902), *Genesung, Tagwandler* (1909), *Der Geheilte* (1927).

TREES. See Forestry.

TRELEASE, William (1857–). An American botanist, born at Mt. Vernon, N. Y., and educated at Cornell, Harvard, Michigan, and Washington universities. He was instructor in botany at the University of Wisconsin (1881–85); professor of botany at Washington University (1885–1913), and at the University of Illinois (1913–26). From 1889 to 1912, he was director of the Missouri Botanical Garden. Professor Trelease wrote: *The Genus Phoradendron* (1916); *Plant Materials of Decorative Gardening* (1917); *Winter Botany* (1918); *The American Oaks* (1925); and many papers and reports on botany and entomology.

TRENCHARD, Sir Hugh Montague (1873–). Marshal of the Royal British Air Force (since 1927). He entered the army in 1893, served in Africa through the Boer War, and became assistant commandant of the Royal Flying Corps at Upavon in 1913. Before the end of the first year of the World War, he was made head of the military wing of the air forces under Sir John French, in which office he was markedly successful. By 1916 he was a major general, and in January, 1918, he went back to England as chief of staff of the newly formed Air Ministry. He resigned in April, 1918, and shortly afterward was given the command of the Independent Force and raided German territory. In 1919 he was made air marshal and became chief of the air staff. He was principal air aide-de-camp to the King (1921–25), air chief marshal (1922), senior member of the air council, and was given his present title in 1927. He received many decorations and honors, and an honorary LL.D. from Cambridge, and a D.C.L. from Oxford.

TRENCH WARFARE. Trench warfare was a development peculiar to the War in Europe. The line of battle extended from the English Channel to Switzerland, its flanks resting on militarily impregnable obstacles which precluded outflanking. The numbers engaged made the battle lines practically continuous, reduced the chance of success of a war of manœuvre, and eventually resulted in the deadlock inevitable to a war of position when the opposing forces are evenly matched. A recurrence of trench warfare of the sort experienced in the War will depend on the likeness of the conditions of any future conflict to those just described. See Ordnance.

Trench Mortars. The trench mortar, in its simplest form, consisted merely of a seamless drawn-steel tube three inches in diameter, closed at one end and provided with a projecting firing-pin at the closed end. A simple bipod, which with the tube itself constituted a tripod, gave elevation and direction to the tube. In action, a very simple form of projectile consisting of a lap-welded three-inch steel tubing, filled with nitro-starch explosive and provided at its lower end with means for attaching an ordinary shot-gun shell, was dropped gently down the muzzle. When the primer of the shot-gun shell struck the projecting firing-pin at the bottom of the closed tube, the cartridge was discharged, and the shell was thrown with considerable velocity in a high arc for several hundred yards. In order to obtain greater range, rings of ballistite were wrapped around the shot-gun shell and were ignited on its discharge. Light vanes, added in prolongation of the shell body, surrounded the shot-gun shell in order to prevent tumbling of the projectile in flight. This material was indeed ordnance reduced to its simplest terms, but due to the simplicity of design and ease of manufacture, the readiness with which troops could be trained in its employment, and its adaptability to the peculiar conditions of trench warfare, it found an enormous use. Three-inch and four-inch Newton-Stokes mortars of British design, in general conformity to the above description, were used to a great extent by the American Expeditionary Forces. Provided with more accurate elevating and traversing mechanism and separate propelling charges, six-inch Newton-Stokes and French 240-mm. mortars were also used to a considerable extent. See Strategy and Tactics, Military.

The Livens projector, of British design, was essentially a long steel tube, closed at one end, intended to be buried in the ground, and supported by a pressed-steel base plate. These tubes were set up in groups of 25 or multiples thereof and were fired simultaneously by electricity, sometimes to the number of 2500. The projectile used was a gas drum cylindrical in shape, about 24 inches long and eight inches in diameter; and when fired in large numbers, it worked great havoc in the ranks of the enemy. Although the British used this type with great success throughout the latter period of the War, and the French and Americans also adopted it and used it freely, the Germans were never able to discover the nature of the device which was causing such damage and were never able to produce anything similar to it.

Pyrotechnics. Pyrotechnics found very extensive use in the War. The exigencies of trench warfare frequently demanded the transmission of orders and information simultaneously by several different methods. In order to supplement the telephone, telegraph, and visual signaling, fire signaling was resorted to, and pyrotechnic devices were developed to meet all needs, including signal rockets, parachute rockets, signal pistols and their ammunition, position and signal lights, flares, smoke torches, and lights to be thrown by the Viven-Bessière tromblon, the French device attached to the end of the rifle in which a rifle grenade fits.

Pyrotechnics won themselves a reputation as a dependable means of communication when all other means, except by runners, were interrupted, and it is probable that they will find a continuing place in the liaison systems of all armies. After the War, considerable attention was devoted to producing pyrotechnic signals which would be entirely dependable as to functioning, could stand rough handling, and would not deteriorate after storage under field conditions. Airplane flares, to be dropped from air craft for the illumination of No Man's Land, have been developed since the War to give a candle power of 400,000 and a burning time of three minutes, with a larger size having a candle power of 800,000 and a burning time of four minutes. Wingtip flares giving a candle power of 40,000 and burning time of two minutes also have been developed for use by aviators attempting to make forced landings at night or on fields not otherwise illuminated.

TRENGGANU. See Malay States, Non-Federated.

TRENTINO. See Tyrol, German South; World War, *Italian Front*.

TRENTON. The capital of New Jersey. The population increased from 96,815 in 1910 to 119,289 in 1920 and to 139,000 in 1928 by estimate of the U. S. Bureau of the Census. In 1924 a comprehensive zoning ordinance was adopted. Trenton is at the head of navigation on the Delaware River and has a municipal dock with wharves and a warehouse built and owned by the city. In 1921 a State office building was erected, and between 1923 and 1926, the Pennsylvania Railroad spent approximately $1,000,000 in enlarging its Clinton Street station. The school-building programme since 1914 has included the erection of a grade school, two high schools, and a junior high school. By 1928 Trenton had 31 public schools, 15 parochial schools, and 4 private schools valued at $3,700,000. In 1927 the State park on the Delaware River at Washington's Crossing was set aside as a public park and monument. The area of park property within the city covered approximately 250 acres and was valued at $1,600,000. In 1929 a memorial building, to cost more than $1,500,000, was planned to be erected in Stacy Park. In 1927, 19,965 persons were employed in approximately 285 industrial establishments in Trenton and received $25,887,303 in wages; the value of products manufactured was $107,416,599. The airport owned by Mercer County is located on the airmail route from New York to Atlanta. The clearings of Trenton's 11 banks increased from $183,000,000 in 1921 to $342,917,000 in 1928. The assessed valuation of property in 1928 was $203,487,663; the net debt was $12,938,003. The city celebrated the 250th anniversary of its founding in October, 1929.

TREVELYAN, tre-vĕl'yan, George Macaulay (1876–). A British historian (see Vol. XXII), who was formerly a fellow of Trinity College, Cambridge, and became Regius professor of modern history there in 1927. He served in a British ambulance unit in Italy during the World War, and was twice decorated by that country. He was a fellow of the British Academy, a commander of the Order of the British Empire (1920), and held honorary degrees from Edinburgh and Durham Universities. His later works include *Scenes from Italy's War* (1919); *Recreations of an Historian* (1919); *Lord Grey of the Reform Bill* (1920); *British History in the Nineteenth Century, 1782–1901* (1922); *Manin and the Venetian Revolution of 1848* (1923); *The Historical Causes of the Present State in Italy*, Sidney Ball Memorial Lecture (1923); *The Two-Party System in English Political History*, Romanes Lecture (1926); *History of England* (1926); *The Present Position of History*, an inaugural lecture at Cambridge (1927); and *Walking* (1928). In 1928 he edited *Select Documents for Queen Anne's Reign down to the Union with Scotland, 1702–07*.

TREVELYAN, tre-vĕl'yan, Sir George Otto (1838–1928). A British historian (see Vol. XXII). A new edition of his *Life and Letters of Lord Macaulay* appeared in 1923. Sir George died on Aug. 16, 1928, in his ninety-first year. His successor in the baronetcy is his eldest son, Charles Philips Trevelyan, M.P., Minister for Education in the MacDonald government. Another son, George Macaulay Trevelyan, is Regius professor of modern history at Cambridge.

TREVES, Sir Frederick (1853–1923). A British surgeon (see Vol. XXII). During the World War, he was president of the Headquarters Board at the War Office and a member of the Advisory Board of the Army Medical Service. His *Surgical Applied Anatomy* passed through its seventh edition in 1918. His chief contribution to literature since 1914 is a book of reminiscences, *The Elephant Man* (1923).

TREXLER, Samuel (Geiss) (1877–). An American Lutheran clergyman, who was born at Bernville, Pa., and graduated from Muhlenberg College at Allentown. He pursued his theological studies at the Lutheran Theological Seminary, Philadelphia, and was ordained to the Lutheran ministry in 1899. He organized the Messiah Church of Brooklyn, N. Y., and was pastor of it until 1912. During the next two years he organized religious work among Lutheran students at Columbia, Harvard, Yale, and Cornell universities. From 1914 to 1920, he was pastor of the Church of the Redeemer at Buffalo, N. Y. Since 1920 he has presided over the Synod of New York and New England, which in 1929 became the United Lutheran Synod of New York by a merger. In the World War, he was a chaplain of the U. S. Army in France and Germany. He is the author of *Crusaders of the Twentieth Century* (1926).

TRIANON, Treaty of the. See Peace Conference and Treaties; Hungary, under *History*.

TRIESTE. See Fiume-Adriatic Controversity.

TRINIDAD, trĭn'ĭ-dăd. An island in the West Indies north of the mouth of the Orinoco, constituting with the island of Tobago (114 square miles) a British colony. Area of Trinidad, 1862 square miles; population in 1911, 333,552; estimated in 1928, 391,705. The largest city, Port of Spain, had 65,016 inhabitants in 1928

(60,000 in 1911). In 1920 Trinidad was chosen as the seat of a West Indian agricultural college. The leading products continue to be the following as indicated by export values in 1927: cacao, £1,671,883 (1913, £1,403,379); petroleum, £1,310,356 (1913, £75,020); petrol spirit, £951,666; sugar, £762,366 (1913, £418,067); asphalt, £464,475 (1913), £230,565); copra, £146,895. Petroleum has made great advances, production in 1927 amounting to 5,380,464 barrels. Imports for 1913 were worth £2,828,550; for 1920, £8,490,232; for 1921, £6,903,694; for 1927, £5,082,871. Exports for the same years were £3,065,863, £8,408,611, £4,683,988, £6,018,864. Transshipments for the same years were £2,139,810, £1,077,934, £509,988, £707,152. The principal imports in 1927 were flour, rice, cotton, and metal manufactures, fish, machinery, motor cars, and other vehicles. The bulk of imports were from the United Kingdom, United States, and Canada. Exports went principally to the United Kingdom, United States, France, and Canada. In 1927 there were 123 miles of railway, as compared with 95 in 1914. Government accounts follow for 1927 (1913–14 figures in parentheses): revenue, £1,686,053 (£970,789); of which customs was £676,400 (£433,276); expenditure, £1,497,024 (£951,962); public debt, as of Dec. 31, 1927, £3,281,854 (£1,476,615).

TRINITY COLLEGE. An institution for the higher education of men at Hartford, Conn., founded in 1823 as Washington College by members of the Protestant Episcopal Church. The present name of the college was adopted in 1825. The enrollment in 1914 was 248; in 1928, 276. The faculty numbered 27 in 1914 and 34 in 1928 and in this period the library was increased from 70,000 to 100,000 volumes. The productive funds in 1928 were $3,070,385.06. The library and administration buildings, the gift of J. P. Morgan, were completed in 1914, and a gift of $150,000 was received by the college from the J. P. Morgan Fund in 1917. In 1923 the centennial celebration was held and the centennial fund of $1,000,000 was completed. President, Remsen Brinckerhoff Ogilby, Litt.D., LL.D.

TRINITY COLLEGE. An institution of learning in Durham, North Carolina, expanded into Duke University in 1924. See Duke University.

TRINITY COLLEGE. A Roman Catholic institution for women founded in 1897 at Washington, D. C., by the Sisters of Notre Dame of Namur; it is affiliated with the Catholic University of America. The number of students increased from 166 in 1914 to 368 in 1927–28 and to 397 in the autumn term of 1928, the number of members in the faculty from 26 to 48, and the volumes in the library from 16,000 to 34,000. The endowment in 1928 was $1,500,000; buildings were valued at $3,056,000; grounds (50 acres of campus) at $195,000; and total income for 1927–28 amounted to $366,000. The Stewart estate adjoining the campus was bought in 1915; the Chapel of Notre Dame was dedicated in 1924; and in October, 1928, a new dining hall was opened, which in addition to two large dining halls, accommodating 250 each, and a spacious cafeteria, provides private rooms for 70 students. President, Sister Raphael, A.B., M.D.

TRIODE. See Radio Telegraphy.

TRIPLE ALLIANCE. See World War.

TRIPLE ENTENTE. See World War.

TRIPOLITANIA. See Libya.

TROELTSCH, Ernst D. (1865–1923). A German religious philosopher, born at Augsburg, and educated at the leading German universities. He was called to a professorship in the University of Berlin in 1912. At the close of the World War, he entered politics under the Democratic standard. In 1920 he became Minister of Education and Religion in the Prussian state government, and in 1921 he was appointed to the same office in the German federal cabinet. His writings are concerned largely with the philosophy of Protestantism. They include: *Soziallehren der Christlichen Kirchen und Gruppen* (1912); *Zu Religions Lage, Religions Philosophie und Ethik* (1913); *Augustin* (1915); *Deutsche Zukunft* (1916); *Humanismus und Naturalismus* (1916); *Geschichte der Philosophie des Positivismus* (1919); *Die Dynamik der Geschichte* (1919); *Die Bedeutung des Protestantismus für die Entstehung der modernen Welt* (1924); *Zur Geistesgeschichte und Religionssoziologie* (1925), and *Deutscher Geist und Westeuropa* (1925).

TRONDHJEM. A city in Norway the name of which was to be changed to Nidaros, Jan. 1, 1930. See Norway, under *History*.

TROPISMS. See Animal Psychology; Zoology.

TROTSKY, Leon Davidovitch (Leon Braunstein) (1879–). A Russian Communist leader born near Elisavetgrad, South Russia, and educated at the University of Odessa. Becoming a member of the left wing of the Social-Democratic Party he was arrested for his political activities in 1898 and deported to Siberia. He escaped in 1902, returned to Russia to aid in the revolution of 1905, was again arrested, and again escaped en route to Siberia. He was active in the international Socialist movement in the years preceding the World War and severely criticized Socialists who supported their governments in the conflict. During the War, he was expelled from France, Switzerland, and Spain and in 1917 went to New York City, where he helped publish the Russian newspaper, *Novy Mir*. He returned to Russia after the Menshevik Revolution of March, 1917, was elected President of the Moscow Soviet, and played a leading rôle in the October revolution which placed Lenin in power. Appointed the first Soviet Commissar for Foreign Affairs, he conducted the peace negotiations at Brest-Litovsk but resigned rather than sign the treaty. As Commissar for War (1919–25), he organized and trained the Red Army, but he came increasingly into conflict with Joseph Stalin, Secretary-General of the Central Executive Committee, and early in 1925 was exiled to the Caucasus for some months.

In May, 1925, he was appointed head of the technical and scientific department of the Supreme Council of National Economy, and of the Central Electric Trust and the Committee of Concessions, all relatively unimportant posts. Elected to the Political Bureau of the Communist Party in 1926, he was expelled from the office the same year for his continued opposition to the policies of the Stalin majoirty. In 1927 he was expelled from the Executive Committee of the Communist International, along with 98 other opposition leaders, and then from the party itself. Early in 1928 he was exiled to the village of Vierne on the Russo-Chinese frontier, where he set forth his side of the controversy with Stalin in a book, *The Real Situation in Russia*, translated into English by Max Eastman (1928). In January, 1929, he was banished from Russia and went to Constantinople where he was forced to remain because of the refusal of other European countries to admit him. Soon after his arrival, he published a series of articles upon the situation in Russia. *My Life,* an autobiography, appeared in 1929.

TROUBETZKOI, Paul (1866–). An international artist and sculptor, born in Intra, Italy, of Russian parentage. Virtually self-educated in art, he attracted attention as early as 1887, when some of his animal figures were exhibited at the Venice Exposition. Later, he worked in Russia, France, and America, and his sculptures have found their way into all of the principal European galleries. He designed the monument to Czar Alexander III in St. Petersburg, an equestrian statue, "Pellerossa," is in the Museum of Modern Art in Rome, and equestrian figures of Alexander III of Russia and of Tolstoi are in the Luxembourg Museum. He executed also "Study in nude," statues of Caruso and Gabriel d'Annunzio, and a bust of Segantini. His art was distinguished for his ability to make figures of stone and metal seem to breathe and palpitate with life.

TROWBRIDGE, Augustus (1870–). An American physicist, born in New York City and educated at Columbia University and in Berlin. During 1898–1900 he was instructor in physics at the University of Michigan and in 1900–06 a member of the faculty at the University of Wisconsin; from 1906 to 1925, he was professor of physics at Princeton University. During the World War he served in the U. S. Army Intelligence Department in France with the rank of lieutenant colonel. He received the Distinguished Service Medal and the Distinguished Service Order, as well as the decoration of the Legion of Honor. He is a member of the National Academy of Sciences and was chairman of the division of physical sciences and member of the fellowship board of the National Research Council (1920–21). He served as European director of Science International Education Board, 1925–28. Since 1928 he has been dean of the Graduate College, Princeton University.

TRUSTS. The year 1914 was important for students of trust legislation. During this year, two noteworthy acts were passed by Congress, the Federal Trade Commission Act and the Clayton Act. The Bureau of Corporations which went into operation in 1904 had been rendering very distinct aid in the curbing of certain evils in the trusts. The creation of the Federal Trade Commission was a direct outcome of the Bureau of Corporations. The chief provisions of the Trade Commission Act follow. (1) A Federal Trade Commission of five members appointed for seven years at an annual salary of $10,000 each was created. (2) The act specifically condemned as unlawful unfair competition by industrial combinations. (3) The principal duty of the Trade Commission was to take action against unfair practices when it was convinced that such existed. The commission was to serve a complaint and hold a hearing and was authorized to order the discontinuance of any practices found to be unfair. In case the order of the commission was not obeyed, it had the power to lay the case before the Circuit Court of Appeals. The court might issue an injunction. The decision of the commission was greatly strengthened by the fact that its findings, if supported by adequate testimony, were regarded as conclusive. (4) The power of the commission was extended to include the investigation of corporations engaged in inter-state commerce, with the exception of banks and common carriers. (5) The commission was authorized to demand from corporations annual reports and other information relative to the conduct of their business. (6) It might initiate investigations relative to the manner in which previous decrees had been carried out by industrial combinations. The Commission might publish its findings if it seemed in the public interest. (7) On direction of the President or of either house of Congress, or on application of the Attorney General, the commission was required to investigate any alleged violations of the anti-trust acts and to recommend such changes as should bring the practices into conformity with the requirements of the act. (8) If the Federal Court made the formal request, the Federal Trade Commission might act in an advisory capacity, relative to the form which the decrees of the court should take. The purpose of the Federal Trade Commission Act was to prevent unfair practices of industrial combinations rather than to inflict punishment when such practices occurred. The power of the Federal Trade Commission was made, under the provisions of the act, much more definite and real than that of any previous governmental body created for the purpose of regulating industrial combinations.

The Clayton Act contained, first, a series of prohibitions against local price discriminations, holding companies, tying contracts, and interlocking directorates; secondly, a statement of the remedies to be applied; and thirdly, a defining of the position which labor was to occupy under it. Price discrimination, where the effect might be to lessen competition or to create a monopoly, was declared unlawful. This provision was not intended to interfere with bona fide transactions and the selection of customers. Any exclusive selling or leasing contracts whose effect was to limit competition was declared unlawful: "The acquisition of stock in one corporation by another, or the combination of two or more corporations through stock ownership, where the effect 'may be specifically to lessen competition, . . . to restrain . . . commerce, . . . or to tend to create monopoly' is prohibited." Interlocking directorates were prohibited, provided the object of forming such a directorate was to restrain competition by combination in a way not permitted by the act. The violation of any of the measures of the act was considered the definite responsibility of the individual directors, officers, or agents who authorized or permitted the acts constituting such violation. It was definitely declared in the act that all laws relating to combination were not to apply to combinations of labor. The courts were forbidden to issue injunctions in labor disputes unless necessary to prevent irreparable damage. Trials for contempt of court in labor cases was to be by jury, except when the contempt was committed in the presence of the court.

In foreign countries, combinations are not forbidden either for domestic or foreign trade. For this reason, industrial enterprises in the United States are at a distinct disadvantage in competing against foreign corporations. After the Clayton Act was passed in 1914, many writers called attention to this handicap under which American exporters labored. The result was the Webb-Pomerene Act of 1918, which was sponsored by President Wilson. This law permitted the American exporters to combine for the purposes of foreign trade on the condition that they file annual reports with the Federal Trade Commission regarding the character of their enterprises.

Under the existing legislation relating to trusts, the Sherman Act of 1890 and the Clayton Act and Federal Trade Commission Act of 1914, many important suits were fought in the courts. The work of the commission had not been generally spectacular, but it had rendered real service in checking unfair practices and discouraging combinations likely to affect public welfare unfavorably. A few cases are outstanding both in importance and in public interest. Chief among these was the United States v. the United States Steel Corporation. The Government brought suit against this giant combination on the ground that it was a monopoly and was engaged in unlawful restraint of trade. The decision of the District Court, rendered in October, 1911, was favorable to the corporation. The decision of the Supreme Court was not rendered until March, 1920; in effect it was that the United States Steel Corporation had not used aggressive measures against its competitors and that the corporation did not possess full monopolistic advantages. The majority decision of the members of the Supreme Court was definite in its statement that mere size does not necessarily mean monopolistic powers. While the United States Steel Corporation was much larger than any of its competitors, it was not in a position to dominate prices of steel products, for the value of its output was not as great as the total value of all its competitors combined. The great argument was that the object of anti-trust legislation was to condemn monopoly and unfair methods of competition. The corporation could not be condemned on either count. The majority opinion of the judges was that the public interest would suffer more if the corporation should be compelled to break up into smaller units. Certain practices in which the corporation had indulged for the purpose of maintaining prices were condemned. Certain pools, associations, and gentlemen's agreements had been formed with the competitors of the trust, but they had not been successful and had been abandoned nine months before suit was brought. The court held that the formation of such price agreements was proof that monopolistic advantage did not exist. Four judges were in favor of the decision outlined above, and three dissented. Two judges did not vote; one had previously been associated with a proceeding against the corporation, and the other had publicly expressed the opinion that the corporation was using unlawful methods.

Another important action of the late years of the decade against industrial combination was that of the meat packers of Chicago. In 1910 suits were brought against the National Packing Company, an organization holding certain independent properties which had been acquired by the Swift, Morris, and Armour companies. The board of directors of this company was made up of representatives of the three large packing firms. In 1912, while under fire, the National Packing Company was dissolved by the members themselves, and its assets were distributed among the three companies involved. The extent to which this dissolution actually restored competitive conditions was not generally known. In December, 1919, a decree was issued which materially affected the packers, known as the "Big Five" (the Armour, Swift, Morris, Wilson, and Cudahy companies). Under threat of a suit for dissolution, the "Big Five" agreed to a decree enjoining certain practices which were considered opposed to the public interest. The decree of the court was entered on Feb. 27, 1920. It provided that the "Big Five" were forbidden perpetually to form any contract or combination in restraint of inter-state commerce. The companies concerned were forbidden to own stock in any stockyard market in the United States or in any stockyard terminal railroad in the United States.

The defendants were enjoined from carrying on either directly or indirectly the manufacture, jobbing, selling, or distributing of a large number of commodities, including vegetables, confectionary, fish, soft drinks, preserves, coffee, tea, chocolate, flour, and sugar. The exception permitted was when these commodities were utilized by the defendants in carrying on their business as packers. From this part of the decree, it is obvious that the "Big Five" were entering other lines of endeavor and had acquired considerable influence on the prices of foodstuffs in different localities. The packers were also enjoined from owning or operating in the United States any markets except those located at their plants. They were also forbidden to own stock in public cold-storage warehouses and to engage in the business of buying and selling fresh milk and cream. In 1929 the packers announced they were preparing to enter the courts to seek the dissolution of the consent decree on the score that the recent growth of chain-store enterprises no longer made monopoly possible, certainly not in the retailing of foodstuffs.

Following the famous decision in the U. S. Steel Corporation case, the "rule of reason" was applied by the district court for the Southern District of California when it enjoined the Southern California Wholesale Grocers' Association (1925) from carrying on practices that were in restraint of trade. In 1926 the Department of Justice gained from a district court consent to order the dissolution of the Ward Food Products Corporation, which up to that time was only laying plans for the perfection of its organization. Interestingly enough, the corporation consented to the decree with the result that the case was not pressed further. In June, 1927, the Supreme Court refused to order the dissolution of the International Harvester Company, applying again the "rule of reason," i.e., that the corporation was not acting in unreasonable restraint of trade though it controlled 64 per cent of the harvester-machinery business. The courts have paid considerable attention to sections 2, 3, 7, and 8 of the Clayton Act and have construed these strictly except in the matter of the resale of commodities. With regard to section 5 of the Federal Trade Commission Act (which prohibits all unfair competitive practices), the Supreme Court has held that it alone may define what is or is not an unfair practice (253 U. S. 421). In a series of decisions handed down over the period being surveyed, the Court enumerated various kinds of unfair practices, e.g., false advertising, misbranding, misrepresentation of product, resale-price maintenance, maligning competitors' products, etc.

Section 6 of the Clayton Act, which has been hailed as the magna charta of the American labor movement in that it exempts labor organizations from "being held or construed to be illegal combinations or conspiracies in restrain of trade, under the anti-trust laws" was reaffirmed in the Appropriation Act of 1927. The same section also exempts agricultural and horticultural organizations, but in the Capper-Volstead Act of 1922, this immunity was hedged about when certain conditions were laid down as to membership and limited profits.

It is interesting to note how the exporting of commodities has been aided by the Webb-Pomerene Law, above referred to. By 1928, 156 such associations had filed their charters and by-laws with the Federal Trade Commission. In 1928 the number on file, indicating active associations, was 56. These associations had a total membership of about 800 concerns; including mining companies, packing houses, mills, refineries, etc. The total value of exports by these associations has been as follows for certain years: 1919, $75,000,000; 1925, $165,200,000; 1926, $200,500,000; 1927, $300,000,000. Some of these associations represent the entire exports of the industries for which they stand, e.g., the Redwood Export Company, the Sulphur Export Corporation, Copper Exports, Inc. The Steel Export Association of America controlled from 75 to 80 per cent of the country's steel exports. In 1924 the Federal Trade Commission handed down a ruling by which on association for price fixing, without necessarily being a selling organization, was legal. The result was that most of the associations formed after 1924 were created for price-fixing purposes purely because the member companies had their own sales agencies.

Status of Trusts, 1929. The post-war period saw trusts on the increase in the United States, where they took on the form of large corporations. Recent examples have been the Radio Corporation of America, the Aluminum Company of America, and the Corn Products Refining Company. During the same period, the trade association movement has developed rapidly and in 1929 there were several thousands of these. They existed not only for the exchange of information and for the establishment of public goodwill, but they often appeared to be fixing prices. In fact, the Federal Trade Commission had to order a number of these trade associations to discontinue the practice of price fixing. The Federal Trade Commission, while not crusading in spirit, has pursued its way quietly, studying the methods of corporations and calling unfair practices to the attention of the courts; but for the most part, it seems to have centred its attention on unfair practices in trade, i.e., those which hurt competitors, and not on the disclosing and removal of monopolistic conditions by which the consumer was being affected. Says Jeremiah Jenks, an outstanding authority, on the existence of monopoly in the year 1929: "Everywhere, in manufacturing, distributing, retailing, competition has given way in some degree to industrial monopoly. . . . In reviewing this array of industrial monopolies, we observe several noteworthy circumstances. First, it is significant that so many restraints of competition have been uncovered in our most important industries. Second, it is to be noted that of those trusts proved to have existed previous to the last few years and dissolved as such, comparatively few have been reinvestigated. . . . Furthermore, in a large percentage of the cases in which follow-up investigations have been made, the industry has been found still controlled by a trust in the same or a different form."

TRYGGER, Ernest (1857–). A Swedish public official and educationist. In addition to serving as chancellor of various Swedish high schools and universities and as president of Upala University, he entered politics with his election to Parliament in 1898 and became leader of the Conservative Party in the First Chamber. He was also, at various periods in his career, Chief Justice, Swedish delegate to the League of Nations (1921–22), Prime Minister (1923), and Minister for Foreign Affairs (1928–).

TSAO KUN (1865–). President of China Oct. 5, 1922–Nov. 24, 1923. He was born at Tientsin of humble parentage, and as a boy entered the provisional army, where his ability was soon recognized. He attended the Peiyang Military Academy, served in the Chino-Japanese War in 1894, and was director of the Soldiers' Training School at Shiao Chan. In 1911 he assisted in the revolution which overthrew the Manchu dynasty and established the Republic. In 1917 General Chang Hsun effected his *coup d'état* which put the young Emperor on the throne, but Tsao Kun and his army, supporting President Li Yuan-hung, forced him out. In 1918 he fought against Dr. Sun Yat-sen's South China Army. Later, he gained control at Peking, and on Oct. 5, 1923, he was elected President. On Nov. 24, 1924, he was forced to resign by Marshal Tuan, who then assumed the office. See China, *History*.

TSINGTAU. See Shantung.

TUAMOTU ISLANDS. See Pacific Ocean Islands.

TUBERCULOSIS. Since 1914 medical views about this affection have undergone numerous and notable modifications. It is known that the mortality has notably lessened, except in some European countries subjected to hardships and underfeeding. The motivation of this improvement has not been so clearly ascertained. Crusades against the disease in the past were based on very imperfect knowledge, such as the assumption of the danger of man-to-man contact in spreading the disease and of the deadly quality of the expectoration. In 1929 the best opinion is that nearly all individuals entertain the bacillus in their tissues when young and that the harboring of this germ, so far from being a menace to later years, induces a process of immunization, in the absence of which a vast number of individuals might develop the disease in active form in adolescence and maturity. It is this immunization which may protect the individual in later life from contact with the bacillus as spread by open cases of tuberculosis. In other words, a strain of mankind without this immunity might develop the disease in a true pestilential form such as has often appeared among aboriginal races.

We are still quite unable to understand why well-nourished and intelligent men and women develop the disease in the absence perhaps of any obvious factor of causation. Trudeau and other phthisiologists state that of a certain number of incipient cases, some are already beyond hope because they simply will not respond to curative measures. It seems doubtful whether this large fraction can ever be salvaged without the discovery of a true specific.

The progress of our knowledge and control of tuberculosis has reached preventive inoculation of young children with the serum devised by Calmette of the Pasteur Institute, Paris. The Hygienic Section of the League of Nations, in its session during October, 1928, took up this subject for discussion. Thus far, the serum has been tested only in some of the Latin countries and to some extent in Norway (where, however, not infants but young schoolgirls were vaccinated). Germany, Great Britain, and the

United States have not yet tested the method. Thirty experts attended the session, comprising bacteriologists, clinicians, and veterinaries. The methods has been tested in certain foundling asylums on a portion of the inmates, but the very high mortality inseparable from these institutions makes it difficult to interpret the results. The consensus of opinion has been to the effect that, although the serum is free from danger, it is not wise to vaccinate all infants, but only those which show a strong predisposition and are exposed to infection from their surroundings. The results probably will prove to be better in the domestic animals than in mankind owing to the greater control and simpler living conditions, and much time must elapse before we can speak intelligently of end results.

TUBERCULOSIS, Bovine. See Veterinary Medicine.

TUBES. See Rapid Transit.

TUBUAI ISLANDS. See Pacific Ocean Islands.

TUFFIER, Théodore (1857–1929). A French surgeon, a pioneer in the surgery of the thorax, including the lungs, orifices of the heart, arch of the aorta, etc. He was born in Bellême in Orne and was educated in medicine at the University of Paris. Some of his writings are of small compass, the more pretentious comprising *Du Rôle de la Congestion dans les Maladies des Voies Urinaries* (1885); *Études Expérimentales sur la Chirurgie du Rein* (1889); *Chirurgie du Poumon* (1897); *Petite Chirurgie,* with Desfosses (5th ed., 1919); *Traité Médico-Chirurgicale des Maladies de l'Estomac,* with Matthieu and Sencert (1913).

TUFTS COLLEGE. A nonsectarian coeducational institution at Medford, Mass., founded in 1852. The student enrollment was 1223 in 1914, as compared with 2037 in 1928. The faculty increased from 242 in 1914 to 407 in 1928; the library from 72,000 to 93,000 volumes; and the productive funds from approximately $2,000,000 to $7,913,501.61. A chemistry laboratory was opened in 1925. President, John Albert Cousens, LL.D.

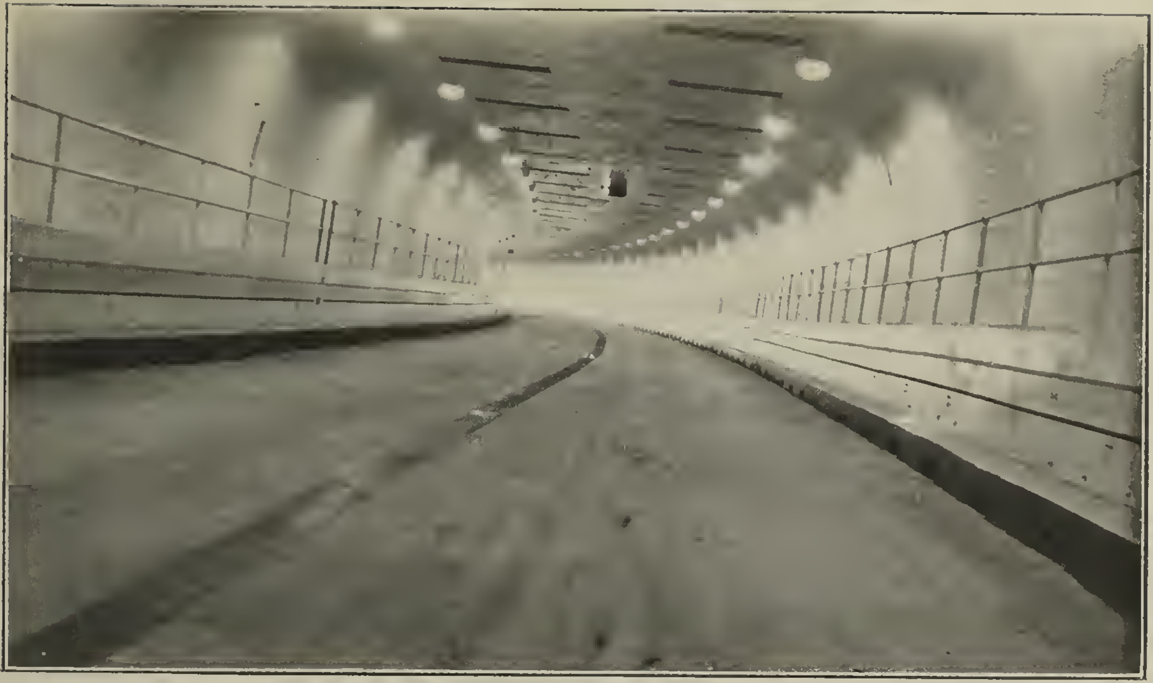
TULANE UNIVERSITY OF LOUISIANA. An institution of higher learning, founded at New Orleans, La., in 1834. The student enrollment in 1914 was 2510, as compared with a registration of 2836 in 1928. During that period, the faculty increased from 297 to 412 members; the library from 68,700 to 132,845 volumes; and the productive endowment from $4,297,987 to $8,982,001.39. In 1918 Newcomb College for Women removed to its campus adjoinjng the University and erected three buildings. The coöperative dormitory for women was opened in 1925. A department of journalism was established in 1926; in the same year a concrete stadium seating 25,000 was erected and Dr. Marcus Feingold bequeathed to the University a valuable ophthalmological library. An academic-law building and a dormitory for women were erected in 1927 and a department of social work was established. In 1928 a four-year course in physical education for men and a special course in parasitology were organized, the work in psychology and sociology was expanded and full time instruction in the school of medicine was further developed. A building was erected for the College of Law and additions were made to the faculty. President, Albert Bledsoe Dinwiddie, Ph.D., LL.D.

TULAREMIA. A new disease of the acute, febrile, communicable type recently has made its appearance in the United States, which evidently, in mankind, is derived from infected food or game animals. At first, the wild rabbit was accused and the persons becoming infected were chiefly meat handlers and others who dressed the game. Later, it was learned that other rodents, such as ground squirrels, wild mice, and even game birds, such as the partridge, could harbor and transmit the disease. It is probable that the rabbit tick is instrumental in diffusing the disease, but, in mankind, transmission direct from the dead animals through infected blood is accused.

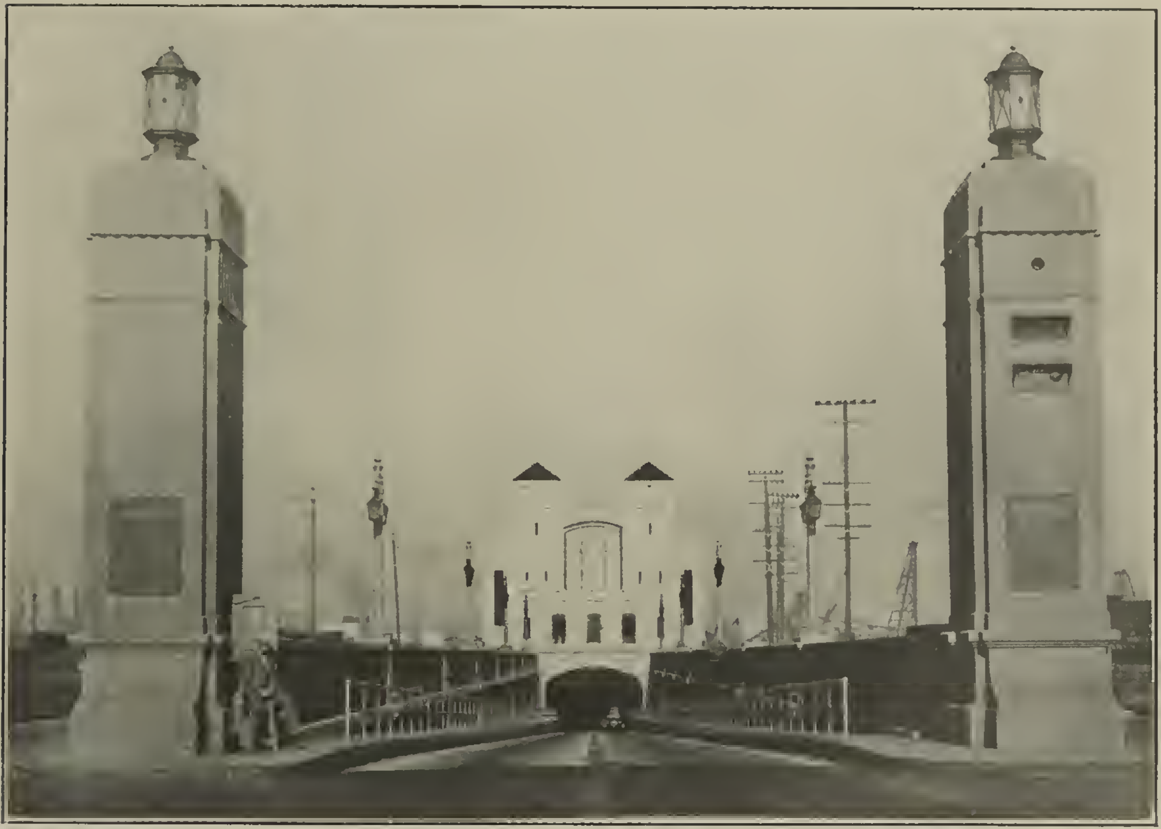
Originally a sort of pathological curiosity, tularemia is now recognized as a widespread disease which readily may be confused with ordinary endemic infections, may end fatally, and, in addition, is able to interfere with the marketing of game. Tularemia was at first regarded as the only purely North American disease, although apparently a very similar malady was isolated at about the same time (1924–25) in Japan. The pioneer work has been done by Dr. Francis of the U. S. Public Health Service and the Government at an early date equipped a laboratory for the study of cases at Hamilton, Mont. The insect transmitting the disease to mankind was first thought to be the deer fly ("deer-fly fever") and Francis, who described the disease in 1922, named it from Tulare Co., Calif., where this malady was first recognized.

In a communincation from Dr. Francis dated July 2, 1929, is the following succinct account of the disease to date: "The great reservoir of this infection is the wild rabbit. Man readily inoculates himself while dressing infected animals, the infection passing through the skin of his hand. An ulcer results on the latter, followed by enlarged glands at the elbow or in the armpit and fever which confines the patient to bed for two or three weeks. Twenty-four deaths have been reported. Cooks, hunters, housewives, and market men are often infected in November, December, or January, when, owing to relaxation of the game laws, it is permitted to hunt wild cottontail rabbits for food. Persons who skin and cut up jack rabbits for fish or coyote bait, fox, chicken, hog, or dog feed, etc., and for the market frequently become infected. Although a new disease of man, tularemia has abruptly become recognized in 41 States of the United States, in Japan, and in Russia, and has taken its place in the medical literature of every country."

TULSA. A city of Oklahoma. Situated in the centre of a vast and newly-opened oil-producing area, the city increased phenomenally in population from 18,182 in 1910 to 72,075 in 1920 and to 170,500 in 1928, by estimate of the U. S. Bureau of the Census. Between 1919 and 1924, Tulsa County built 150 miles of paved roads radiating in every direction from the city; by 1929, the city had more than 200 miles of paved streets. In 1925 construction was begun on the $7,500,000 Spavinaw water-supply system which is to bring water 55 miles by gravity from the Spavinaw Dam in the Ozark Mountains to the Mohawk Reservoir, from which it is to be pumped the remaining distance of 4 miles to the city's distributing reservoir. The Mohawk Reservoir, which covered an area of 115 acres, had a capacity of nearly 500,000,000 gallons. The city acquired 2000 acres of land surrounding this reservoir, which it plans to convert into a municipal park and playground. Within the city limits, there are 15 parks covering an area of 3000 acres. The International Petroleum Exposition has been held annually in Tulsa since 1923. The city is



INTERIOR OF TUBE



PORTAL AND ENTRANCE
THE GEORGE A. POSEY TUBE

Oakland-Alameda, California
Beneath the Estuary, or Inner Harbor, of San Francisco Bay

also an important manufacturing centre for oil-field supplies and equipment, and the home offices of a large number of the leading oil and refining companies are located there. In 1927, 2186 persons were employed in 131 industrial establishments and received $3,404,828 in wages; the value of products manufactured was $20,300,932. Building permits rose from $1,194,639 in 1910 to $14,840,254 in 1927, while bank deposits rose from $33,000,000 in 1916 to $105,000,000 in 1928. In 1928 Tulsa had 32 grade schools and 9 high schools, valued at more than $10,000,000, and two large airports, one privately owned and the other municipally owned. The assessed valuation of property in 1928 was $118,240,110; the net debt was $14,758,616.

TUMULTY, Joseph Patrick (1879–). An American lawyer and former secretary to President Wilson, who was born at Jersey City, N. J., and educated at St. Peter's College there. He practiced law in New Jersey and was elected to the New Jersey Assembly in 1907. In 1910 he was appointed private secretary to Woodrow Wilson, then Governor of New Jersey, and clerk of the Supreme Court of New Jersey in 1912. When Mr. Wilson became President of the United States in 1913, Mr. Tumulty was made his secretary and served in that capacity till 1921. His close association with President Wilson made his book, *Woodrow Wilson as I Know Him* (1921), of especial interest.

TUNGSTEN FILAMENT LAMPS. See Electric Lighting.

TUNIS, tū'nĭs, or Tunisia. A French protectorate in North Africa with an estimated area of 50,000 square miles. By the 1926 census, the population totalled 2,159,708, of which there were 54,243 Jews, 1,932,184 Arabs and Bedouins, 71,020 French, 89,216 Italians, and 8396 Maltese. Total European population was 173,281, a gain of 24,805 over 1911. Populations of large cities were: Tunis, the capital, 185,996; Bizerta, 20,593; Ferryville, 4462. Agriculture continues to predominate and show gratifying advances. The 960,000 acres under wheat yielded 255,000 tons in 1927; 187,500 acres under barley, 90,000 tons; 90,000 acres under oats, 21,500 tons. The mean production of dates during 1917–28 was about one million pounds. Olive trees produce about 40,000 metric tons of oil annually. Other products are almonds, oranges, lemons, shaddocks, pistachios, alfa grass, henna, and cork. Important mineral products are phosphates (3,075,000 tons in 1927), and iron (915,000 tons in 1927). Fishing and the sponge industry also are important. Cattle in 1913 and 1927, 157,100 and 501,223; horses, 29,500 and 92,348; mules and asses, 107,700 and 200,528; camels, 123,900 and 155,356; sheep, 843,100 and 2,142,366; goats, 561,700 and 1,380,855. The presence of an agricultural bank and central coöperatives among farmers greatly stimulated the whole industry. The advances made were mirrored in the trade record. Exports for 1913 and 1928 were 178,663,000 francs and 1,336,987,000 francs; imports for the same years were 144,254,000 francs and 1,957,328,000 francs. In 1928 France supplied 71 per cent of the imports and in 1927 purchased 37 per cent of the exports. Revenue in 1928 amounted to 439,542,956 francs and expenditures to 439,430,489 francs. In 1913 expenditures were 85,000,000 francs. The reigning Bey, Sidi Ahmed, succeeded to the throne Feb. 11, 1929. In 1922 an increased share in the government was bestowed on the natives. Five regional councils at Tunis, Bizerta, Susa, Kef, and Sfax were erected as well as a grand council for the whole protectorate. The latter, made up of two sections, one French and the other native, was given the power to examine the governmental budget. In 1928 there were 441 public and 32 private schools, with 68,150 pupils.

TUNNELS. The period after 1914 was marked by spectacular advances in tunneling, particularly in the United States. While no new methods of great importance were developed, new records for speed and size were established. These tunnels were generally built for railroads and for various water-power, water-supply, and irrigation works, but the development of automobile and motor traffic, which has led to a new era in highway construction, also has produced some remarkable highway tunnels.

Land Tunnels. It will be remembered that for many years the Simplon was the record tunnel of the world. The Simplon still remains the longest tunnel in the world built without an intermediate shaft. Furthermore, in the month of July, 1904, when a single heading in this tunnel was advanced 685 feet, a hard-rock record was established. It is interesting to note that American engineers had been unable even to equal European records, such as the Simplon, and the American technical press frequently commented unfavorably on this subject. In the period just before the World War, however, American records began to rise. In August, 1909, a soft-rock record of 1061 feet in one month was made in advancing the heading in Tunnel 17M on the Jawbone division of the Los Angeles Aqueduct, and in the Elizabeth Tunnel on the same work, an American hard-rock record of 604 feet was established. This latter figure, however, remained a record for only a short time. In the Laramie-Poudre Tunnel (1909–12), it was increased to 653 feet. The St. Louis Waterworks Tunnel increased it to 745, and the Arizona Copper Tunnel, to 799 feet per month. This was followed by the Mount Royal Tunnel at Montreal, Canada (1912–16), in which a heading was advanced 810 feet in 31 days.

It was said that the use of electrical devices in tunneling was responsible for these increases, but this seems very doubtful. It is organization and training which are probably the main elements in speed of drifting. The hardness of the rock, of course, makes a great difference and it is difficult to compare the rock in different tunnels. For example, in the Loetschberg Tunnel, north of the Simplon in Switzerland (1906–11) a maximum monthly rate of 1013 feet was obtained in the north heading, where the rock was soft, whereas only 545 feet was possible in the south heading.

In the Rogers Pass (later named the Connaught) Tunnel on the Canadian Pacific Railroad (1913–16), the engineers of the New World sought a record and secured it with 932 feet advance in one month. In this work, the "pioneer heading" method, which has been used in all subsequent great tunnels where speed was an element, was adopted.

Again in 1923–28, an American record of 777 feet in one month and 33 feet in one day was made in the Moffat Tunnel in Colorado. This work was in large measure overshadowed, however, by the Cascade Tunnel, which, although longer than the Moffat and begun after this tunnel, was finished about the same time, being opened Jan. 12, 1929. This is the longest railroad tunnel in the New World, being exceeded only by the Simplon and other great Alpine tunnels. The record made in the Cascade Tunnel in the month of October, 1926, of 1157 feet advance for a heading in one month is today the world's record.

It will be noted from this outline of tunneling operations that the "pioneer heading" is probably the principal new departure in long tunnel work and has had much to do with these new records As indicated above, this plan was first used in the Simplon, although the second heading of the Simplon was not simply a "pioneer" affair, but was later enlarged (1912–22) to a twin tunnel. Indeed, at the Simplon, it was decided to plan for two parallel, single-track tunnels but to cut through the heading of tunnel No. 2 at the same time that tunnel No. 1 was built. The heading of No. 2 was thus connected to the No. 1 tunnel at intervals and was used for the ventilation, drainage, and for handling the excavation and material for tunnel No. 1. The scheme was very successful.

When the Rogers Pass Tunnel was projected, it was planned to build a separate side tunnel which was never intended to be later enlarged or used for any other purpose than as an adjunct to the construction of the main tunel—the "pioneer tunnel" as a purely construction device was born. Indeed, in this tunnel, the pioneer tunnel or heading was cut about 50 feet north of the main tunnel at the east end and about the same distance south at the west end—it was not even a continuous tunnel on one side of and parallel to the main work. In the pioneer-tunnel method, the pioneer tunnel is carried ahead of the main operation and is connected to the main tunnel by crosscuts at intervals of 1200 to 1500 feet. In fact the crosscuts are made ahead of the main tunnel heading and this heading is actually excavated backward and forward from these advance crosscuts. This, of course, increases speed of work. Furthermore, an even more important advantage is gained through the pioneer tunnel in that the enlargement of the main heading to full tunnel size may proceed at a large number of points without operations interfering with one another or with the progress of the heading.

There was much discussion, at the time the Rogers Pass Tunnel was built, of the relative merits of the pioneer-tunnel plan and also of the central-heading American method versus the European bottom heading. It was generally conceded that the great difference in the cost of labor in America and abroad made the bottom heading with overhead stoping, as used in Europe, uneconomical in America; also that the economy of rapid construction, an economy resulting from putting the work in operation at the earliest possible moment and thus saving interest on the large amounts of capital often involved in great construction, had to be balanced up against the cost of such devices as pioneer tunnels and the admittedly greater cost of rapid excavation due to bonuses, etc. In short, it became clear that the plan of excavation and the organization of the contractor's forces for a great tunnel operation involved an extremely difficult and complicated problem in engineering economics.

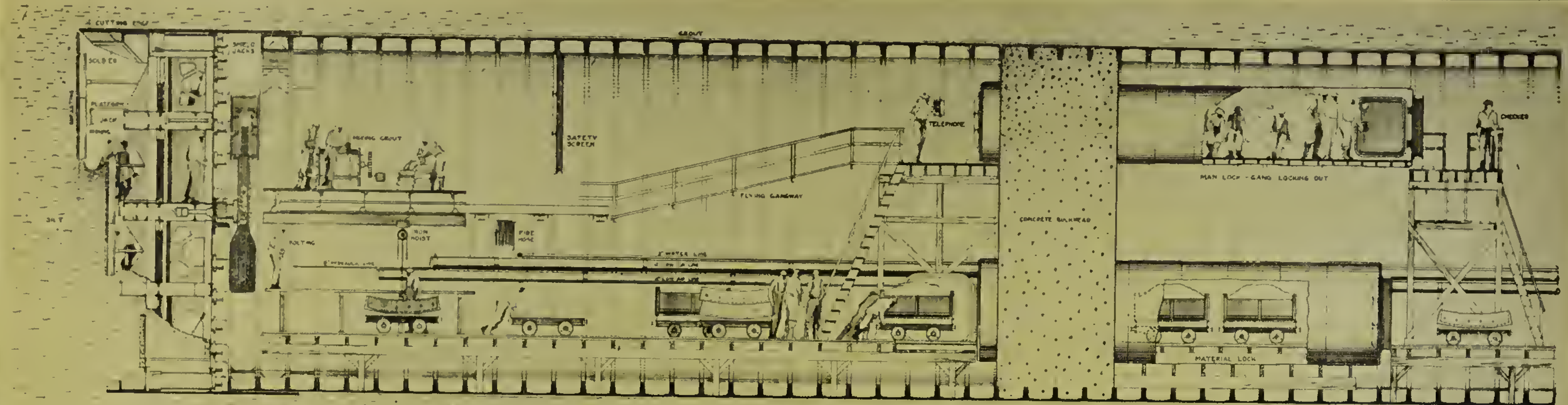
There have been no notable changes in tunnel cross-sections in the period under consideration. One of the largest American tunnels from the standpoint of cross-sections is the Niaraga Falls Power Tunnel built in 1923 to carry water to Power Plant No. 3 of the Niagara Falls Power Company. This tunnel was 36 feet in diameter in rock, with a concrete lining which reduced this diameter to 32 feet clear. The Liberty Tunnel at Pittsburgh, a twin-tube vehicular tunnel, was put in operation in 1923 with a section 26½ feet wide. The Mount Royal Tunnel, already mentioned, was a double-track railroad section. In general, the long tunnels, however, have a single track. There has been, however, under construction at Marseilles in Southern France, a canal tunnel which far exceeds all existing tunnels in cross-section. The Rove Tunnel, as it is called, is part of a canal work built to bring directly to Marseilles the Rhone River traffic and avoid the somewhat dangerous open sea trip from the mouth of the Rhone around to Marseilles Harbor. This tunnel is 72 feet wide, 40 feet high, and is also notable in length, 4½ miles. Begun in 1912, the Rove Tunnel was completed in 1927 and was hailed in France as the greatest European engineering work of the century.

In addition to the tunnels mentioned above, there have been other important works such as the Shandaken Tunnel for the New York Water Supply, 18 miles long, the Otira Tunnel in New Zealand, 5¼ miles long, the Tana Tunnel in Japan, 15 miles long, and other notable works of this class. Detailed descriptions both of these tunnels, and of others above noted, will be found in the editions of *New International Year Book.*

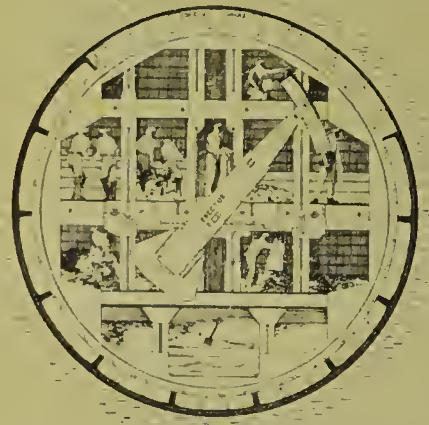
Subaqueous Tunnels. The New York-Jersey City or Holland Vehicular Tunnel under the Hudson is undoubtedly the outstanding subaqueous accomplishment of the period from 1914 to 1928. In 1886 the British engineer, Greathead, had combined for the first time the shield, invented by Brunel in 1818 and improved by Barlow and by Beach in 1869, with the compressed-air process invented by Cochrane in 1830. Using this method, he built the City and South London Subway under the Thames in London clay and water-bearing gravel. The first attempts in New York, now the most tunneled city of the world, were, however, unsuccessful. The New York problem involved tunneling through an almost liquid mass of river silt and mud with considerable depth of water overhead. Ledge rock was also encountered in many of the New York tunnels and was extremely difficult to remove with such a precarious cover over the tube as is afforded by only a few feet of liquid mud.

Perhaps the most important step in advancing the technique of subaqueous tunneling in New York was the discovery, first made in the Hudson-Manhattan Tubes in 1902, that the shield could be forced ahead without completely excavating the material in advance. In practically all subsequent work in New York, this shoving method has been followed. Usually, only about one-third of the material has been actually removed—the tunnel has been forced through the the mud displaced by the pressure of the hydraulic jacks operating the shield. The technique of tunneling in New York mud has, therefore, been fully developed.

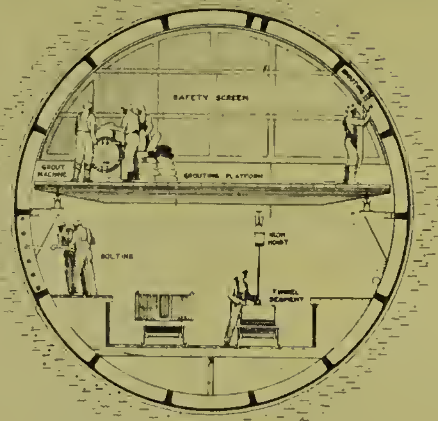
The Holland Vehicular Tunnel brought into use no radically new methods in subaqueous work. It was simply a striking example of the perfection of this process in modern tunneling. It is notable because both of the two parallel tubes were of extremely large size, 29½ feet outside diameter, were extremely long, 5480 feet between shafts, and were put through with no difficulty in extremely rapid time. The depth of cover over the tubes was also extremely small near the shore where they dipped downward under the river. Here, the old method of covering the river bottom


CUTTING EDGE
SOLDIER
PLATFORM
JACK
SHIELD JACKS
SILT
GROUT
MIXING GROUT
SAFETY SCREEN
FLYING GANGWAY
IRON HOIST
FIRE HOSE
BOLTING
WATER LINE
AIR LINE
TELEPHONE
CONCRETE BULKHEAD
MAN LOCK - GANG LOCKING OUT
CHECKER
MATERIAL LOCK

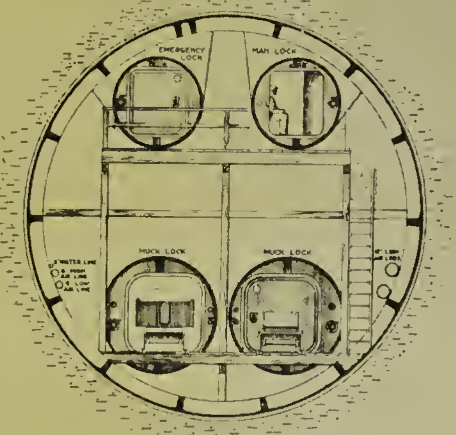
LONGITUDINAL SECTION THROUGH TUNNEL HEADING SHOWING CONSTRUCTION OPERATIONS



REAR OF SHIELD
ERECTION OF IRON & MUCKING IN PROGRESS


SAFETY SCREEN
GROUT MACHINE
GROUTING PLATFORM
BOLTING
MUCK HOIST
TUNNEL SEGMENT

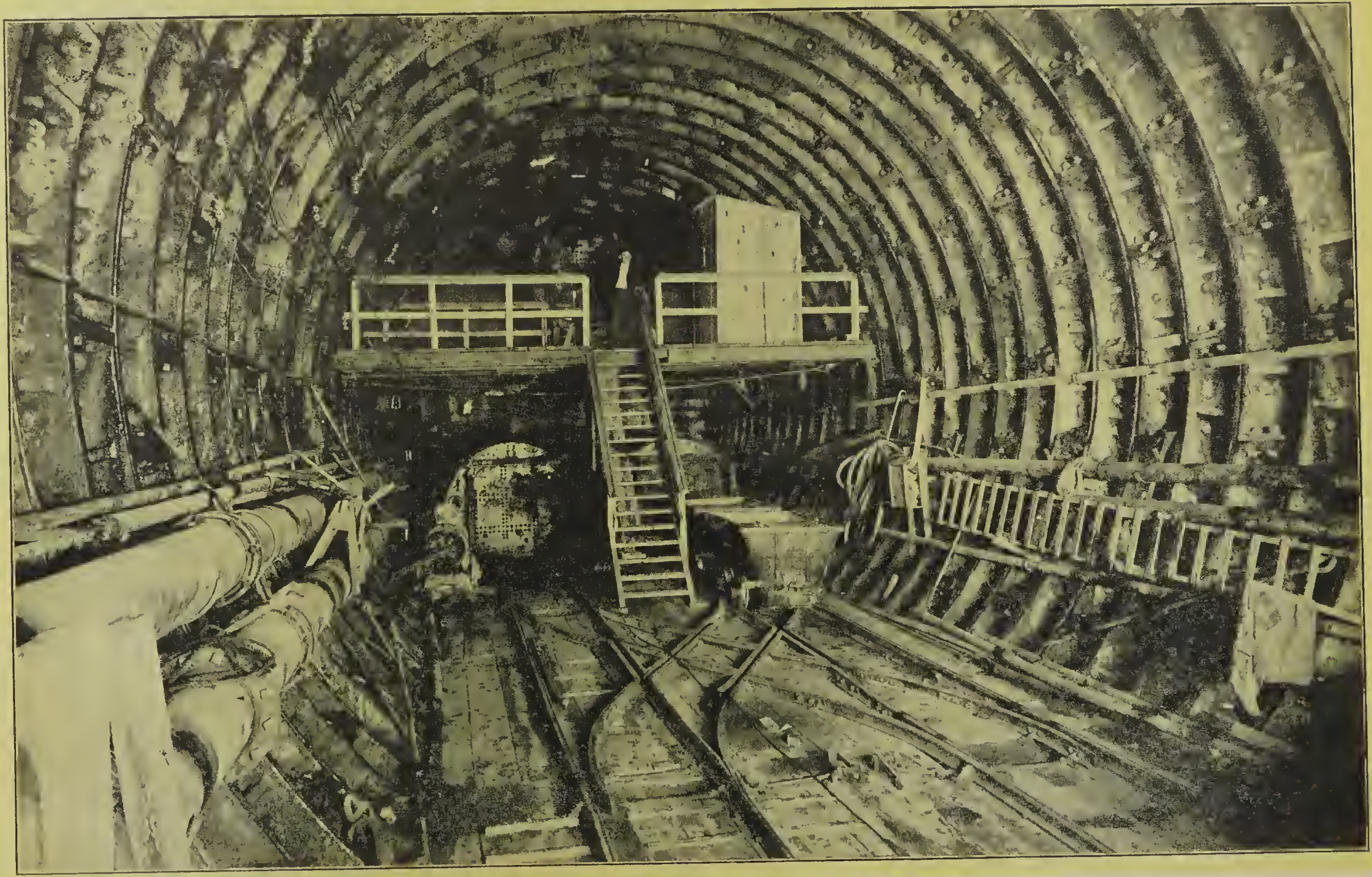
VIEW FROM REAR OF SHIELD
BOLTING & GROUTING IN PROGRESS


EMERGENCY LOCK
MAN LOCK
MUCK LOCK
MUCK LOCK
WATER LINE

EXTERIOR VIEW OF CONCRETE BULKHEAD
SHOWING AIR LOCKS

HUDSON RIVER VEHICULAR TUNNEL
TUNNELING OPERATIONS

CONSTRUCTING A SUBAQUEOUS TUNNEL BY THE SHIELD PROCESS



HUDSON RIVER VEHICULAR TUNNEL

Interior of tunnel lining showing bulkhead with the manlocks above and the mucklocks below with a heavy blanket of clay deposited from scows was followed, and, although the air pressure required to balance the outside water pressure at the bottom of the tunnel was practically an atmosphere different from that required at the top, no serious loss of air and no blow-outs occurred. The work was perfectly organized and executed. See JERSEY CITY.

Another method of subaqueous tunnel building, the trench method, also has been brought to a high degree of perfection. The largest subaqueous tunnel in cross-section in the world, the Oakland Estuary Tube, was completed by this method in 1928. It is 3545 feet long between portals and two-thirds of this length is made up of 12 precast segments, practically huge sections of pipe, built in drydock, floated to the site and sunk in position in a trench previously dug in the estuary bottom. In part of the trench, piles were driven to support these sections of the tube, the bottom of which was as much as 90 feet below water level. Generally, the sections simply form forms about which concrete is deposited by tremie tubes from scows at river level. When the tunnel is entirely closed in, the water is pumped out and the interior lining and construction is put in place. The Oakland tube section is 37 feet outside diameter and provides a roadway 24 feet wide. See OAKLAND.

Contracts were let in 1928 for another important tunnel to be built in part by the same method, the Detroit-Windsor Tunnel, a vehicular tunnel to connect Detroit, Mich., with Windsor, Ont. The method is thus well established and is used where river and other conditions make it a more economical construction than the shield and compressed-air process.

Highway Tunnels. It will be noted that the most important of these subaqueous works are highway or vehicular tunnels. The vehicular problem today is, of course, an automobile and motor-truck problem. Ventilation in long vehicular tunnels is therefore a very important element.

An intensive study of the ventilation of vehicular tunnels was made in connection with the the Liberty Tunnel at Pittsburgh. This consisted of two tunnels 26½ feet wide and 5715 feet long between portals. This, of course, was a land tunnel through the South Hills, and, while it was found that the amount of carbon monoxide—usually limited to four parts in 10,000—varied with the amount of traffic and movement of vehicles, as well as the direction of the wind, it was clearly demonstrated that forced ventilation was essential.

This problem also received very careful attention in the Holland Tunnel and provision was made for an air inlet in the circular space below the roadway with inlet ports along the curb, and for air outlets in a similar space between the flat roof and the tunnel top. Large ventilating buildings were installed on piers at the river edge and also at each end, about midway between the pier ventilating buildings and the portals. These buildings were completely equipped with ventilating fans of the most modern type and the system has been most satisfactory in service.

Great Tunnel Projects. In connection with subaqueous tunneling, it should be noted that plans are again being discussed for a Channel Tunnel. It would appear that there is at last hope that this much needed tunnel will be built. An investigation also is under way for a tunnel under the Strait of Gibraltar—a very difficult and costly undertaking because of the great depth to which the tunnel would have to be carried to keep it in sound rock. It would therefore appear that modern methods of tunneling permit the engineer to meet practically any condition of construction or design and that the size of any tunneling operation is largely a matter of business economics—if the project shows an adequate return on computed cost and operating expenses, and if funds can be secured, modern engineering still stands ready to design and construct the project irrespective of length or size.

Bibliography. Recent works in this field include: David W. Brunton, and John A. Davis, *Modern Tunneling*, rev. ed. (New York, 1922) includes new chapters on railroad tunneling by J. Vipond Davies, considerable attention to American practice in tunnel construction being paid B. H. M. Hewett; and S. Johannesson, *Shield and Compressed-Air Tunneling* (New York and London, 1922), as well as the engineering journals.

TUNNEY, GENE (1898–). An American heavyweight boxing champion, who was born in New York City, where he was educated in public and parochial schools. Leaving school at an early age, he became a clerk in a freight office. He first attracted attention in boxing circles by two successful bouts in 1918. Shortly afterward he enlisted in the U. S. Marines and was sent to France, where he won the heavyweight championship of the A. E. F. Returning to the United States, he won the light heavyweight championship from Battling Levinsky, lost it in 1922 to Harry Greb, and rewon it from Greb the following year. Later, he entered the heavyweight class and won with knockouts over Carpentier, Tommy Gibbons, and Bartley Madden. He succeeded to the heavyweight championship by defeating Jack Dempsey in a 10-round bout at Philadelphia, Sept. 23, 1926, and successfully defended his title in a second bout with Dempsey in Chicago a year later. On July 26, 1928, in New York City, he knocked out another challenger, Tom Heeney, in the eleventh round. In October of the same year, he announced his retirement from the ring. He was married in Rome in 1928 to Miss Mary Josephine Lauder.

TURBINES, STEAM. See STEAM ENGINES AND STEAM TURBINES.

TURINA, JOAQUÍN (1882–). A Spanish pianist and composer, born in Seville. He received his first instructions in his native city from Rodríguez (piano) and Torres (theory), then was a pupil of Tragó in Madrid, and in 1905 went to Paris, where he finished his pianistic studies under Moszkowski and studied composition under d'Indy at the Schola Cantorum. He remained in the French capital until 1914, when he settled in Madrid as conductor of the Russian Ballet and as pianist of the Quinteto de Madrid. As a teacher, he exerted a wide influence in raising the standard of musical education throughout Spain. He and de Falla are the leaders of the younger Spanish composers who are, in their main characteristics, following the ideals of the French impressionists. Turina's principal works are the operas *Margot* (Madrid, 1914), *Navidad* (1916), *La Adúltera penitente* (Barcelona, 1917), *El Jardín del Oriente* (Madrid, 1923); two symphonic poems, *La Procesión del Rocío* and *Evangelio de Navidad*; *Sinfonía sevillana*; *Danzas fantásticas*; a string quartet; a piano quintet; a piano trio; numerous compositions for piano. He also wrote *Enciclopedia abreviada de Música* (2 vols.).

TURKESTAN, tŏŏr′kĕ-stän′, Russian (Turkmenistan). Since the Russian Revolution, an autonomous republic in central Asia federated with the Union of Socialist Soviet Republics. It was governed after Apr. 12, 1921, when Moscow relinquished control, by its own Central Executive Committee and Council of People's Commissaries. On Oct. 27, 1924, the Trans-Caspian Region of Turkestan, the Charjiui vilayet of Bokhara, and a part of Khiva on the west bank of the Oxus were organized as the Turkoman Soviet Socialist Republic. In May, 1925, the Turkoman Republic became a constituent republic of the Soviet Union. Former Russian Turkestan comprised the provinces of Ferghana, Samarkand, Semiryetchensk, Syr-Darya, and Transcaspia and had an area of 571,650 square miles and a population of 7,201,551 (1920). The population in 1912 was 6,416,700. The Turkoman Republic has an area of 189,603 square miles and a population of 1,030,549. Ashkabad, population 47,155 in 1929, is the capital. Other large towns are Merv, Charjiui, Kerki, Tashauz. The population is 70 per cent Turkoman and 16 per cent Uzbeks. Cotton, wool, Astrakhan fur, carpets, ozokerite, oil, sulphates, salt, and sulphur are the main products. There are 955 miles of railway line in the territory. See Russia.

TURKESTAN, Chinese. See Sinkiang.

TURKEY, tûr′kĭ. A republic since Oct. 29, 1923. In 1914 Turkey possessed a total area, excluding Arabia, of about 700,000 square miles. Its population at that time was about 21,274,000. By the Treaty of Lausanne of July 24, 1923, the Turkish boundaries were delimited so as to include only about half of its area of 1914, and less than half of its former population. Turkey's territory was thus made up of Anatolia, the Constantinople district, Thrace east of the Maritza River (in Europe), Kars, Ardahan, and some few islands, especially Imbros and Tenebos. The population, too, was seriously reduced. According to the census of 1927, the total population was 13,649,945. The population of the principal cities follow: Constantinople, 673,029; Smyrna, 153,845; Angora, 74,784; Adana, 72,652; Brussa, 61,450; Konia, 47,286; Ghazi-Aintab, 39,571; Cæsarea, 39,544; Adrianople, 34,669.

Agriculture. Turkey is essentially an agricultural country. The principal products are tobacco, cereals, cotton, dried fruits, nuts, olives and olive oil, silk, gums, and opium. Returns for 1927 indicated an improvement over 1926 for most crops. Tobacco production was 91,500,000 pounds, against 84,000,000 pounds in 1926 (1924, 170,000,000 pounds; 1925, 104,500,000). Cotton at 57,360,000 pounds (1926–27) showed a considerable increase (1924–25, 37,478,000 pounds; 1925–26, 50,263,000). The fig and raisin crops of 25,000 and 47,000 metric tons, respectively, were somewhat inferior to 1926 returns, but the filbert output was 15,000 metric tons against 5000 tons in 1926. The wheat crop was below the 4,700,000 metric tons produced in 1926. The 1927 olive-oil yield was estimated at 4,580,000 gallons. Opium production was estimated at 3000 cases (ranging from about 132 to 165 pounds) against 4750 in 1926 and 4500 in 1925. Live stock in 1927 consisted of 5,045,000 cattle, 13,222,000 sheep, 8,668,000 horses, and 955,000 mules and asses. Wool production was about 11,900,000 and the mohair clip, 8,157,000 pounds.

Mining. While no comprehensive geological survey ever has been undertaken in Turkey, it is generally believed that the country possesses vast mineral wealth. Some of it, such as coal, chrome, emery, lead, copper boracite, meerschaum, salt, marble, mercury, antimony, and gypsum, is already being extracted, with a promise of material development.

Manufacturing. Industries in Turkey are mostly quite primitive. There are a few textile mills, sugar factories, fig-packing establishments, and cotton ginneries. There has been a slow recovery of the leading industries which followed the exodus of the non-Moslem population, who predominated in this field. The progress in the rug industry is indicated by the increase in the export of rugs through the port of Smyrna to 11,782,000 pounds in 1927, as compared with 10,382,000 pounds in 1926 and 8,809,000 pounds in 1925. Sugar factories opened near Smyrna and in Thrace in 1926, produced 5620 tons in 1927. Total manufacturing plants in 1927 numbered 65,245 with 256,855 employees.

Commerce. Imports and exports for 1926 were $122,574,000 and $98,096,000, respectively. In 1920 imports were $155,286,000 and exports $43,659,000, and in the fiscal year 1913–14, they were $175,455,000 and $104,222,000, respectively. The five leading exports in order of value in 1926 were tobacco, fruits and vegetables, wool, cotton, and chemicals, and drugs; the five leading imports in similar order were cotton and manufactures thereof, metals, wool and manufactures thereof, sugar, coffee, tea and spices, and mineral oils. The United States supplied 3.5 per cent of the imports and purchased 13.2 per cent of the exports; France, 13.6 and 12.2; Germany, 13,8 and 12.6; Italy, 15.8 and 27.6; and the United Kingdom, 14.1 and 11.4.

Communications. New Turkey had in operation 2796 miles of railway in 1928, and the Government had 1383 miles of new railway under construction. There are no navigable rivers in Turkey, but the long coast line compensated to some extent for the lack of highways and waterways. The number of post offices in Turkey was estimated at over 2000 in 1929. Turkey's shipping after the World War was in poor condition. It was estimated that Turkey had not more than 110,000 tons of shipping at the beginning of the War. In 1927 the Turkish merchant marine was estimated at 186,986 tons. Most of the Turkish shipping was limited in equipment. Turkey under the National Assembly limited her coastal shipping exclusively to vessels under Turkish registry, with the result that a new impetus was given to the development of a national merchant marine. Ship tonnage at Smyrna was 1,775,000 tons in 1927, at Constantinople 11,321,654.

Finance. Budget estimates for 1928–29 showed receipts at £T207,173,000 and expenditures at £T194,580,000; those for 1929–30 disclosed revenues of £T220,291,300 and expenditures of £T220,297,200. The debt of the Ottoman Empire at the close of the World War was $548,618,000, of which Turkey is now responsible by virtue of the Treaty of Lausanne, for 70 per cent or $382,184,000. The total annuity of the debt was $47,282,000 and the new Turkey's share, $31,539,000. Turkey is to pay on the principal for the first seven years, beginning June, 1928, £T2,000,000 gold annually. This annual payment is gradually increased for each period of seven years, reaching its maximum, £T3,400,000 gold, beginning June, 1951. A plan to retire the old paper currency went into effect on Nov. 1, 1927. The total new paper currency amounted to £T153,000,000.

Education. Under the Republic, education is nominally compulsory for all children of both sexes. The schools are directly in charge of the Ministry of Education. The policy of the republic has been to abolish religious schools of all kinds and replace them with government schools. The government schools comprise primary grades, secondary schools, training schools for teachers, and the University of Constantinople. No satisfactory educational statistics for the Republic have been published down to 1929. On Nov. 1, 1928, the National Assembly passed a law for the adoption of the Latin alphabet. Publication of books in Arabic characters was forbidden after Jan. 1, 1929.

History. The friendly policy which the German Emperor pursued toward Turkey from the beginning of the twentieth century bore fruit before the World War was many months old. Russia's known designs on the Straits, England's retention of Cyprus, the spread of English influence in Egypt, the Pan-Slavic movement which implied the irretrievable loss of Turkish territory in Europe—all militated against the maintenance of a friendly attitude toward the Allies. Late in October, Turkey's hand was forced when a German-Turkish squadron, headed by the German Admiral von Souchon, bombarded Russian Black Sea ports. On October 31, Russia retaliated by declaring war. The other Allies followed suit. The character of the struggle was immediately and profoundly changed. From being a war localized in Europe, its incidence spread over the Near East and touched India. English troops before long were engaged in Mesopotamia and in defense of the Suez Canal. Here was the origin of the ill-fated expedition to force the Dardanelles and of the prolonged struggle in the Saloniki region. Now, too, there was danger that the entire Moslem populations of Arabia, India, and Egypt might plunge into a Holy war at the behest of the Sultan, who was their Caliph or religious head.

Fortunately for the Allies, however, the dangers of a Holy War failed to materialize, and while India and Egypt remained at least relatively quiet, some of the Arabs, headed by the Grand Sherif of Mecca, actually declared their independence in 1916. This separatist spirit was fomented and abetted by such able British agents as Colonel Lawrence and Gertrude Bell (see ARABIA). From 1916 on, Turkish arms, except on one front, were everywhere unsuccessful.

After an initial setback, the British succeeded in overrunning Mesopotamia; in 1917 Palestine was lost to the Turks; and in 1918, Syria. In Transcaucasia, Turkey emerged triumphant after the collapse of Russia, and by the Brest-Litovsk Treaty received the former Turkish provinces of Kars and Ardahan. Beset by enemies on all sides and confronted by pressing internal problems of which famine and brigandage were only the more evident, on Oct. 12, 1918, the Turkish government appealed to the United States by way of the Spanish Ambassador at Washington for an immediate cessation of hostilities. On October 30, Turkey surrendered to the British Vice Admiral Calthorpe and on the next day accepted the terms of the Armistice of Mudros. Its conditions were drastic: the Dardanelles, Bosporus, and Black Sea were to be opened to the Allies; the army was to be demobilized, and all Turkish war and merchant ships surrendered; troops were to be withdrawn from Transcaucasia. With its acceptance, the Young Turk movement collapsed, too, and Enver, Taalat, and Djemal, with the other members of their party, fled the country.

The Turkish people, however, refused to accept the status of a conquered nation, and in the period following the War, so assiduously played the diplomatic game that, as a result of the Greek defeat and the mutual jealousies of the French and the British, Turkey emerged to a large extent triumphant. In 1919 her rulers were prepared to accept extensive territorial losses as well as the restoration of the Capitulations (which Turkey had terminated on her entrance into the War), and an international control of the Straits; but the unwise decision of the Supreme Council early in 1919, at the prompting no doubt of Venizelos, to deprive Turkey of Thrace as well as Smyrna, aroused patriotic Turks to a fury that became white hot when Greek troops were landed in Smyrna in May, 1919. The last straw was the signing of the Treaty of Sèvres on Aug. 10, 1920, by representatives of the discredited Sultan Mohammed VI, who had succeeded to the throne upon the death of Mohammed V, in July, 1918.

The treaty clearly reflected the selfish interests and rivalries of the Western Powers in the Near East. By it, Turkey was to become a shadow of her former self. Thrace, the islands of Tenedos and Imbros, the Dodecanese, Smyrna (for five years preceding a plebiscite), Cyprus, Egypt, Armenia, Mesopotamia, Syria, Palestine, and the Hedjaz were lopped off. Constantinople was to remain Turkish, but the Dardanelles, the Sea of Marmora, and the Bosporus were to form a "Zone of the Straits" under international control. An independent Armenia was established and the drawing of its frontiers entrusted to President Wilson, who finally delimited a state of 30,000 square miles with an outlet, Trebizond, on the Black Sea, but the Turkish Nationalists refused to accept the treaty, as, ironically enough, did the governments of all the signatories. Meanwhile, with the consent of the Supreme Council, Greek forces had occupied Eastern Thrace and spread over Smyrna.

Then, much to the astonishment of the Allies, things began to happen in Turkey. The Turkish Nationalist Party, led by Mustapha Kemal Pasha, after signing a National Pact on Sept. 13, 1919, set up a Grand National Assembly at Angora in the heart of Anatolia, and thus far removed from Allied influences at Constantinople. On Jan. 20, 1921, this Assembly voted a new constitution for Turkey in the form of the Fundamental Law. This document vested the sovereignty in the people and in their representatives (elected every four years) at Angora. Universal male suffrage without distinction as to religion or race was provided for, and a programme of social reform projected. Next, the Nationalists refused to recognize the Treaty of Sèvres as binding, and Mustapha Kemal, as President of the Assembly and Commander-in-Chief, set out to clear the country of the foreigners.

Kemal was born in 1880 of a politically powerful family, became an army officer, took part in the Young Turk Revolution of 1908, fought in Tripoli in 1911 and 1912, as well as in the Balkan wars, and was largely responsible for the failure of the Allies at Gallipoli in 1915. He was chagrined when the Sultan signed the Armistice in 1918, and called the Nationalist Congress to meet at Erzerum on the Black Sea. For this, the Sultan, at Allied request, sent an army to subdue him, but Mustapha defeated it with ease and made arrangements for the meeting of the National Assembly at Angora in 1920. He then embarked upon a career which was so glorious as to win for him the title of Ghazi, meaning Conqueror.

In an understanding with Soviet Russia, effected late in 1920, Mustapha, representing Nationalist Turkey, was promised financial and material aid, as well as supplies of men to facilitate a readier communication with Transcaucasia, a Turkish Army marched into the Armenian Republic of Erivan in September, 1920, and by November had not only humbled it but celebrated its victories by bloodshed. The massacres recalled the days of 1915–16. The result was the establishment of a Soviet state of Armenia, the cession once again of the provinces of Kars and Ardahan to Turkey, and the establishment of communications between Erzerum and Azerbaijan.

Meanwhile, the defeat of Venizelos in the Greek elections of 1920, the return of King Constantine as a result of the plebiscite of Dec. 5, 1920, and the withdrawal of Allied aid to Greece, changed the whole aspect of the situation once again. Dissension in the Allied councils was now too plain. The English support of Greece had been uncertain; the French in a year had made a *volte-face* and were openly favorable to Turkey. The purposes of the two countries conflicted sharply, as a result of their imperialistic ambitions in the Near East. All these factors led to an attempt in February, 1921, to revise the Treaty of Sèvres, at the expense of Greece, and for the grudging reconciliation of the Nationalists. Greece, against the advice of the Supreme Council, refused to compromise and in March, 1921, took into her own hands the enforcement of the Treaty of Sèvres.

As the war between Turks and Greeks dragged on during 1921–22, France took the opportunity to seek her own advantage, at the expense of Allied unity. On Oct. 20, 1921, an agreement was signed with the Angora government by which, for the price of withdrawal from Cilicia, the French gained immunity in Syria, as well as important financial and mining rights and a lease of a part of the Bagdad Railway. Italy likewise concluded a secret agreement with Angora.

In the summer of 1922, the Greek troops, exhausted, poorly led, with a shattered morale as a result of the uncertainties of the home situation, everywhere gave way, murdering and pillaging as they retired, and in September, were compelled to evacuate the city of Smyrna. Before the end of October, the country was free of the invader. (For a discussion of the war, see GREECE.) The alarm of Europe at this turn of events would be difficult to exaggerate. A triumphant Turkey might menace the security of Thrace, Syria, Mesopotamia, Arabia, the well-being of the Christian populations of Asia Minor and the Jews of Palestine, and the peace of mind of the whole Moslem world. Premier Lloyd George strenuously objected to the appearance of a Turkish force in Europe, hastened troops into the Chanak region to oppose a passage into Thrace, and in spite of a studied French and Italian indifference, worked heroically, by a mixture of doggedness and forbearance for the arrangement of a peace. An armistice was signed at Mudania, October 10, which was tantamount to a Turkish triumph, for the Greeks were compelled to evacuate Thrace. The Turks met with the Allies on Nov. 20, 1922, at Lausanne, to draft a definite peace treaty. The conference sat for 11 weeks, broke down in February, 1923, because of the Turkish rejection of the Allies' proposals, and then resumed sittings on April 23. On July 24, a treaty was signed by Great Britain, France, Italy, Japan, Greece, Rumania, and Turkey which unmistakably revealed the regeneration of the Turkish spirit and the breakdown of Allied unity.

In an atmosphere of intrigue which clearly indicated that Europe had learned nothing from the War, a peace was effected which left Turkey secure in Europe and in control of Constantinople, the Bosporus, and the Straits. Syria, Palestine, Mesopotamia, the Hedjaz, and Yemen were severed from Turkey, the Dodecanese were given to Italy and not to Greece, while Eastern Thrace to the Maritza line and the whole of Anatolia, including Smyrna, were left in Turkish hands. The Capitulations were abandoned in exchange for promises of judicial reform, and provision was made for a wholesale exchange of Turkish subjects in Greece for Greek subjects in Asia Minor. Conventions for the regulation of the Straits and the demilitarization of the Greek-Bulgarian-Turkish frontier in Eastern Thrace were also signed.

At peace with the world at last, Turkey could now concentrate upon internal reforms. Already on Nov. 3, 1922, Mohammed VI had been forced to abdicate, and the Assembly then elected Abdul Mejid Caliph in his place. Then, on Oct. 29, 1923, Turkey was officially declared a republic with its capital at Angora, and Mustapha its first President. On Mar. 2, 1924, the Assembly went still further and abolished the Turkish Caliphate entirely, at the same time exiling all the members of the House of Osman and depriving them of their Turkish citizenship. The Caliphate, for centuries held by Ottoman sultans, nominally implied spiritual headship over the entire Moslem world, but its real importance was grossly exaggerated by public opinion in the Occident. In reality, the Caliph had long been disregarded not only by the schismatic Shiahs of Persia, but by the millions of orthodox Mohammedans in non-Ottoman countries. Nevertheless, after the Angora Assembly's action, rival aspirants to the Caliph's vacant office appeared on every hand—the King of Egypt, the Sultan of Morocco, the Aga Khan of Bombay, and the King of the Hedjaz; but the Caliphate remained an unappropriated honor.

Although the new constitutions of 1923 and 1925 still mentioned Islam as the religion of the state, an amendment to the constitution in 1928 finally declared that Turkey no longer had a state religion. In other words, Mohammedanism was tolerated in the same way that any other religion was tolerated, and Mohammedan mosques no longer received state support.

In the matter of political, economic, and social reform, two slogans influenced the Government's activities: "Turkey for the Turks" and "Efficient Turks for Turkey." The first ideal was carried out by the deportation of the Greeks, and by the passing of laws prohibiting members of foreign nationalities from settling in Turkey. Turkish labor, Turkish capital, Turkish ownership, and products, were to prevail. The second ideal was carried out by a process of Europeanization—startling, quick, and dictatorial. Although he was regularly reëlected for a further four-year term on Nov. 1, 1927, under the provisions of the new constitution of October, 1925, Kemal did not try to hide the fact that he was virtually Dictator of Turkey; but the Turks were accustomed to arbitrary rule, and Mustapha was popular, so that he had relatively little opposition. In 1925 polygamy was abolished and the wearing of the veil on the part of women made optional. New divorce laws were promulgated and various professions and public offices thrown open to women. In the summer of 1929, they were given the right to vote in municipal elections.

In 1926 the old Mohammedan law codes were abolished and replaced by adapted forms of the Swiss civil code, the Italian criminal code, and the German commercial code. The Gregorian calendar also was adopted in 1926, and civil marriages made obligatory, though religious ceremonies might follow if desired. The number of primary schools in 1928 was twice the number in 1914, and in May, 1928, a law was passed providing for the gradual introduction of the Western alphabet and numerals over a period of from five to fifteen years. A new official dictionary containing only words of Turkish origin (about 24,000 in number) was published in 1929. The wearing of the fez, or turban, was prohibited. Many economic reforms were introduced, and deserving families were given state aid in setting themselves up on Anatolian farms. Mustapha, like Mussolini, had his own model farm. Special government departments were created to study agriculture, commerce, and shipping. Commercial treaties were negotiated with most European countries, but every project to speed reconstruction by the aid of foreign money was discouraged. A new tariff law went into effect Oct. 1, 1929. New railways and telegraph and telephone systems were built as rapidly as finances permitted, and before long Turkey also had its share of motion-picture houses and jazz palaces.

In foreign policies, Turkey continued to be suspicious of the League of Nations, especially after 1925, when the League decided against it in a dispute with England over northern Iraq. This made it draw closer to Russia with which country a treaty of friendship and arbitration was signed in 1923 and strengthened and renewed in 1925 and 1928, when a similar treaty was signed with Italy, which fact caused considerable fright in France. There were rumors late in 1928 of a proposed Afro-Asiatic alliance between Persia, Afghanistan, Egypt, and Turkey, but the latter country's gaze was centred so strongly on the West, that there seemed little ground for believing in the possibility of an entangling alliance with the more decidedly Oriental countries. Although the United States Senate definitely rejected the Lausanne Treaty on Jan. 18, 1927, a *modus vivendi* had to be found since economic interests were again beginning to outweigh diplomatic considerations. Accordingly, by an agreement of Feb. 17, 1927, provision was made for a renewal of diplomatic and consular relations, and on May 20, 1927, Joseph C. Grew was appointed American Ambassador to Turkey. The *modus vivendi* was to last until June 1, 1928, with possibilities for renewal. On June 1, 1928, then, it was renewed for another year, and on June 1, 1929, it was again extended to run until June 1, 1930. For the dispute regarding Mosul, see IRAQ. See also the following articles: PEACE CONFERENCE AND TREATIES; SMYRNA; THRACE; CILICIA; ARMENIA; AZERBAIJAN; GEORGIA; ARABIA; IRAQ; PAN-ISLAMISM; PAN-TURANIANISM; CALIPHATE; GREECE.

TURNER, WALTER JAMES REDFERN (1889–). An Australian poet and musical critic who was educated at the Scotch College in Melbourne, traveled, and then settled in England where he became musical critic on the *New Statesman* (1916–), and was also dramatic critic for the London *Mercury* (1919–23), and literary editor of the *Daily Herald* (1920–23). His poetry tends toward the romantic, and has an unusual detachment from the events of daily life. He wrote two plays, *The Man Who Ate the Popomack* (1922) and *Smaragda's Lover* (1924). Besides many articles for magazines, his writings, largely poetry, include *The Hunter and Other Poems* (1916); *The Dark Fire* (1918); *In Time Like Glass* (1921); *Music and Life*, essays (1921); *Landscape of Cytherea* (1923); *Variations on the Theme of Music*, essays (1924); *Orpheus, or the Music of the Future* (1926); *Marigold, an Idyll of the Sea* (1926); *Beethoven* (1927); *The Æsthetes* (1927); and *Musical Meanderings* (1928).

TURNER, WILLIAM (1871–). An American Roman Catholic bishop, born at Kilmallock in Ireland. He was graduated from the Royal University of Ireland in 1888, and studied at the American College at Rome and in Paris. In 1893 he was ordained priest and from 1894 to 1906 was professor of philosophy at St. Paul Seminary. From the latter date to 1919, he occupied the same chair at the Catholic University of America. In 1919 he was consecrated Bishop of Buffalo. Bishop Turner is the author of *History of Philosophy* (1903), and *Lessons in Logic* (1911). He edited *The American Ecclesiastical Review* from 1914 to 1919, and was associate editor of *The Catholic Historical Review.*

TURPAIN, ALBERT CAMILLE LÉOPOLD (1867–). A French physicist, born at La Rochelle, and educated there at the École Fénélon. He became professor of physics at the University of Poitiers and was one of the first to perform experiments in wireless telegraphy. His works include: *Recherches expérimentales sur les oscillations électriques* (1899); *La Télégraphie sans fil et les applications pratiques des ondes électriques* (2d ed., 1908); *Leçons de physique* (2 vols., 6th ed., 1920); *Manipulations de physique* (1908); *Téléphonie* (1909); *Télégraphie* (1910); *La Lumière* (1913); *L'autre ennemi; Son invasion, ses progrès, ses mefaits, sa carte de guerre* (1917); *Vers la Houille Blanche* (1918); *Manipulations électro-techniques* (1920); and *Conférences scientifiques*, his collected essays (5 vols., 1924).

TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE. A nonsectarian, coeducational normal and industrial school for the education of Negro youth, at Tuskegee, Ala., founded by Booker T. Washington in 1881. The student enrollment rose from 1527 in 1914 to 3323 in 1928. In the same period, the faculty increased from 192 to 274 members; the library from 20,000 to 40,000 volumes; productive funds from $1,942,112 to $7,308,397.36; and yearly income from $473,764 to $485,206. A group of boys' trades buildings was constructed in 1919 at a cost of $226,000, and the Ellen Curtiss James Hall, a dormitory for girls, in 1920. Junior college courses of three years in agriculture and two years in teacher training and business practice were added to the regular academic course. The Institute received an anonymous gift of $250,000 for permanent improvements in 1916 and $800,000 from the will of Mrs. Russell Sage in 1919. President, Robert Russa Moton, LL.D.

TUTANKHAMEN. It would probably be difficult to discover an Egyptian King of whom less is known historically and who at the same time is better known to the civilized world. The fame is of course due to the discovery of his tomb and its indescribably sumptuous contents by Lord Carnarvon (died 1923) and Howard Carter in 1922. Finds of amazing richness and beauty have continued to be made up to the present time. Not the least interesting discovery late in 1928 was that iron was still looked upon as a precious metal in Tutankhamen's time. The fourth and last chamber of the King's tomb was cleared in 1928. This Pharaoh, whose funerary furnishings are the most splendid yet discovered, belongs chronologically to the end of the eighteenth dynasty. He was the husband of the third daughter of Akhenaten, or Amenhotep, the famous heretic King, and came to the throne a short time before or after the death of his father-in-law—probably after it. We do not know whether he was of royal blood. It is believed that he died when he was hardly more than a boy. At the time of his marriage, his wife, Ankh-es-en-pa-Aten, could hardly have been over ten years old. Just how long Tutankhamen ruled also is unknown, though certainly it was at least for six years.

It is common knowledge that Akhenaten, the dreamer, by his substitution of a monotheistic religion, had alienated the priestly caste, who found themselves well in the way of losing power. It is equally well known that in all probability the idealism of the King was incomprehensible to the uneducated, who must have longed for a return to the traditional form of worship of the country. During the reign of Akhenaten, too, the foreign policies of Egypt lacked vigor and the Empire abroad was crumbling. It is small wonder that soon after his death there should have been a violent reaction toward the traditionally accepted forms of religion. How soon this took place may be estimated from the fact that on the back of one of the chairs found in the tomb of Tutankhamen appears the symbol of the god Aten, while elsewhere in the same room the name of the youthful ruler is spelled with the ending "amon," showing that the maintenance of his position upon the kingly throne probably required him to return to an allegiance to the older form of worship. In view of his youth, it is a matter of speculation how he came to occupy the throne at all. He seems to have been too young to count for much on his own part. Perhaps the answer is to be found in the fact that his successor, Aye, who during Tutankhamen's reign was chief priest, represented himself on the wall of the burial chamber of the young King's tomb. Since it is most unusual for any other than the deceased King himself to appear in decorations of his tomb, the suspicion arises that this priest chose to have the young Tutankhamen on the throne as a matter of policy, for the boy would be likely to prove pliable in the hands of this powerful friend of the family, who felt perhaps that the time was not ripe for him to seize the throne for himself. For description of his tomb see ARCHÆOLOGY.

TUTUILA. See SAMOA, AMERICAN.

TWENTY-ONE DEMANDS. See CHINA; JAPAN; SHANTUNG.

TYDINGS, MILLARD E. (1890–). A United States Senator. He was born at Havre de Grace, Md., and graduated at Maryland Agricultural College in mechanical engineering. He studied law at the University of Maryland and was admitted to the bar in 1913, beginning practice at Havre de Grace. In the World War, he was with the A.E.F. in France as lieutenant colonel in the 29th Division, Machine Gun Units, winning the Distinguished Service Medal. He was a member of the Maryland House of Delegates for two terms, becoming Speaker in 1920–22. Later, he was sent to the Maryland Senate and during 1923–27 represented the 2d District in the Sixty-eighth and Sixty-ninth Congresses. In 1926 he was elected as a Democrat to the U. S. Senate for the term ending in 1933. He has been a member of the Senate committees on District of Columbia, inter-state commerce, naval affairs, public buildings and grounds, and territories and insular possessions.

TYNAN, KATHARINE. See HINKSON, MRS. KATHARINE.

TYPHOID FEVER. During the World War, typhoid in the ordinary course of events would have been a tremendous menace to the troops, but the successful use of mass preventive measures, as carried out in the mobilization of 15,000 United States troops along the Rio Grande when hostilities with Mexico threatened, had shown what can be done in war time. The warring troops were as rapidly as possible immunized against typhoid, the two paratyphoid fevers, and dysentery; usually, three serial inoculations were practiced. In addition, the older sanitary measures, such as proper construction of latrines and disposal of feces, anti-fly campaigns, etc., were practiced. As a result, the troops were remarkably free from these infections throughout the War, although it was found that protective inoculation of troops after prolonged exposure to hardships could not always be guaranteed.

In civil practice, it was shown again and again that combined prophylaxis against typhoid in cities can stamp out the disease even in communities as large as Chicago. The water supply must be pure, and city dwellers about to go on summer vacations and to drink from doubtful wells are urged to subject themselves to preventive inoculation. Campaigns against house and stable flies are encouraged by health authorities. It is often found that the greatest obstacle encountered in eradicating the disease entirely is the so-called "typhoid carrier" who still harbors the virus about his, or more often her, person, and who is able to contaminate the food supply of houses and institutions. The worst carriers are cooks and others who come in contact with the food.

The great epidemic at Montreal in 1927 has been styled one of the most deplorable in modern times. Over 5000 were stricken and there were 545 deaths. The epidemic originated from an insanitary milk supply from a focus in Quebec and in the earlier weeks, the local health authorities were accused of an almost mediæval indifference to the peril of the community, for they did practically nothing in the way of tracing the source of infection. Pasteurization of the milk supply alone should have averted most of the danger.

At about the same time, Mussolini was ordering a vigorous campaign of compulsory anti-typhoid vaccination for Italy, restricted, however, to the groups most disposed to contract or diffuse the disease, save when an epidemic threatened, when the practice became compulsory for all exposed. Owing to certain objections to anti-typhoid vaccination in some industrial localities, the method of peroral immunization has been tested and favorable reports have been received, for example, from the Jugoslavian city of Osijek. Swimming-pool and bathing-beach sanitation against the spread of typhoid has become more active, since it has been found that there is no possibility of keeping certain shore waters free from sewage pollution.

TYPHUS FEVER. During the World War, knowledge of this affection was notably augmented. Much also was learned from a study of Mexican typhus, which occasionally crosses into the United States; during 1923 there was a small epidemic in southern California. The part played by the louse as the sole medium of transmission became fully realized, and prevention of its spread was effected chiefly by delousing and by the use of approximately louse-proof apparel by those necessarily exposed. A few cases appeared in western Europe during the War, but gave no trouble, and it was shown in the intensive anti-typhus campaign that there were a few cases in Paris which may not have been imported, recalling the so-called Brill's disease sometimes encountered in New York. It was realized that the true virulent disease might run a mild course and that the malignancy of epidemics is due to rapid passage through its victims, facilitated by overcrowding and the low resistance of the patients, who are often in a state of semi-starvation. During the War, the countries ravaged by typhus were Russia, the Balkans, Poland, and Galicia, and the disease extended eastward into Asia. Its invasion of the rest of Europe was held in check only by the most intensive efforts; only a few hundred cases occurred in mid-Europe. The cause has never been determined, although many organisms have been accused and serological studies have been of use in diagnosis. No specific remedy has been discovered.

TYROL, tĭr′ŏl. A province of the Republic of Austria. Its area in 1910 was 10,301.7 square miles; in 1923, 4882 square miles. Its population in 1910 was 946,613; in 1923, 313,885. See AUSTRIAN REPUBLIC; TYROL, GERMAN SOUTH.

TYROL, GERMAN SOUTH. On the possession of this area, made up of the districts of Trentino (area, 2454 square miles) and Alto Adige (area, 2953 square miles) centred a bitter struggle between Austria and Italy, and though Italy emerged victorious in 1919 by gaining the region through the Treaty of St. Germain, subsequent events revealed that it still remained a source of grave conflict. Racial figures reveal the situation. The Trentino, in 1910, contained, 13,450 Germans and 360,847 Italians; Alto Adige had 215,796 Germans, 6704 Italians, and 19,605 Ladins (who speak a dialect akin to Italian). Italy's claims, therefore, for frontier rectification north of the Trentino could be based only on strategical grounds. Austrian control of the Alpine passes meant that the plains of Lombardy and Venetia lay always open to a hostile attack, and the easy success with which the Austrian armies had poured into Italy in 1916 gave point to the contention. This consideration had been behind one of the guiding principles of the Italian foreign policy. In the early months of the World War, when both sides were exerting all their efforts to gain either Italian adhesion (Allies) or to assure Italian neutrality (Central Powers), Baron Burian for Austria made two Austrian offers. The second of these offered to cede the Trentino, but halted at the transfer of Bozen. On May 3, stating that an agreement was impossible, Sonnino declared for Italy that the treaty of alliance with Austria was terminated and that henceforth Italy reserved to herself "complete liberty of action." It is interesting to note that a week preceding, on Apr. 26, 1915, Italy had signed with the Allies the secret Treaty of London, by which, for her actual support in the War, she was assured not only the Trentino and Bozen but the whole German South Tyrol to the Brenner Pass, including the old German towns of Bozen, Brixen, and Meran and the wholly German-populated valleys of the Oltzthal and the Zillerthal. On this treaty, Italy plainly took her stand at the Peace Conference. Regardless of the fact that there were 230,000 Germans in the territory, that the Ladins in October, 1918, had expressed their sympathies as being with the German Tyrolese, and that the whole Tyrol was a political and economic unit, the Peace Conference finally yielded to the Italian demands and incorporated, substantially, the London line into the Treaty of St. Germain (on May 29, 1919).

There was widespread disaffection on the part of the smaller powers because Italy, unlike themselves, was not compelled to sign a Minorities Treaty. It was plain that for an Italia Irredenta an Austria Irredenta had been substituted. The events of 1919–29 only served to confirm this fact. On Jan. 20, 1919, the Austrian Tyrolese Diet passed a resolution refusing to recognize the cession of South Tyrol; in April, 1921, the Austrian Tyrolese, realizing that the weakness of their own country might stand in the way of an eventual readjustment, voted for union with Germany. On the other hand, Italy, perversely it seemed, did everything to fan the flame of Tyrolese discontent. From April, 1922, on, with the advent of Fascism, the population was subjected to a series of outrages, which, under the Mussolini régime, turned into legal oppression. Italianization of the inhabitants proceeded rapidly. Italian place names were substituted for the universally known German; Italian was prescribed as the official language of public bodies and the courts; Italian officials began to be introduced in completely German-speaking parishes and Austrian railway and postal employees were dropped for Italians; all instruction in elementary schools was being changed to Italian while religious instruction was undergoing the same change (beginning October, 1923).

In 1924 Italians began to confiscate the property of the German citizens residing in the South Tyrol, in direct violation of the Treaty of St. Germain. In 1925 complaints in the German and Austrian press of the "ruthless" measures employed in the Italianization of the Tyrol were answered by a defiant speech from Premier Mussolini before the Italian Chamber. Foreign Minister Stresemann replied in a moderate but firm tone before the Reichstag, provoking a vigorous counter-reply from Mussolini before the Italian Senate. Austria, Bavaria, and Germany again protested in 1926 and 1928 against Italy's treatment of the German population of South Tyrol, but the effort to impose Italian culture continued. In 1929 the territory remained a fertile source of enmity between Italy and German-speaking peoples. See ITALY, under *History*.

TYRRELL, THE RT. HON. WILLIAM GEORGE, FIRST BARON (1866–). A British diplomat. He was educated at Balloil College, Oxford, and entered the Foreign Office in 1889. From 1907 to 1915, he was Senior Clerk, acting as private secretary to Sir Edward Grey. He was Assistant Under-Secretary from 1919 to 1925 and Permanent Under-Secretary from 1925 to 1928, when he was appointed British Ambassador to France. He received the Coronation Medal in 1902 and 1911, and was created Knight Commander of the Bath in 1927, Privy Councilor in 1928, and baron in 1929.

TYRWHITT, tĭr′ĭt, Sir Reginald Yorke (1870–). A British admiral, born at Oxford. He joined the navy in 1883 and was promoted through the grades till he reached the rank of rear admiral in 1919. The same year he was created a baronet. He had an important part in the World War as commander of the destroyer flotillas in action in Heligoland Bight in August and December, 1914, and off Dogger Bank in 1915, receiving the D.S.O. in the next year. He was the commanding officer of the coast of Scotland (1923–25), was made Vice Admiral in 1925, and Commander-in-chief of the China Station (1927–29).

TYSON, Lawrence Davis (1861–1929). A United States Senator, who was born near Greenville, N. C., and graduated at the U. S. Military Academy (1883). He served in the Army for twelve years, including five years as professor of military science and tactics at the University of Tennessee. He resigned his commission in 1895 to practice law at Knoxville, Tenn., but volunteered for the Spanish-American War in 1898 and as colonel took the Sixth Regiment of Volunteer Infantry to Porto Rico for service. In the World War, he was commissioned a brigadier general and assigned to the command of the 59th Brigade, 30th Division. For exceptionally meritorious service, he was awarded the Distinguished Service Medal. In 1903 he had been elected to the Tennessee Legislature and made speaker of the House. He continued active in politics, being a delegate to the Democratic National Convention of 1908. He was elected United States Senator in November, 1925, for the term ending in 1931. He died two years before the expiration of his term.

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U-BOAT WARFARE. See GERMANY; SUBMARINES, VESSEL, NAVAL.

UCHIDA, COUNT YASUYA (1865–). A Japanese diplomat and public official, who was born in Kumamoto-ken and graduated in law from the Imperial Tokyo University. He served successively as attaché at Washington, personal secretary to the Minister of Agriculture and Commerce, legation secretary at London and Peking, director of the Political Bureau, Vice Minister of Foreign Affairs (1900–01), and Minister to Peking (1901–06). Appointed Ambassador to Vienna in 1906 and to Washington in 1909, he became Minister of Foreign Affairs in 1912 and held the same portfolio in the Hara and Admiral Kato cabinets. During the World War, he was Ambassador to Petrograd (Leningrad). In 1924 he was made a Privy Councilor, a post which he resigned in July, 1929, after he had been criticized in connection with the wording of the Briand-Kellogg Pact, which he had signed on behalf of Japan at the Paris ceremony earlier that year.

UDRŽAL, FRANTIŠEK (1866–). A Czechoslovak public official. He was a member of the Bohemian Diet until its dissolution in 1913 and of the Austrian Reichsrat (1897–1918), being vice president in the latter year. Following the proclamation of the Czechoslovak Republic (1918), he was a member of the Constitutional Assembly. A member of Parliament representing the Agrarian Party (after 1920), he served as Minister of National Defence (1921–25 and 1926–29).

UFER, WALTER (1876–). An American painter who was born in Louisville, Ky., and studied chiefly at the Royal Academy of Dresden and then in Chicago and at Munich. He settled at Taos, N. M., and became known after 1914 as one of the foremost painters of the Pueblo Indians. He paints their life and country with deep and sympathetic insight into the Indian character in vivid color, and with fine decorative feeling. He received the First Logan Medal of the Art Institute of Chicago (1917); the Altman Prize, National Academy of Design, New York (1921); the Temple Gold Medal, Pennsylvania Academy, Philadelphia (1923); the first prize for Kentucky artists, Nashville, Tenn. (1925), and the second Altman Prize and Isidor Medal from the National Academy (1926). He is represented in the Public Museums of Brooklyn, Chicago, and Philadelphia; the Corcoran Gallery, Washington, D. C., and in other museums. He became a member of the National Academy of Design in 1926.

UGANDA, o͞o-gän′dȧ or ū-găn′dȧ. A British protectorate in East Africa with an area of 94,204 square miles, and an estimated population (December, 1927) of 3,157,008. Of these, natives numbered 3,143,670; Asiatics, 11,464; Europeans, 1874. There were 3651 Asiatics in 1914 and 1017 Europeans. Chief towns are Mengo, in Kampala (population 40,000); Entebbe, the capital (population 12,000). Cotton growing continues the most important single activity. In 1913–14 the cotton export was valued at £317,687; in 1921, at £1,281,000; in 1926, at £3,051,791; and in 1928, at £2,486,000. Next in order were (exports of 1927): Coffee, £170,407; cottonseed, £170,303; rubber, £82,007; ivory, £34,574; hides and skins, £99,541. The total exports in 1927 were £2,310,260, as compared with £524,260 in 1913–14. Total imports in 1927, £1,819,161, consisting mainly of cotton fabrics and manufactures, £520,514. In 1926 imports totaled £2,114,044.

Revenues for 1913–14 were £256,559 and expenditures £290,180; for 1927 these were £1,292,306 and £1,430,976. The poll tax accounted for the greater part of the revenues in the post-war years; £526,605 in 1927. The debt was £1,107,595 in 1927. After 1914 a cessation was made of imperial grants-in-aid. British penetration into the interior continued, so that by 1915 almost the whole protectorate was, with the exception of Rudolf Province, well in hand. During the World War, great numbers of natives (estimated at 150,000) saw service as carriers in the African campaigns. In 1921, the Legislative Council, made up of nominated members, met for the first time. The Indians refused to participate because of the social and economic segregation to which they were subjected. Various mission schools were attended by 115,5525 boys and 100,876 girls in 1927.

UHAGÓN Y GUARDAMINO, FRANCISCO RAFAEL DE, MARQUES DE LAURENCÍN (1858–1927). A Spanish jurist and historian. Born in Balbao, he studied law in Madrid, winning the doctorate in jurisprudence in 1877, with high honors. Soon, however, he turned from law to letters, history, and scholarship. Probably his greatest service to national culture was that of saving and gathering together, in the Archivo Histórico Nacional, the priceless treasure contained in the archives of the four great military-religious orders of Santiago, Calatrava, Alcántara, and Montesa, and making them accessible to scholars. This he did while serving as Minister of the Tribunal de las Órdenes. He prepared also well-ordered indices of these four orders.

In 1898 he was elected member of the Real Academia de la Historia de Madrid, of which he became director (the twenty-fifth) in 1918, which post he held up to his death. For his services to scholarship and culture, he received numerous Spanish and European decorations. His publications were of varied interests: hunting, riding, falconing, bullfighting, literature, and history. His most important works were: *Indice de los documentos de la orden militar de Calatrava* (1899); *Indice de pruebas de los caballeros. . . . de Santiago*, etc (with Vignau, 1901); *Indice de pruebas de los caballeros . . . de Calatrava, Alcántara, y Montesa*, etc. (with Vignau, 1903); and *Don Agustín de Montiano y Luyando, primer Director de la Real Academia de la Historia* (1926).

UKRAINE. While the Ukrainians had some claim to self-determination on the grounds of language, it is doubtful whether socially and culturally they formed a distinct and homogeneous nation. Before the World War, there were some 35,000,000 of them in central-eastern Europe. In Russia, 30,000,000 were to be found; 3,500,000 in Austria, in Galicia and Bukovina chiefly, and known more commonly as Ruthenians; and 500,000 in Hungary. In Hungary, their national consciousness had been kept alive by the repressive policy of the Magyars; in eastern Galicia, because of their hatred of the Poles, they clung to their language, religion, and folkways (see GALICIA; POLAND.) In Russia, with the beginning of the twentieth century, there began to appear evidences of a tenderly fostered and not very virile Ukrainian movement that aimed at regional automony. Though most of the Ruthenians in Galicia were peasants and 60 per cent were illiterate, Lemberg became the cultural seat of the agitation and from it radiated thin lines of influence into the Russian provinces.

The break-up of the Russian empire gave the Ukranians their long-sought opportunity. The independence of Russian Ukraine was proclaimed on Nov. 21, 1917; that of Austrian Ukraine, on Nov. 19, 1918; on Dec. 14, 1918, the Government of Ukraine, a directory of five members, was set up as a provisional government; and on Jan. 3, 1919, the union of Eastern (Russian) and Western (Austrian) Ukraine took place. Though the Ukrainians had been recognized as constituting a nation by Russia and the Central Powers in the Brest-Litovsk treaties (March, 1918), they were pointedly refused a hearing by the Paris Peace Conference. In fact, they were compelled to see their hopes vanish as the commissioners apportioned out territories they claimed as peculiarly their own. To Rumania, Czechoslovakia, and Poland went Bessarabia, the Carpathian Ruthenians, Bukovina, and Galicia. The region itself was never for long under a single rule nor did it, until 1922, enjoy any surcease from the trials of war. In 1919 the central government, under Hetman Petlura, was waging war against the Poles. In 1920 the Ukraine joined arms with Poland against Russia with the result that its representatives were signatory to the Treaty of Riga (October, 1920), by which the region's independence was recognized by both powers. However, by the treaty, the Polish boundary was pushed so far east that Galicia and Volhynia were lost to the Ukraine. Petulra's government continued to exist for a time; but gradually power was being accumulated in the hands of the Communists, who formed the Ukrainian Soviet Socialist Republic Dec. 11, 1919. From 1919 on, armed bandits terriorized the countryside. The Jews in particular were singled out as victims. Not until 1922 was it evident that the country was settling down to a peaceable activity.

On Dec. 30, 1922, delegates from the Ukraine in company with those of Russia, White Russia, and the Transcaucasian Federation completed a treaty by which the Union of Socialist Soviet Republics was set up. From thence on, the history of the Ukraine was, more properly, that of Russia. Economically, there was every justification for the federation; for, while the Ukraine possesses great wheat, barley, and sugar fields, as well as valuable coal and iron deposits, it is, like the other Russian regions, dependent upon the oil from Baku, the lumber of the northern forests, Siberia's dairy products, and the cotton of Transcaucasia and Turkestan. See RUSSIA.

ULSTER. See IRELAND.

ULTRA-MODERNISTS, IN MUSIC. See MUSIC.

ULTRA-VIOLET LIGHT. See ELECTRIC LIGHTING.

ULYANOV, VLADIMIR ILYITCH. See LENIN, NIKOLAI.

UNAMUNO Y JUGO, MIGUEL DE (1864–). A Spanish mystical philosopher. Born at Bilbao, he studied philosophy and letters at Madrid (1880–84). He taught privately at Bilbao 1884–91. In this latter year, he won the chair in Greek language and literature at the University of Salamanca. In 1901 he became rector, and professor of Spanish literature. In 1914 he was dismissed from the rectorship. During the years 1914–18, he defended valorously the Allied cause. In 1924 he was deported for his political activities. By the loftiness of his purpose, and the seriousness and loyalty of his life work, he surpasses all other writers in Spain in the first quarter of the twentieth century. He is a member, and a medalist of arts and letters, of the Hispanic Society of America. His many works include *En torno al eastieismo* (1902); *Vida de Don Quijote y Sancho* (1905); *Mi religión y otros ensayos* (1910); *Contra esto y aquello* (1912); *Del sentimiento trágieo de la vida* (1913); *Niebla* (1914); *Ensayos* (6 vols., 1916–18; *El Cristo de Velázquez* (poems, 1920); and *Como se hace una novèla* (1925).

UNCONSCIOUS MIND. See CONSCIOUSNESS AND THE UNCONSCIOUS.

UNDERWOOD, OSCAR WILDER (1862–1929). An American legislator (see VOL. XXII). He was first elected to the Senate in 1915, after serving 20 years in the House of Representatives, and continued in this office until 1927. He was Democratic leader of the Senate in the Sixty-seventh and Sixty-eighth Congresses, resigning in 1923. He served as American delegate to the Conference for the Limitation of Arms in 1921–22. In 1924 he was a candidate for the presidential nomination. He was appointed a member of the International Commission between the United States and France (1927). He wrote *Drifting Sands of Party Politics* (1928), a survey of American political history beginning with the present century.

UNDERWOOD TARIFF BILL. See TARIFF IN THE UNITED STATES; UNITED STATES, under *History.*

UNDSET, SIGRID (1882–). A Norwegian novelist, awarded the Nobel Prize for Literature in 1928. She was born at Kallunborg, Denmark, studied at a business college, and was a municipal clerk in Christiania until 1909. In 1907 her first novel, *Fru Marta Oulie,* appeared. It was followed by a series dealing with the rather drab life of the working girl, the most notable of which was *Jenny* (1911). She had long been a student of Norwegian history, and she vividly and authentically reproduced the life and customs of Norway in the fourteenth century in *Kristin Lavrandsdatter* (3 vols., 1920–22), and the thirteenth century in *Olav Audunssøn in Hestviken* (2 vols., 1925); *Olav Audunssøn and his Children* (2 vols., 1927); and *In The Wilderness,* English translation of the third volume of *The Master of Hestviken* (1929).

UNDULANT FEVER. See VETERINARY MEDICINE.

UNEMPLOYMENT. The period following 1914 saw severe unemployment crises, especially in the years following the World War. In the belligerent European countries, unfavorable conditions of employment gave way during the War to less than normal unemployment, because of the drafting of many millions of workers into the armies, the stimulation of many lines of production by military needs, and the establishment of central control in industry. Neutral countries which were in a position to cater to the military needs of the belligerents enjoyed a rather lasting war prosperity. The most severe crises of unemployment occurred in the years after the Armistice when the war prosperity came to an end and the after-effects of the War threw the industrial machinery of the world into violent disorders. In the United States, in Great Britain, Germany, Italy, Poland, and Austria, the year 1929 saw great armies of unemployment. The two outstanding reasons were the increasing mechanization of industry and the greater premium on speed, which militated against the employment of middle-aged workers.

United States. Chiefly as a result of the War, the United States experienced its most severe unemployment crisis in many years in 1914 and the early part of 1915. The unemployed constituted 15.8 per cent in 1914, and 16 per cent in 1915, of the total labor force. The very sharp upward turn in business, however, during the summer and the early fall of 1915 had a very wholesome effect on the labor market, and employment conditions improved rapidly, chiefly because of the enormous manufacture of munitions. This improvement continued during 1916 and 1917, when the proportion of the unemployed to the total labor force was 7.1 per cent and 4.7 per cent, respectively. In 1917 there was great scarcity of labor and subsequently a great demand for it. This was due to both the drafting of millions of men into the military service and the great increase in industrial activity. This situation remained unchanged until the late fall of 1918, when some of the employers began to lay off their workmen, although there was still a great deal of demand for manufactured products and the labor market continued to be good until the early fall of 1920. Statistics show that in September, 1920, there occurred in many important industries decreases of from 4 to 14 per cent in the employment. Unemployment gained momentum in the last months of the year and reached its maximum intensity in January and February, 1921. The outstanding event of this latter year in the unemployment situation was President Harding's National Unemployment Conference in October, which set unemployment before the country in an official way as being chiefly a problem of industry. The conference estimated the number of unemployed at from 3,500,000 to 5,000,000. Secretary of Labor James J. Davis estimated the unemployed in the beginning of 1922 at between 5,000,000 and 6,000,000, but this figure is probably an exaggeration. During the course of 1922, the situation improved materially. In 1923 unemployment declined still further and production became normal.

The situation once more became acute during the winter of 1927–28, when the unemployed were variously estimated to total from 1,874,054 to 4,000,000 workers. The country was in an unfortunate position to cope with the problem, for no agencies existed for the tabulation of unemployment figures. The best the Bureau of Labor Statistics could do was to guess what the shinkage in employment was between 1928 and 1925 (in which earlier year a census had been taken). In other words, there were 25,222,742 workers employed in 1925 and if the shrinkage in certain industries was applied to all the workers, it was calculated that there was a net loss of 1,874,054. W. I. King, in a report submitted to the Unemployment Conference, which was published in *Recent Economic Changes* (1929), estimated the minimum total of unemployed persons in the country as follows: 1920, 1,401,000; 1921, 4,270,000; 1922, 3,441,000; 1923, 1,532,000; 1924, 2,315,000; 1925, 1,775,000; 1926, 1,669,000; 1927, 2,055,000. During 1928 and 1929, the general discussion of unemployment brought to a head the outlining of a programme which economists and social statisticians recognized as a minimal requirement for an adequate unemployment policy. This included the following: the creation of Federal, State, and municipal exchanges; the collection of unemployment statistics through these agencies; one form or another of unemployment insurance; long-range planning of public works by public authorities.

This last plan, which received much public attention in 1928 and 1929, was made the subject of a congressional bill and received the approval of President Hoover. The so-called Jones Bill, introduced in 1928 and 1929 called for the creation of a "prosperity reserve" of $150,400,000 for public works to be used only when the volume of construction work had fallen off 10 per cent for three months, as compared with a similar period in the preceding three years. The Hoover programme, which was attributed to William T. Foster and Waddill Catchings of the Pollak Foundation, and which was laid before the Conference of Governors in November, 1928, proposed that there be created a $3,000,000,000 State and Federal construction reserve fund "to do for labor and industry what the Federal Reserve has done for finance."

General approval was given to the scheme by a Senate Committee which reported in February, 1929, and which among other things recommended the following programme: 1. Public insurance schemes, when and if considered, belonged in the province of State action. 2. It was the duty of the States and municipalities to build up efficient employment exchanges. 3. A system for the collection of adequate unemployment statistics was necessary. 4. The Government should adopt legislation for the purpose of providing a system of planning public works to furnish a reserve against unemployment. 5. More consideration needed to be given to the necessity for creating systems of old-age pensions. As a result of congressional enactment in 1929, it was provided that the 1930 census should take the first count of unemployment which was ever made in the country.

Some trade unions sought to cope with the problem by building up unemployment funds in their industries. The plan was first tried by the Amalgamated Clothing Workers which, in Chicago (1923), Rochester (1928), and New York (1928), provided for unemployment benefits through funds built up by employer and employee contributions. Similar funds were devised by the Cloth Cap and Hat Makers Union of New York (1924) and the Ladies' Garment Workers of Cleveland (1921). Benefits, however, were small and for a limited period. Funds have collapsed when the drain of prolonged unemployment has been too heavy. These apparently have been only slight expedients in coping with unemployment.

Great Britain. From the outbreak of the War until 1917, unemployment declined steadily in Great Britain. In the first seven months of the latter year, the percentage of unemployment among trade unions paying unemployment benefits averaged less than one-third of 1 per cent, as compared with an average of nearly 4 per cent during the preceding 10 years. After August, 1917, the number of unemployed increased and in 1919 the situation became serious, due to the rapid demobilization. Following upon this unfavorable condition of the labor market, there came an interval of about eight months during which the rate of unemployment was low; but in the autumn of 1920, the most acute crisis, that of unprecedented unemployment, began. In June, 1921, the number of men out of work, entered on the insurance list, was 2,177,000, and the number partially unemployed was 998,000.

In fact, in January, 1921, 23.1 per cent of the British workers was unemployed. By June, 1926, the proportion was 14.6 per cent, and in January, 1929, 12.3 per cent of the country's 11,880,000 workers was without work. The following industries were affected: mining, textiles, constructional engineering, miscellaneous metals, leathers, and distributive trades. The Government sought in various ways to cope with the problem which was largely due to mechanical changes in industries and American competition in the markets of the world. The period saw great extensions in the unemployment insurance system.

In 1911 Great Britain had introduced an act for the protection of 2,250,000 workers against unemployment. The benefits of the act were extended in 1916 and again in 1920, when they were made to apply to all workers (excluding only domestic servants and agricultural laborers). During the period from November, 1920, to July, 1925, receipts in this fund (to which workers, employers, and the state contributed) totaled £203,133,528 and expenditures were £233,827,723.

The period following the termination of the general strike of 1926 saw a deficit in the fund of over £21,000,000. In 1927 the act was amended to reduce benefits for young people and men without dependents. Claimants also were to be called upon to accept "suitable" work not necessarily in their own trades. Unemployment continued to be a serious national question and in the general elections of May, 1929, the failure of the Conservative government to stem its increase was seized upon by the Liberal Party under Lloyd George as the chief reason why it should be turned out of office.

The newly-elected Labor government applied itself seriously to the formulation of a programme for the handling of the very serious unemployment situation. Mr. J. H. Thomas, holding the portfolio of the Lord Privy Seal, in the summer of 1929, made a special trip to Canada in the interests of British industry, particularly coal and steel. With the opening of Parliament in November, there was submitted Labor's proposals with respect to unemployment. These called for the immediate expenditure of $200,000,000 on public-works programmes and allowed for the employment of 150,000 men for a year. The only help for the coal miners was to be the effort to extend the export markets for British coal and in this particular Mr. Thomas reported that Canada was to take 600,000 tons of English coal in 1929. Mr. Thomas did not seek to minimize the nature of the difficulties. He pointed out that out of a total of 1,150,000 persons in receipt of unemployment relief, fully 800,000 were permanently unemployed. In the years between 1894 and 1913, the average rate of unemployment among trade unionists was 4 per cent; since 1921 it has been 11 per cent. That there has been a gradual improvement cannot however be denied in the light of the fact that from June, 1921, to November, 1929, the total unemployed has decreased from 2,560,000 to 1,150,000.

Germany. The employment situation in Germany was very bad in the fall of 1914, but it improved steadily during the four years of the War, due primarily to government efforts. The rapid demobilization at the end of the War caused a serious unemployment crisis. The Government started various measures for relief and in six months there was a marked improvement. The number of the unemployed was reduced from 1,500,000 at the beginning of 1919 to 500,000 at the end of the year. During the following years, the labor market continued to gain. The ratio of unemployed to the total number of workingmen was reported to be less than 1 per cent during the first seven months of 1922. After that, an increase in unemployment occurred, and at the end of 1923, there were 3,000,000 without work; 60 per cent of the workers were employed only two or three days a week during that year.

On Nov. 1, 1925, the number of workers in receipt of relief benefits was 363,961; on Mar. 1, 1926, the number was 2,055,928; on Dec. 15, 1927, 1,002,243; in 1927, a compulsory insurance act was passed. Premiums into this fund were to be paid by employers and employees at the same time that health-insurance premiums were paid. The same law set up a system of federal employment exchanges. Early in 1929, it was reported that the unemployment-insurance account showed an actual deficit, because of heavy unemployment. In fact, in February, 1929, it was reported that workmen entirely unemployed made up 19.4 per cent of the labor-union membership of the country. In addition to Great Britain and Germany, the following six countries also have compulsory unemployment insurance funds together with systems of unemployment exchanges: Italy, Austria, Russia, Queensland, Poland, and Irish Free State. Nine other countries had systems of voluntary unemployment insurance with state subsidies, viz., France, Denmark, Norway, the Netherlands, Finland, Spain, Belgium, Czechoslovakia, and Switzerland. See also SOCIAL INSURANCE.

Late in 1928, unemployment in the chief European countries appeared to be on the increase. For instance, there were more people not working in 8 out of 18 European countries in December, 1928, than was the case in December, 1927. In Germany, 16.7 per cent of the trade unionists were wholly unemployed in the 1928 month, as compared with 12.9 per cent in the 1927 month. In the Scandinavian countries, where the number of trade unionists unemployed was not so great as in the 1927 month, the percentages of unemployed among trade unionists was still very large. In Denmark, 25 per cent of the trade unionists were out of work and the figure was well over 17 per cent in both Norway and Sweden. In Italy, in December, 1928, 363,000 persons were registered as being wholly unemployed. See also SOCIAL INSURANCE.

UNIFLOW ENGINE. See STEAM ENGINES AND STEAM TURBINES.

UNION COLLEGE. A nonsectarian institution for men at Schenectady, N. Y., founded in 1795. The student enrollment increased from 474 in 1914 to 823 in 1928. During the same period, the faculty increased from 38 to 77 members; the library from 43,000 to 71,000 volumes; and productive funds from $950,000 to $4,000,000. In 1925 a Memorial Chapel was completed and in the following year physics and biology laboratories were built. In 1927 a three-story building for the housing of the liberal arts department was dedicated, and a loan fund of $25,000 was established, the gift of Gerard Swope, president of the General Electric Company, primarily for the benefit of employees of that company. President, Frank Parker Day, LL.D., who was installed May 4, 1929.

UNION OF SOCIALIST SOVIET REPUBLICS. See RUSSIA.

UNION OF SOUTH AFRICA. See SOUTH AFRICA, UNION OF.

UNITARIAN CHURCH. A denomination, which, in the United States, developed within New England Congregationalism. The American Unitarian Association, organized in May, 1825, for missionary purposes, became the executive body of the denomination. The Unitarian Church imposes no theological test of membership on either the laity or clergy. It believes in one God in one person and, consequently, in the purely human personality of Jesus. Emphasis is placed on God in the inner life of man. On Jan. 1, 1928, the Unitarian Church had 442 churches, 386 of which were active, with 131,912 adherents, as compared with 353 active churches and 60,152 adherents in 1926 and 411 churches and 82,515 adherents in 1916. In 1928 there were 3273 Sunday-school teachers and officers and 21,526 pupils; in 1926, 3025 officers and teachers and 18,722 pupils. Receipts for current church activities in 1928 were $367,527. Total expenditures in 1926 of 344 Unitarian churches, amounted to $3,418,975, including $255,759 for benevolences, while expenditures by 369 churches in 1916 were $1,485,556. The value of church property, not including parsonages, increased from $15,247,349 in 1916 to $27,478,554 in 1926.

The church sponsors three theological seminaries: Harvard Divinity School; Meadville Theological School, Meadville, Pa.; and the Pacific Unitarian School for the Ministry, Berkeley, Calif.; and three schools for the training of parish assistants. General denominational work is carried on by the departments of publication, religious education, church extension, social relations, new Americans, foreign relations, recruiting the ministry, and others. The department of new Americans conducted missionary work among American citizens and particularly among immigrants of Icelandic, Finnish, and Norwegian origin. The department of foreign relations, functioning in place of a foreign-missions board, frequently extended aid to liberal religious movements in South America, Italy, the countries of north and central Europe, Egypt, India, China, Japan, and other lands. During the period 1914–29, Unitarian churches showed an increasing tendency to federate with like-minded liberal religious groups. The 1926 census figures are exclusive of 18 federated churches with a membership of 2838, in each of which a Unitarian unit was represented. Denominational publications are the *Christian Register* (weekly); the *Beacon* (weekly); and the *Unitarian World and Work* (monthly). Headquarters of the American Unitarian Association are at 25 Beacon Street, Boston, Mass.

UNITAS FRATRUM. See MORAVIANS.

UNITED BRETHREN IN CHRIST, CHURCH OF. An outgrowth of the German Reformed and Mennonite churches, formally organized under the leadership of Philip William Otterbein and Martin Boehm in Maryland in 1800 and in 1889 divided into two bodies, the Old and the New Constitutions. Its theology is Arminian, while its polity is similar to that of the Methodist Episcopal Church. The membership of the Old Constitution decreased from 21,401 in 1906 to 17,872 in 1926. The larger division of the church, or New Constitution, had, in 1928, 406,678 members, as compared with 274,649 in 1906. The church is divided into 35 annual conferences, including those in China, Japan, the Philippines, Porto Rico, and West Africa. In 1928 there were 1756 charges; 3071 organized churches; 1647 itinerant ministers; 2882 Sunday schools with an enrollment of 387,348, including teachers and officers. The valuation of church property was $28,754,501. The church maintains eight educational institutions in the United States, as well as the Otterbein Home, the United Brethren Orphanage and Home, and the Colonel R. M. Baker Home for Retired Ministers. In 1929 a preliminary plan of union was approved by the Evangelical Synod of North America, the Reformed Church in the United States, and the United Brethren in Christ.

UNITED CHURCH OF CANADA. See CANADA, UNITED CHURCH OF.

UNITED KINGDOM. See GREAT BRITAIN.

UNITED PRESBYTERIAN CHURCH OF NORTH AMERICA. A branch of the Presbyterian Church formed by the union of the Associate and the Associate Reformed churches in 1858 at Pittsburgh. In organization and government, it is in accord with other Presbyterian bodies, having the same courts-session, presbytery, synod, and general assembly, and observing the same general methods of baptism, admission to church membership, and ordination to the ministry. A confessional statement of 44 articles was adopted by constitutional action in 1925 to replace the Judicial Testimony of 1858. The membership from 165,186 in 1925 to 175,075 in 1928. The number of congregations, however, declined from 924 in 1924 to 898 in 1928; the number of presbyteries from 58 to 57; and the number of ministers from 937 to 916. The Sunday-school enrollment rose from 171,922 in 1924 to 177,589 in 1928; there were also 918 young-people's societies, with 26,837 members, in the earlier year, and 958 societies, which had 26,225 members, in the later year.

Church contributions increased from $5,845,370 in 1924 to $6,224,733 in 1928. The total value of church property and permanent funds of the denomination in 1928 amounted to $47,830,333. Missionary contributions in that year amounted to $1,639,382. The denomination supported 400 missionaries in India, Egypt, the Sudan, and Abyssinia, part of their work being accomplished in 31 hospitals and dispensaries, and 411 missionaries working at home. The educational work of the church is carried on at home and abroad through 333 schools, 9 colleges, and 4 theological seminaries. Contributions to the New World Movement, for the advance of the church's work, between 1919 and 1926 amounted to $7,916,976.

UNITED STATES. The United States of America consists of 48 States and the District of of Columbia, located between the 25th and 49th parallels, north latitude, and in addition the noncontiguous territories of Alaska, Hawaii, Guam, Panama Canal Zone, Philippine Islands, American Samoa, Porto Rico, and the Virgin Islands. The total land area of continental United States exclusive of Alaska is 2,973,800 square miles. The population at the 1920 census was 105,710.620; estimated population of July 1, 1928, was 120,013,000. The areas and populations of the noncontiguous territories are given in Table I.

TABLE I—AREA AND POPULATION OF THE UNITED STATES

Territory	Area Square miles	Population in 1920
Continental United States	2,973,774	105,710,620
Alaska	590,884	55,036
Guam	210	13,275
Hawaii	6,449	255,912
Panama Canal Zone	527	22,858
Philippine Islands	115,026	10,607,872
Porto Rico	3,435	1,299,809
American Samoa	77	8,056
Virgin Islands	132	26,051 [a]
Totals	3,690,514	117,999,489

[a] Nov. 1, 1917.

POPULATION

The United States is the only important country of the world which has even a fairly complete history of the growth in population from its beginning. The First Federal Census was taken in 1790 and subsequent enumerations at 10-year intervals. In 1790 the total population of the United States, as then constituted, was 3,929,214 and at the last census in 1920 it was 105,710,620, an increase of 2565 per cent for the 130 years. Table II gives the population of continental United States at each census, together with the actual and percentage increases for each decade.

The Bureau of the Census estimates the total population for intercensal years and periods. Table III shows the estimated total population of continental United States on July 1 of each year from 1915 to 1928.

TABLE II—POPULATION OF THE UNITED STATES, WITH DECENNIAL INCREASES 1790–1920

Census year	Population	Total decennial increase	Per cent of increase
1790	3,929,214	....	...
1800	5,308,483	1,379,269	35.1
1810	7,239,881	1,931,398	36.4
1820	9,638,453	2,398,572	33.1
1830	12,866,020	3,227,567	33.5
1840	17,069,453	4,203,433	32.7
1850	23,191,876	6,122,423	35.9
1860	31,443,321	8,251,445	35.6
1870	39,818,449 [a]	8,375,128 [a]	26.6 [a]
1880	50,155,783	10,337,334 [a]	26.0 [a]
1890	62,947,714	12,791,931	25.5
1900	75,994,575	13,046,861	20.7
1910	91,972,266	15,977,691	21.0
1920	105,710,620	13,738,354	14.9

[a] Estimated correction for error in census of 1870.

From 1790 to 1860, the population showed a relatively uniform rate of growth amounting to an increase of about one-third per decade. Had this ratio of increase continued after 1860, the total population of continental United States in 1920 would have been upward of 180,000,000.

The decline in the percentage rate of increase in the first three decades following the Civil War was very gradual. From 1860 to 1890, the average increase was approximately 26 per cent per decade. For 1890 to 1900, the rate dropped to 20.7 per cent. From 1900 to 1910, it was at 21 per cent, but for the decade between 1910 and 1920, the rate of increase showed a marked decline to 14.9 per cent. This sharp decline in the rate of increase for that decade is partly due to the decline in immigration and to the return of many former immigrants to their native land, during the War. Even if the effect of immigration and emigration is allowed for, however, there has been a very significant decline in the rate of population increase during that census decade. (See discussion by W. S. Rossiter: "Increase of population in the United States." *Census Monograph No. 1*, U. S. Bureau of the Census, Department of Commerce, 1922.)

The United States has passed the pioneer stage of development and it is probable that future censuses will continue to show moderate rates of increase characteristic of more fully settled and developed countries. The rates of increase in population for England and Belgium before the World War were between 10 and 11 per cent, while Germany increased 15 per cent, Italy 6.6 per cent, and France only 1.6 per cent per decade.

It is of interest to note, however, that although the rate of increase has been rapidly declining, the actual numerical increase in population has been relatively stationary for the past four decades. The largest numerical increase recorded for any decade was 15.977,691 between 1900 and 1910. Between 1910 and 1920, the increase was 13,738,354. On the average, therefore, the United States was adding about 1,400.000 persons to its population each year, or almost 4000 persons per day. The increase alone during any one of the last four decades was greater than the entire population of the country in 1830.

TABLE III—ESTIMATED TOTAL POPULATION ON JULY 1 FOR INTERCENSAL YEARS

Year	Population July 1	Year	Population July 1
1915	99,343,000	1922	109,893,000
1916	100,758,000	1923	111,693,000
1917	102,173,000	1924	113,727,000
1918	103,588,000	1925	115,378,000
1919	105.003,000	1926	117,136,000
1920	106,422,000	1927	118,628,000
1921	108,445,000	1928	120,013,000

Increase in Population by Geographic Divisions, States, and Cities. The distribution of population by geographic divisions and individual States for 1910 and 1920 and the increases for the decade, with comparisons with the percentage increase in the preceding decade, are shown in Table IV.

It is clear from the data in this table that there was a decided slackening in the westward migration of population, compared with the period between 1900 and 1910. In the last preceding decade, the population of the Pacific States increased 73.5 per cent and the Mountain States 57.3 per cent. Between 1910 and 1920, these two divisions continued to show higher percentages of increase than other sections of the country, but the rates of increase declined to 32.8 and 26.7 per cent, respectively. Only one of the nine geographic divisions showed a rate of increase in the last decade higher than in the decade 1900 to 1910. This was the East North Central Division consisting of the States of Ohio, Indiana, Illinois, Michigan, and Wisconsin. This was the region which showed the most notable industrial expansion of this period. In marked contrast is the low rate of increase shown for the East South Central States and the West North Central Division. In the former region, the northward migration of Negroes during and after the World War was at least partly responsible for the low rate. In the West North Central States, the decline in the rate of increase was largely due to stabilized agriculture and absence of any marked industrial development.

The largest numerical increase occurred in the East North Central States, with a total of 3,224,972 more persons than in 1910. The Middle Atlantic States reported the next largest increase, amounting to 2,945.252; the South Atlantic Division increased 1,795,377, while the West South Central and the Pacific divisions each increased approximately 1,400,000.

TABLE IV—INCREASE OF POPULATION, BY DIVISIONS AND STATES, 1910–1920

	Population						
	1920		1910		Increase [a] 1910 to 1920		Per cent of increase 1900 to 1910
Division and State	Number	Per cent of total	Number	Per cent of total	Number	Per cent	
United States	105,710,620	100.0	91,972,266	100.0	13,738,354	14.9	21.0
Geographic Divisions							
New England	7,400.909	7.0	6,552,681	7.1	848,228	12.9	17.2
Middle Atlantic	22,261,144	21.1	19,315,892	21.0	2,945,252	15.2	25.0
East North Central	21,475,543	20.3	18,250,621	19.8	3,224,922	17.7	14.2
West North Central	12,544,249	11.9	11,637,921	12.7	906,328	7.8	12.5
South Atlantic	13,990,272	13.2	12,194,895	13.3	1,795,377	14.7	16.8
East South Central	8,893,307	8.4	8,409,901	9.1	483.406	5.7	11.4
West South Central	10,242.224	9.7	8,784,534	9.6	1,457,690	16.6	34.5
Mountain	3,336,101	3.2	2,633,517	2.9	702.584	26.7	57.3
Pacific	5,566,871	5.3	4,192,304	4.6	1,374,567	32.8	73.5
New England							
Maine	768,014	0.7	742,371	0.8	25.643	3.5	6.9
New Hampshire	443,083	0.4	430,572	0.5	12,511	2.9	4.6
Vermont	352,428	0.3	355,956	0.4	–3,528	–1.0	3.6
Massachusetts	3,852,356	3.6	3,366,416	3.7	485,940	14.4	20.0
Rhode Island	604,397	0.6	542,610	0.6	61,787	11.4	26.6
Connecticut	1,380,631	1.3	1,114,756	1.2	265,875	23.9	22.7
Middle Atlantic							
New York	10,385,227	9.8	9,113,614	9.9	1,271,613	14.0	25.4
New Jersey	3,155,900	3.0	2,537,167	2.8	618,733	24.4	34.7
Pennsylvania	8,720,017	8.2	7,665,111	8.3	1,054,906	13.8	21.6
East North Central							
Ohio	5,759,394	5.4	4,767,121	5.2	992,273	20.8	14.7
Indiana	2,930,390	2.8	2,700,876	2.9	229,514	8.5	7.3
Illinois	6,485,280	6.1	5,638,591	6.1	846,689	15.0	16.9
Michigan	3,668,412	3.5	2,810,173	3.1	858.239	30.5	16.1
Wisconsin	2,632,067	2.5	2,333,860	2.5	298,207	12.8	12.8
West North Central							
Minnesota	2,387,125	2.3	2,075,708	2.3	311,417	15.0	18.5
Iowa	2,404.021	2.3	2,224,771	2.4	179,250	8.1	–0.3
Missouri	3,404.055	3.2	3,293.335	3.6	110,720	3.4	6.0
North Dakota	646,872	0.6	577,056	0.6	69,816	12.1	80.8
South Dakota	636,547	0.6	583,888	0.6	52,659	9.0	45.4
Nebraska	1,296,372	1.2	1,192,214	1.3	104,158	8.7	11.8
Kansas	1,769,257	1.7	1,690,949	1.8	78,308	4.6	15.0
South Atlantic							
Delaware	223,003	0.2	202,322	0.2	20,681	10.2	9.5
Maryland	1,449,661	1.4	1,295,346	1.4	154,315	11.9	9.0
District of Columbia	437,571	0.4	331,069	0.4	106,502	32.2	18.8
Virginia	2,309,187	2.2	2,061,612	2.2	247,575	12.0	11.2
West Virginia	1,463,701	1.4	1,221,119	1.3	242,582	19.9	27.4
North Carolina	2,559,123	2.4	2,206,287	2.4	352,836	16.0	16.5
South Carolina	1,683.724	1.6	1,515,400	1.6	168,324	11.1	13.1
Georgia	2,895.832	2.7	2,609,121	2.8	286,711	11.0	17.7
Florida	968,470	0.9	752,619	0.8	215,851	28.7	42.4
East South Central							
Kentucky	2,416.630	2.3	2.289.905	2.5	126,725	5.5	6.6
Tennessee	2,337,885	2.2	2,184,789	2.4	153,096	7.0	8.1
Alabama	2,348,174	2.2	2,138,093	2.3	210,081	9.8	16.9
Mississippi	1,790.618	1.7	1,799,114	2.0	–6,496	–0.4	15.8
West South Central							
Arkansas	1,752,204	1.7	1,574,449	1.7	177,755	11.3	20.0
Louisiana	1,798,509	1.7	1,656,388	1.8	142,121	8.6	19.9
Oklahoma	2,028,283	1.9	1,657.155	1.8	371,128	22.4	109.7
Texas	4,663,228	4.4	3,896,542	4.2	766,686	19.7	27.8
Mountain							
Montana	548,889	0.5	376,053	0.4	172,836	46.0	54.5
Idaho	431,866	0.4	325,594	0.4	106,272	32.6	101.3
Wyoming	194,402	0.2	145,965	0.2	48.437	33.2	57.7
Colorado	939,629	0.9	799,024	0.9	140.605	17.6	48.0
New Mexico	360,350	0.3	327,301	0.4	33.049	10.1	67.6
Arizona	334.162	0.3	204.354	0.2	129,808	63.5	66.2
Utah	449,396	0.4	373,351	0.4	76,045	20.4	34.9
Nevada	77,407	0.1	81.875	0.1	–4,468	–5.5	93.4
Pacific							
Washington	1,356,621	1.3	1,141,990	1.2	214,631	18.8	120.4
Oregon	783.389	0.8	672,765	0.7	110,624	16.4	62.7
California	3.426.861	3.2	2.377.549	2.6	1,049,312	44.1	60.1

[a] A minus sign (–) denotes decrease.

Of the 48 States of the Union, 45 showed increases of population from 1910 to 1920. The three reporting decreases were Mississippi, 0.4 per cent, Vermont, 1 per cent, and Nevada, 5.5 per cent. The largest rate of increase for any State was 63.5 per cent in Arizona, followed by Montana with 46 per cent, California with 44.1 per cent, Wyoming with 33.2 per cent, Idaho with 32.6 per cent, and Michigan with 30.5 per cent. Six other States—Florida, New Jersey, Connecticut, Oklahoma, Ohio, and Utah—each showed rates of increase between 20 and 30 per cent for the decade.

Aside from the three States showing decreases, the five States showing the lowest rates of increase were New Hampshire, 2.9 per cent; Missouri, 3.4 per cent; Maine, 3.5 per cent; Kansas, 4.6 per cent; and Kentucky, 5.5 per cent.

Eight States contributed more than half of the total increase of 13,738,354 shown at the last census. These in the order of their contributions were: New York, Pennsylvania, California, Ohio, Michigan, Illinois, Texas, and New Jersey. The first three each showed an increase of over 1,000,000 persons, while in the other five the increase ranged between 600,000 and 1,000,000 each.

At the 1920 census, there were 2500 cities in the United States having a population between 2500 and 25,000; 219 cities having from 25,000 to 100,000 inhabitants, and 68 having more than 100,000 persons. During the 10-year period, 1910 to 1920, 474 towns and other communities passed, because of population increases, into the class of cities having 2500 to 25,000 inhabitants. During the same period, 59 cities passed from this class into that having 25,000 to 100,000 population, while 18 left this class for the one comprised of cities of over 100,000.

TABLE V—POPULATION OF CITIES HAVING 250,000 INHABITANTS OR MORE IN 1920, WITH INCREASE AND RANK: 1920 AND 1910

City	Population 1920	Population 1910	Increase 1910–1920 Number	Increase 1910–1920 Per cent	Rank 1920	Rank 1910
New York	5,620,048	4,766,883	853,165	17.9	1	1
Chicago	2,701,705	2,185,283	516,422	23.6	2	2
Philadelphia	1,823,779	1,549,008	274,771	17.7	3	3
Detroit	993,678	465,766	527,912	113.3	4	9
Cleveland	796,841	560,663	236,178	42.1	5	6
St. Louis	772,897	687,029	85,868	12.5	6	4
Boston	748,060	670,585	77,475	11.6	7	5
Baltimore	733,826	558,485	175,341	31.4	8	7
Pittsburgh	588,343	533,905	54,438	10.2	9	8
Los Angeles	576,673	319,198	257,475	80.7	10	17
Buffalo	506,775	423,715	83,060	19.6	11	10
San Francisco	506,676	416,912	89,764	21.5	12	11
Milwaukee	457,147	373,857	83,290	22.3	13	12
Washington	437,571	331,069	106,502	32.2	14	16
Newark	414,524	347,469	67,055	19.3	15	14
Cincinnati	401,247	363,591	37,656	10.4	16	13
New Orleans	387,219	339,075	48,144	14.2	17	15
Minneapolis	380,582	301,408	79,174	26.3	18	18
Kansas City, Mo.	324.410	248,381	76,029	30.6	19	20
Seattle	315,312	237,194	78,118	32.9	20	21
Indianapolis	314,194	233,650	80,544	34.5	21	22
Jersey City	298,103	267,779	30,324	11.3	22	19
Rochester	295,750	218,149	77,601	35.6	23	25
Portland, Oreg.	258,288	207,214	51,074	24.6	24	28
Denver	256,491	213,381	43,110	20.2	25	27

By far the larger portion of large cities is located in the Eastern and Central industrial States. At the 1920 census, 38 out of the 68 cities of over 100,000 inhabitants were located in the three geographic divisions of New England, Middle Atlantic, and East North Central States. These 38 cities had a total population of approximately 19,500,000 out of an aggregate for the group of 27,500,000; also, 144 out of the 219 cities in the class 25,000 to 100,000 were located in these three divisions and they furnished 6,500,000 out of the 10,340,000 inhabitants in this class of cities.

Of the 68 cities having 100,000 or more inhabitants in 1920, there were 25 which had a population of 250,000 or over. A study of the changes in the population of these 25 cities at the last two censuses illustrates the changing trends in large urban populations for the two decades.

Only four out of these 25 cities retained the same ranks in 1920 as they had in 1910, while 10 improved their positions and 11 took lower ranks than in 1910. Detroit moved from ninth up to fourth place, Los Angeles from seventeenth to tenth, while two cities, Portland, Oreg., and Denver, Colo., which were outside the first 25 in 1910, moved into this class in 1920.

Urban and Rural Population. There has long been observed in the United States a strong movement of population from the country to the city and this tendency seems to be increasing. The census defines urban population as that living in cities or other incorporated places of 2500 inhabitants or more.

In 1790 this country was substantially all rural. Only six cities had a population of 8000 or more. From this time, urban population has been increasing until at the 1920 census more than half of the population lived in cities of 2500 or over. Even as recently as 1880, 71.4 per cent of the population was rural and only 28.6 urban. In 1890 the proportions were 63.9 per cent rural and 36.1 per cent urban; by 1900 the latter proportion had moved to 40 per cent, and in 1910 to 45.8 per cent. In 1920, for the first time, urban population passed the halfway mark, forming 51.4 per cent of the total, while rural population made up only 48.6 per cent. Between 1910 and 1920, urban population increased by over 12,000,000, or 28.8 per cent. while the rural population increased only 1,600,000, or 3.2 per cent. Part of this increase in urban population was due to the fact that 474 small towns which in 1910 had less than 2500 inhabitants had passed this mark by 1920 and were included as urban. Even if allowance is made for this, however, the predominating increase in urban population is still evident.

If the population living in all incorporated places instead of that in places of 2500 and over had been considered as urban, the total urban population in 1920 would have been 63,277,000, or 59.9 per cent of the total, and the rural population only 42,434,000, or 40.1 per cent. On this basis, the corresponding proportions in 1910 were 54.7 and 45.3 per cent.

In 1920 the census for the first time compiled the numbers of persons living on farms or the total agricultural population. This figure was 31,614,219, or 30 per cent of the total population, and 61.5 per cent of the population classified as rural.

For the decade 1910 to 1920, the movement from rural to urban continued to be heaviest in the areas in which it began, i.e., the industrial North Eastern and North Central States. The three groups, New England, Middle Atlantic, and East North Central States, showed a stationary rural population from 1900 to 1910 and slight decreases for 1910 to 1920, while all of the heavy increases in these sections fell to the urban population. Even in the three Southern divisions of the country, the increase in urban population in the last decade far exceeded the rural. Likewise, in the Pacific States, the urban increase was much greater than the rural. It was only in the mountain group of States (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada) that the rural element showed a decidedly larger increase than the urban class.

TABLE VI—INCREASE IN URBAN AND RURAL POPULATION: 1890–1920

	URBAN				RURAL		
Census	Total	Increase	Per cent of increase	Per cent urban	Total	Increase	Per cent of increase
1890	22,720,223	....	...	36.1	40,227,491	....	...
1900	30,380,433	7,660,210	34.2	40.0	45,614,142	5,386,651	13.4
1910	42,166,120	11,785,687	38.8	45.8	49,806,146	4,192,004	9.2
1920	54,304,603	12,138,483	28.8	51.4	51,406,017	1,599,871	3.2

Changes in Population Considered by Sex, Nativity, and Color. The following tabulation shows the sex distributions of the population of continental United States at each of the last three censuses:

Census year	Males	Females	Males to 100 females
1900	38,816,448	37,178,127	104.4
1910	47,332,277	44,639,989	106.0
1920	53,900,431	51,810,189	104.0

It is a peculiarity of population statistics that the number of males in nearly all instances exceed the number of females. This has been true of every census of the United States since 1830, when for the first time the returns showed the sex of every person enumerated. In 1920 the number of males exceeded by more than 2,000,000 the number of females, which was a considerably smaller excess than in 1910 when the males exceeded females by nearly 2,700,000. Also, the proportion of males to females was lower in 1920 than in any of the three preceding censuses. A similar decrease in the proportion of males was noted after the Civil War in the decade between 1860 and 1870. No doubt the greater mortality of males due to the War, the emigration of more males than females, and perhaps an increase in the proportion of female immigrants tended to affect the 1920 ratio. The statistics show that about three-fifths of the decrease in the excess of males in 1920 was among the foreign-born white population.

With regard to nativity and color, the census divides the population into the following chief groups: (1) native whites of native parentage; (2) native whites of foreign parentage; (3) native whites of mixed parentage; (4) foreign-born whites; and (5) colored, separating the latter two classes by nationality. It would lie too far outside the scope of this article to treat this subject in detail. The accompanying table gives the more important classes and the rates of increase in each since 1890, in comparison with the total.

TABLE VII—GROWTH OF WHITE AND COLORED ELEMENTS IN POPULATION

			Whites									
					Native Whites							
Census year	Total population	Per cent of increase	Total whites	Per cent of increase	Total native whites	Per cent of increase	Of native parents	Per cent of increase	Foreign-born whites	Per cent of increase	Colored	Per cent of increase
1890	62,947,714	24.9	55,101,258	26.7	45,979,391	24.5	34,475,716	20.2	9,121,867	39.1	7,864,456	16.2
1900	75,994.575	20.7	66,809,196	21.2	56,595,379	23.1	40,949,362	18.8	10,213,817	12.0	9,185,379	17.1
1910	91.972,266	21.0	81,731,957	22.3	68,386.412	20.8	49,488,575	20.8	13,345,545	30.7	10,240,309	11.5
1920	105,710,620	14.9	94,820,915	16.0	81,108,161	18.6	58,421,957	18.1	13,712,754	2.8	10,889,705	6.3

It is of interest to note that the rate of increase of whites in the decade 1910 was 18.6 per cent, compared with 14.9 per cent for the total population. For native whites of native parents, the rate of increase was 18.1. For the two classes not shown in the table, the native whites of foreign parentage increased by 21.5 per cent, a higher rate than that for any other group of the white population. In many urban and industrial sections, the rate of increase in this class of the population exceeded 30 per cent.

In 1920 the foreign-born white population totaled 13,712,754, which represented an increase of only 2.8 per cent over those shown in this class at the 1910 census. Foreign-born whites in 1920 formed only 13 per cent of the total population, but it is significant to note that of the adult male population over 21 years of age, they formed 22.1 per cent, or over one-fifth of the total.

The colored population increased only 6.5 per cent in this decade. as compared with 11.5 per cent in the preceding decade. The total colored population in 1920 numbered 13,712,754, of which 10,463,131 were Negroes, 244,437 American Indians, 111,010 Japanese, 61,639 Chinese. The increase in the total Negro population from 1910 to 1920 was only 635,000, or 6.5 per cent, the lowest ever recorded. The number of Indians declined by 21,246 in that decade while the Japanese increased 38,853, or 54 per cent, and the Chinese decreased by 9892.

Persons Gainfully Employed. In connection with the decennial enumeration, the Bureau of the Census also compiles the number of persons engaged in specified gainful occupations. These occupations are classified into nine main groups. The 1920 census showed a total of 41,614,248 persons gainfully employed, or a little less than 40 per cent of the total population. Of the total number of workers, 24,862,000, or about 60 per cent, were employed in the basic industries of agriculture, mining, and manufacturing. The following tabulation gives the number of workers in each of the nine principal groups at the census of 1920:

Agriculture, forestry, and animal husbandry	10,953,158
Extraction of minerals	1,090,223
Manufactures and mechanical industries	12,818,524
Transportation	3,063,582
Trade	4,242,979
Public service (not elsewhere classified)	770,460
Professional service	2,143,889
Domestic and personal service	3,404,892
Clerical	3,126,541
Total	41,614,248

It is of some interest to present the geographic distribution of the number of workers in agriculture, compared with the number in manufacturing and mining combined. These figures, together with the value of the products of each group by geographic divisions, are shown in Table VIII.

TABLE VIII—COMPARISON OF AGRICULTURE WITH MANUFACTURES AND PRODUCTION OF MINERALS ON BASIS OF NUMBER OF PERSONS ENGAGED AND VALUE OF PRODUCT, BY GEOGRAPHIC DIVISIONS, 1919

Geographic Division	Persons engaged in— Agriculture	Persons engaged in— Manufactures and production of minerals [a]	Value of agricultural products [b]	Value added by manufacture plus value of products of mineral industries [a]
United States	10,636,826	11,893,558	$20,933,487,000	$28,206,165,000
New England	221,162	1,543,095	463,106,000	3,249,884,000
Middle Atlantic	633,664	3,816,142	1,497,641,000	9,287,921,000
East North Central	1,586,291	3,091,676	4,323,955,000	7,596,274,000
West North Central	1,664,919	708,772	5,540,245,000	1,690,804,000
South Atlantic	2,114,586	1,073,132	2,509,661,000	2,211,625,000
East South Central	1,782,628	480,570	1,722,324,000	846,211,000
West South Central	1,781,389	413,863	2,702,169,000	1,220,595,000
Mountain	414,009	222,382	914,787,000	634,264,000
Pacific	438,178	543,926	1,259,599,000	1,468,587,000

[a] Including production of oil and gas.

[b] Total value of crops plus total value of live-stock products and domestic animals sold or slaughtered on farms; includes some duplication representing value of crops consumed by live stock.

Agriculture. General statistics and other information in respect to agriculture in the United States are given in the article Agriculture. For special discussions of the important crops, see Corn, Oats, Potatoes, Wheat, Cotton, etc. The following articles bear on agricultural activities: Agricultural Education; Agriculture, International Institute of: Agricultural-Extension Work; Agricultural Credit; Agriculture, United States Department of; Horticulture; Botany; Diseases of Plants; Tractor; Reclamation; Dairying; Live Stock; Food and Nutrition; Fertilizers; Soil; and Veterinary Medicine. The articles on individual States consider local agricultural matters in detail.

Mineral Production. It was natural that the War should promote mineral production, and from 1914 to 1918 there was a continuous increase in the value of metallic and nonmetallic minerals mined. Table IX shows the striking rise of production through 1920, the reaction of 1921, and subsequent recovery, approximately maintained through 1927, with a slight decline in 1928.

Table X presents a survey of the principal minerals, by production and value, for the years 1913, 1920 (the peak year of the period), 1922, and 1927.

The more important minerals mined in the United States are treated under the following separate heads: Coal; Coke; Copper; Gold; Iron and Steel; Lead; Petroleum; Silver. See also Aluminum; Asphalt; Bauxite; Cement; Graphite; Gypsum; Lime; Natural Gas; Phosphate Rock; Platinum; Quicksilver; Radium; Talc and Soapstone; Stone; Sulphur; Tin; Zinc. The articles on the individual States contain sections on mineral production.

TABLE IX—TOTAL VALUE OF MINERAL PRODUCTS OF THE UNITED STATES, 1913–1927

Year	Metallic Value	Nonmetallic Value	Unspecified (metallic and nonmetallic)	Total Value
1913	$ 878,869,000	$1,554,298,000	$ 378,000	$2,433,545,000
1914	686,639,000	1,424,063,000	470,000	2,111,172,000
1915	991,730,000	1.400,484,000	2,430,000	2,394,644,000
1916	1,620,745,000	1,884,413,000	3,281,000	3,508,439,000
1917	2,086,234,000	2,900,462,000	5,800,000	4,992,496,000
1918	2,153,318,000	3,380,690,000	6,700,000	5,540,708,000
1919	1,359,744,000	3,232,626,000	3,400,000	4,595,770,000
1920	1,762,350,000	5,214,170,000	4,820,000	6,981,340,000
1921	654,130,000	3,481,890.000	2,650,000	4,138,670,000
1922	987,180,000	3,656,410,000	3,700,000	4,647,290,000
1923	1,498,200,000	4,515,800,000	4,000,000	6,018,000,000
1926	1,402,920,000	4,803,080,000	7,600,000	6,213,600,000
1927	1,217,700,000	4,303,600,000	8,200,000	5,529,500,000
1928	1,282,000,000	4,109,000,000	9,000,000	5,400,000,000

MANUFACTURES

At the end of the nineteenth century, the United States was known chiefly as an agricultural and raw-material-producing nation. The developments of the last two decades brought this country to the forefront as an industrial nation.

TABLE X—PRODUCTION AND VALUE OF PRINCIPLE MINERALS FOR 1913, 1922, 1928
Expressed in thousands)

	1913		1920		1922		1928	
	Amount	Value	Amount	Value	Amount	Value	Amount	Value
Aluminum, pounds	72,379	$ 13,845	....	$ 41,375	......	$ 13,622	....	$ 47,899
Copper, pounds	1,224,484	189,795	1,209,061	224,467	950,285	128,289	1,825,900	262,930
Gold, fine ounces	4,299	88,884	2,476	51,186	2,363	48,849	2,194	45,360
Iron, pig, long tons	30,388	458,342	35,710	1,140,904	27,670	608,144	38,303	661,351
Lead, short tons	436	38,405	476	76,296	468	51,562	626	72,639
Silver, fine ounces	66,801	40,348	55,361	60,801	56,240	56,240	56,020	32,771
Zinc, short tons	337	37,772	450	72,907	353	40,273	591	72,166
Cement, barrels	92,949	93,001	97,079	195,589	118,590	208,464	177,948	278,795
Clay products	....	181,289	....	373,670	......	321,494	....	....
Bituminous coal, short tons	478,523	565,307	568,666	2,129,933	422,268	1,274,820	492,755	946,090
Anthracite coal, long tons	81,718	195,181	79,998	434,252	48,824	273,700	68.512	400,374
Lime, short tons	3,595	14,648	3,570	37,543	3,639	33,255	4,395	36,600
Natural gas, M cubic feet	....	87,846	....	166,259	......	221,535	1,540,000	333,000
Petroleum, barrels	248,446	237,121	442,929	1,360,745	557,531	895,111	900,364	1,077,900
Salt, barrels	34,399	10,123	....	29,894	......	27,464	8,074	26,772
Stone	....	83,732	....	133,541	......	122,066	133,130	196,800
Sulphur, long tons	311	5,479	1,517	30,000	1,343	22,000	2,082	37,500
Total metallic	....	$ 882,980	....	$1,762.350	......	$ 987,180	....	$1,282,000
Total nonmetallic	....	1,562,324	....	5,184,240	......	3,656,410	....	4,109,000
Total mineral products	....	$2,445,805	....	$6,951,410	......	$4,647,290	....	$5,400.000

If development continues in the future as it has in recent years, the eastern part of the United States will become firmly established as one of the highly industrialized areas of the world. The growth of industrial activity is best brought out by the data from the census of manufactures which are available at varying intervals since 1850. These figures are summarized in Table XI.

TABLE XI—SUMMARY OF MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1850–1927

Census year	No.of establishments	No. of wage earners—average	Wages paid	Cost of materials	Value of products	Value added by manufacturing
			Millions of dollars			
1850	123,025	957,059 [b]	237	555	1,019	464
1860	140,433	1,311,246 [b]	379	1,032	1,886	854
1879	253,852	2,732,595 [b]	948	3,397	5,370	1,973
1889	355,405	4,251,535	1,891	5,162	9,372	4,210
1899	207,514	4,712,763	2,008	6,576	11,407	4,831
1904	216,180	5,468,383	2,610	8,500	14,793	6,294
1909	268,491	6,615,046	3,427	12,143	20,672	8,529
1914	275,791	7,036,337	4,079	14,368	24,246	9,878
1919	290,105	9,096,372	10,534	37,376	62,418	25,042
1921 [a]	196,357	6,946,570	8,200	25,337	43,653	18,317
1923	195,580	8,768,491	10,999	34,481	60,258	25,778
1925	187,390	8,384,261	10,730	35,897	62,668	26,778
1927	191,866	8,354,000	10,848	35,133	62,718	27,585

[a] The 1921 census of manufactures relates only to establishments having products valued at $5000 or more, whereas at previous censuses the corresponding limit was $500. It is estimated that establishments with products valued between $500 and $5000 contributed only 0.6 per cent of total wage earners and 0.3 per cent of the total value of products.

[b] Includes salaried officials, clerks, etc.

It will be noted that the value of products as stated by the census rose from $20,672,000,000 in 1909 to the maximum of $62,718,347,289 in 1927, an increase for the period of over 200 per cent. The value added by manufacture in 1927 was $27,585,792,755, or an increase of 6.7 per cent over the total for 1923. In 1925 it was $26,771,373,163. The relative increase in the physical output of the manufacturing industry of the United States was about the same during the decade 1909–19 as during that preceding.

TABLE XII—COMPUTATION OF APPROXIMATE VALUE OF MATERIALS, PRODUCTS, AND VALUE ADDED BY MANUFACTURE AT 1889 PRICES
(In millions of dollars)

Year	Price Index	Cost of Materials		Value of Products		Value added by Manufacture	
		As Stated	At 1899 Prices	As Stated	At 1899 Prices	As Stated	As 1899 Prices
1899	100	6,576	6,576	11,407	11,407	4,831	4,831
1904	115	8,500	7,319	14,793	12,863	6,294	5,473
1909	129	12,143	9,413	20,672	16,025	8,529	6,612
1914	131	14,368	10,968	24,246	18,508	9,878	7,541
1919	275	37,376	13,591	62,418	22.697	25,042	9,106
1921	196	25,337	12,927	43.653	22.271	18,317	9,363
1925	212	35,936	16,951	62,714	29,580	26,778	12,631

The census of 1921 was the first of a series of biennial censuses of manufactures authorized by Congress. These relate only to establishments having products valued at $5000 or more, whereas at previous censuses the corresponding limit was $500. The Bureau of the Census stated that although the establishments with products valued between $500 and $5000 constituted 21.6 per cent of the total number of establishments in 1919, they represented only six-tenths of 1 per cent of the total number of wage earners and only three-tenths of 1 per cent of the total value of products. Consequenty, their omission has only a slight effect upon the completeness of the data.

Another measure which may be employed to gauge the trend of the manufacturing industries independent of the price factor is the average number of wage earners employed as given in Table XIII. In this case, however, the increasing introduction of labor-saving machinery and the

TABLE XIII—SUMMARY OF MANUFACTURING INDUSTRIES BY GENERAL GROUPS

	Average Number of Wage Earners				Cost of Materials				Value of products			
Group	1909	1919	1921	1927	1909 Millions	1919 Millions	1921 Millions	1927 Millions	1909 Millions	1919 Millions	1921 Millions	1927 Millions
Food	411,575	684,672	568,734	679,158	$3,188	$10,112	$5,938	$8,113	$3,938	$12,439	$7,850	$10,999
Textiles	1,445,720	1,611,309	1,510,876	1,692,473	1,763	5,382	3,804	4,926	3,087	9,216	6,961	8,964
Iron and steel	,026,553	1,585,712	1,031,523	835,091	1,800	4,816	3,003	3,540	3,164	9,404	5,601	6,199
Lumber	911,593	839,008	675,069	866,581	718	1,360	1,189	1,633	1,588	3,070	2,430	3,457
Leather	309,766	349,362	280,071	316,421	670	1,714	934	1,087	993	2,610	1,544	1,868
Paper, printing	415,990	509,875	467,072	553,040	451	1,307	1,331	1,837	1,179	3,013	3,149	4,638
Liquors, beverages	77,827	55,442	35,374	......	186	223	158	....	674	604	292	....
Chemicals												
Stone, clay, glass	267,261	427,008	329,472	394,817	931	3,748	3,070	4,061	1,527	5,610	4,537	6,404
Metals other than iron and steel	342,827	298,659	250,812	350,397	184	409	421	594	532	1,086	1,019	1,612
Tobacco	249,607	339,469	235,170	270,665	892	1,910	995	1,780	1,240	2,760	1,575	2,668
Vehicles	166,810	157,097	149,985	129,299	177	484	609	420	416	1,013	1,048	1,163
(land)	202,719	495,939	281,350	494,905	307	2,498	1,576	2,907	562	4,059	2,509	4,702
Railroad repair	304,592	515,709	418,285	428,291	215	548	507	545	438	1,354	1,267	1,289
Miscellaneous	482,206	1,227,111	712,777	268,793	661	2,868	1,801	865	1,334	6,180	3,872	1,925

Machinery is not included under *Iron and Steel* for 1927, while under *Vehicles* for 1927 is included vehicles for air and water as well as land transportation.

varying efficiency of labor are factors which affect the results, but cannot be precisely gauged. In the decade between 1899 and 1909, the number of wage earners increased 40.3 per cent and between 1909 and 1919 the increase was 37.5 per cent. These figures agree fairly well with those arrived at from values of product computed at a constant price, if allowance is made for the above-mentioned factors. Between 1919 and 1921, however, the average number of wage earners declined from 9,096,000 to 6,947,000, a decrease of nearly 24 per cent. In 1923 the number of wage earners rose to 8,776,646 and then gradually decreased to 8,351,257 in 1927. That the output of manufacturing industries continued to increase despite the drop in wage earners, is evidenced by the rates of increase in the horse power of engines and motors in manufacturing establishments—8.1 per cent for the period 1923–25 and 9.1 per cent for 1925–26.

In 1850 the total value of products of the manufacturing industries of the United States was only $1,019,000,000. By 1899 this amount had increased to $11,407,000,000; by 1909 this latter value had been nearly doubled, and in 1919 had reached the enormous total of $62,418,000,000, not exceeded until 1925. In 1927 the total value of products was $62,718,347,289. Taking into account a change in the methods of compilation, this figure represents a decrease of two-tenths of 1 per cent in the value of manufactured products from 1925. The magnitude of the 1919 total was due partly to high prices; partly also to quantity of output. Some approximation to the increase in physical volume of production can be arrived at by reducing the figures for later years by the use of price-index numbers. Table XII gives figures on cost of material used, value of products, and value added by manufacture, from 1899 through 1925, (1) as stated by the Census and (2) estimated on the supposition that prices in succeeding periods had remained at the same level as in 1899. These latter computations are based on the all-commodity wholesale price index of the Bureau of Labor Statistics, U. S. Department of Labor. The index given in the first column of the table is the same as that computed by the Bureau except that for convenience the base has been transferred from 1913 to 1899. It must be remembered that the Department of Labor index is based on products which do not enter equally into manufacture and can give only

TABLE XIV—COMBINED SUMMARY FOR ALL MANUFACTURING INDUSTRIES, BY STATES, 1927

(Figures are for manufacturing and printing and publishing industries, as compiled from returns made at the biennial censuses for 1927. No data are included for establishments having products valued at less than $5000.)

	Number of establishments	Wage earners (average for the year) [a]	Value of products [b]
Alabama	2,355	119,093	$ 550,372,126
Arizona	300	8,967	117,624,434
Arkansas	1,146	40,032	182,750,871
California	10,066	262,936	2,593,247,224
Colorado	1,483	32,001	278,221,43[illegible]
Connecticut	2,877	240,806	1,284,738,563
Delaware	446	21,016	129,899,735
District of Columbia	503	9,519	90,389,537
Florida	1,912	61,219	218,790,152
Georgia	3,175	154,168	609,917,660
Idaho	470	13,513	86,256,399
Illinois	14,711	623,468	5,386,003,235
Indiana	4,726	280,717	2,153,479,432
Iowa	3,061	73,692	769,340,610
Kansas	1,766	45,368	681,570,334
Kentucky	1,851	74,912	447,764,961
Louisiana	1,625	82,415	638,361,215
Maine	1,426	68,142	372,093,474
Maryland	3,205	126,700	943,410,896
Massachusetts	10,037	578,068	3,317,851,888
Michigan	5,800	488,856	4,244,941,132
Minnesota	3,886	98,833	1,066,727,215
Mississippi	1,333	50,569	196,640,742
Missouri	5,422	195,378	1,665,173,463
Montana	565	14,242	203,503,250
Nebraska	1,277	26,110	420,296,190
Nevada	116	2,419	26,815,907
New Hampshire	1,028	65,482	327,528,366
New Jersey	8,312	408,010	3,417,450,248
New Mexico	200	4,653	20,182,672
New York	36,650	1,072,284	9,406,751,185
North Carolina	2,984	204,590	1,154,646,612
North Dakota	307	3,260	47,003,022
Ohio	10,961	669,097	5,230,323,268
Oklahoma	1,373	27,932	371,718,409
Oregon	1,779	61,401	342,852,371
Pennsylvania	17,314	987,414	6,715,563,455
Rhode Island	1,497	120,009	592,232,647
South Carolina	1,059	108,992	358,334,205
South Dakota	472	5,170	83,001,163
Tennessee	2,098	114,968	614,040,524
Texas	4,065	116,763	1,206,579,962
Utah	556	13,585	163,118,376
Vermont	880	26,241	134,029,978
Virginia	2,432	114,918	671,346,808
Washington	3,344	104,468	677,913,579
West Virginia	1,313	77,630	451,555,334
Wisconsin	7,473	247,722	1,973,653,261
Wyoming	229	5,577	85,368,360

[a] Not including salaried employees.

[b] The amount of manufacturers' profits cannot be calculated from the census figures, for the reason that no data are collected in regard to a number of items of expense, such as interest on investment, rent, depreciation, taxes, insurance, and advertising.

rough approximations when used in this way. The resulting figures, however, serve to give some idea of the changing volume of the manufactures, apart from price changes, through 1921. After that year, changes in the yearly price index were moderate, the figure rising through 1925 and then declining to approximately the 1921 level for 1927.

Manufacturing Industries by Groups. The census classifies all manufacturing industries by general groups. These groups, together with some of the principal figures for the censuses of 1909, 1919, 1921, and 1927, are shown in Table XIII.

The most important group from the standpoint of value of products is that of foods and their products, which increased from less than $4,000,000,000 in 1909 to $12,439,000,000 in 1919. In 1925 the value was $10.373,082,162 and in 1927, $10,999,789,550. The two groups, textiles and their products and iron and steel and their products, compete for the second place, although in 1927 the former group was well in the lead. A marked increase has occurred in the group of chemicals and allied products, which were valued at $1,527,000,000 in 1909, at $6,438,027.055 in 1925, and at $6.404,914,348 in 1927. Vehicles for land transportation show the development of the automobile industry. This group increased from $562,000,000 in 1909 to $4,059,000,000 in 1919, an increase for the 10 years of 622 per cent. In 1927 the value of automotive products proper was $2,848,443,000, while the value of all land, air, and water vehicles manufactured was $4,702,378,136. The heavy decrease in the output of the liquor and beverage group since 1919 coincides with the establishment of prohibition and the curtailment of legitimate liquor, wine, and beer manufacture.

Manufacturing Industries by States. The statistics of manufacture by individual States are to be found in the articles on the individual States such as have manufacturing industries of relative importance. Table XIV summarizes the manufacturing activities of the State, in 1925; Table XV summarizes manufacturing activities in the various geographic divisions in 1914, 1925, and 1927.

TABLE XV—CENSUS OF MANUFACTURES: SUMMARY BY GRAPHIC DIVISIONS

Source: U. S. Bureau of Census

[Figures for wage earners in thousands; value of products and value added by manufacture in millions of dollars]

	Wage earners (average number)			Value of products			Value added by manufacture			Percentage change 1914 to 1927	
Geographic Division	1914 [a]	1925 [b]	1927	1914 [a]	1925 [b]	1927	1914 [a]	1925 [b]	1927	Wage earners (average number)	Value added by manufacture
United States	7,036	8,382	8,353	24,246	62,668	62,721	9,878	26,771	27,585	+18.7	+179.2
New England	1,140	1,122	1,099	2,927	6,161	6,028	1,269	2,936	2,980	−3.6	+134.8
Middle Atlantic	2,356	2,491	2,468	8,054	19,409	19,540	3,373	8,727	9,045	+4.7	+168.2
East North Central	1,680	2,342	2,310	6,542	19,017	18,988	2,747	8,261	8,463	+37.5	+208.1
West North Central	382	451	448	2,032	4,696	4,733	634	1,504	1,562	+17.4	+146.3
South Atlantic	685	839	879	1,683	4,534	4,628	680	1,983	2,144	+28.2	+215.3
East South Central	264	356	360	701	1,807	1,809	314	766	784	+36.0	+149.9
West South Central	212	265	267	803	2,543	2,399	276	824	755	+26.0	+174.0
Mountain	81	100	95	438	1,046	981	165	358	321	+17.1	+94.4
Pacific	236	415	429	1,068	3,454	3,614	421	1,414	1,532	+82.1	+264.2

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[a] The figures for 1914 are not strictly comparable with later years, due to the inclusion in this year and the exclusion in later years of establishments with products valued at less than $5000 and data for the "Automobile repairing" and "Poultry killing and dressing" industries.

[b] The figures for 1925 exclude data for the "Coffee and spice, roasting and grinding" industry which were not compiled for this year.

As to geographic groups of States, the greatest increase in value of products during the period 1914–27, was made by the East North Central group, including Illinois, Michigan, Indiana, Ohio, and Wisconsin. The value of the products produced in this division increased $12,446,000,000 during the 13 years. The Middle Atlantic States, including New York, New Jersey, and Pennsylvania, ran a close second in actual increase. The value of products produced in this territory rose from $8,054,000,000 in 1914 to $19,540,000,000 in 1927, an increase of $11,486,000,000. The greatest relative increase for any division was in the Pacific States, where the value of products rose from $1,068,000,000 in 1909 to $3,614,000,000 in 1927. This was followed by the West South Central States with an increase for the same 10 years of 264 per cent. The New England and South Atlantic States increased the value of their output by $3,101,000,000 and $2,945,000,000, respectively, during the period.

The three geographical divisions, New England, Middle Atlantic, and East North Central, contain the principal manufacturing industries. This territory, which may be described roughly as east of the Mississippi and north of the Ohio and the Mason and Dixon line, produced 72.7 per cent of the value of all manufactured products in 1909, 71.8 per cent in 1919, and 71 per cent in 1925. See also articles: MOTOR VEHICLES; FOOD AND NUTRITION; IRON AND STEEL; BOOTS AND SHOES; LEATHER; RUBBER; SILK; SILK, ARTIFICIAL; TEXTILE MANUFACTURING; WATER POWER; PAPER AND WOOD PULP; SHIPPING; SHIPBUILDING; MOVING PICTURES; RADIO; and the section *Manufactures* in the articles on the individual States.

FOREIGN COMMERCE

The World War had a marked effect upon the foreign trade of the United States. For the five pre-war years, 1910 to 1914 inclusive, the average exports of domestic merchandise amounted to $2,130,000,000 per year, while imports averaged $1,689,000,000. During the next five years, 1915 to 1920, domestic exports averaged $6,161,000,000 and imports $3,223,000,000. The foreign trade of this country reached its maximum in

TABLE XVI—EXPORTS, IMPORTS, AND BALANCE OF TRADE OF THE UNITED STATES
(*Values in millions of dollars*)

Years	Merchandise exports			Merchandise imports					Excess of exports (+) or imports (−)		
Years ended June 30—	Domestic	Foreign	Total	Free	Dutiable	Total	Per cent free	Per cent imports to exports	Merchandise	Gold and silver	Mdse., gold, and silver
1875–1879	599	14	612	142	323	466	30.6	76.0	+147	+27	+174
1880–1884	794	17	811	208	477	685	30.3	84.5	+125	−25	+100
1885–1889	702	13	715	228	447	675	33.8	94.4	+40	+13	+53
1890–1894	887	16	902	383	414	797	48.1	88.3	+106	+50	+156
1895–1899	1,021	19	1,040	341	377	718	47.5	69.0	+322	+10	+332
1900–1904	1,403	26	1,429	397	522	919	43.2	64.3	+510	+17	+527
1905–1909	1,707	26	1,733	567	690	1,257	45.1	72.5	+476	−6	+471
1910–1914	2,130	35	2,166	906	783	1,689	53.6	78.0	+477	+38	+515
Years ended, Dec. 31—											
1915–1920	6,161	101	6,261	2,160	1,063	3,223	67.0	51.5	+3,039	−85	+2,953
1921–1923	4,078	83	4,162	1,857	1,281	3,138	59.2	75.4	+1,024	−407	+617
Years ended June 30—											
1910	1,710	35	1,745	755	802	1,557	48.5	89.2	+188	+85	+273
1911	2,014	36	2,049	777	750	1,527	50.9	74.5	+522	−32	+490
1912	2.170	34	2,204	882	772	1,653	53.3	75.0	+551	+26	+577
1913	2,429	37	2.466	988	825	1.813	54.5	73.5	+653	+39	+692
1914	2,330	35	2,365	1,128	766	1,894	59.5	80.1	+471	+70	+541
Years ended, Dec. 31—											
1915	3,493	61	3,555	1,167	611	1,779	65.6	50.0	+1,776	−401	+1,375
1916	5,423	60	5,483	1,612	780	2,392	67.4	43.6	+3,091	−492	+2,599
1917	6,170	64	6,234	2,136	817	2,952	72.3	47.4	+3,281	−150	−3,131
1918	6,048	101	6,149	2,230	801	3,031	73.6	49.3	+3,118	+160	+3,278
1919	7,750	171	7,920	2,699	1,206	3,904	69.1	49.3	+4.016	+441	+4,457
1920	8,080	148	8,228	3,117	2,161	5.278	59.1	64.2	+2,950	−69	+2,880
1921	4,379	106	4,485	1,562	947	2,509	62.3	55.9	+1,976	−679	+1,297
1922	3,765	67	3.832	1,872	1,241	3,113	60.1	81.2	+719	−246	+473
1923	4,091	77	4,168	2,136	1,656	3,792	56.3	91.0	+376	−296	+80
1925	4,819	91	4,910	....	....	4,227	...	86.1	+683	+169	+852
1927	4.759	107	4.865	2,622	1,563	4,185	62.6	88.0	+681	+15	+589
1928	5,030	99	5,129	....	....	4,091	...	79.8	+1,038	+411	+1.449

1920, when domestic exports totaled $8.080,000,000 and imports $5,278,000.000. After that, the value of the foreign trade declined, amounting to $3,765.000,000 for exports and $3.113,000,000 for imports in 1922. Foreign trade recovered gradually from the depression of 1922; in 1927 domestic exports totaled $4,758,864,000; imports, $4,184,742,000 In 1928 domestic exports totaled $5,030,000,000 and imports, $4,091,000,000.

In order to understand the true significance of changes in the value of trade, it is necessary to know whether they are caused by changes in quantity, fluctuations of price, or a combination of these two factors. For this reason, it is desirable to make periodic studies of the price movements of both exports and imports and of the quantitative changes in the trade. The most satisfactory method of estimating these changes

TABLE XVII—INDEXES OF CHANGES IN QUANTITY, PRICE, AND VALUE OF GENERAL IMPORTS AND EXPORTS OF UNITED STATES MERCHANDISE

Year	Exports of United States merchandise			General imports			Domestic wholesale price index
	Quantity	Price	Value	Quantity	Price	Value	
1913 taken as 100:							
1913	100	100	100	100	100	100	100
1921–1925	123	144	176	151	126	192	142
1919	142	223	317	125	174	218	199
1920	137	241	330	139	213	294	221
1921	120	150	179	120	117	140	140
1922	112	138	154	154	113	174	139
1923	115	146	167	161	132	212	144
1924	130	143	184	156	129	201	141
1925	137	144	197	166	142	236	148
1926	146	133	192	178	139	247	143
1927	158	124	194	180	130	233	137
1928	165	125	206	181	126	228	140
1923–1925 taken as 100:							
1913	79	69	55	62	75	46	69
1921–1925	96	100	96	94	94	89	99
1919	112	155	173	78	130	101	138
1920	108	167	181	86	158	136	153
1921	94	104	98	75	87	65	97
1922	88	95	84	96	84	80	96
1923	90	101	92	100	98	98	100
1925	102	99	101	97	96	93	97
1926	108	100	108	103	106	109	103
1927	115	92	105	110	104	114	99
1928	124	86	107	112	96	108	95
1924	130	86	113	113	94	106	97

is by the calculation of price indexes which are weighted by the quantities of the commodities entering the trade. Changes in the quantitative volume of trade are then obtained by adjusting the total value figures by these price indexes. Table XVII shows indexes of both price and quantity of exports and imports, respectively, calculated in this manner. The recently revised index of wholesale prices, constructed by the Bureau of Labor Statistics, is included in Table XVII for comparative purposes and all indexes are shown on both a pre-war and a post-war base.

TABLE XVIII—FOREIGN TRADE OF THE UNITED STATES BY COMMODITY GROUPS[a]

EXPORTS OF DOMESTIC MERCHANDISE

(Values in millions of dollars)

Year	Crude material for use in manufacturing		Foodstuffs in crude condition and food animals		Foodstuffs partly or wholly manufactured		Manufactures for use in further manufactures		Manufactures ready for consumption	
	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total
1910	566	33.1	110	6.4	259	15.2	268	15.7	499	29.2
1911	713	35.4	103	5.1	282	14.0	309	15.4	598	29.7
1912	723	33.3	100	4.6	319	14.7	348	16.0	672	31.0
1913	732	30.1	182	7.5	321	13.2	409	16.8	776	32.0
1914	793	34.0	137	5.9	293	12.6	374	16.1	725	31.1
Average, 1910–1914	705	33.1	127	5.9	295	13.8	342	16.0	654	30.7
1915	510	18.8	507	18.7	455	16.7	356	13.1	807	29.7
1916	536	12.6	381	8.9	599	14.0	658	15.4	1,998	46.8
1917	732	11.8	532	8.5	738	11.9	1,191	19.1	2,943	47.3
1918	897	15.4	375	6.4	1,154	19.8	1,201	20.6	2,185	37.4
1919	1,610	20.8	678	8.8	1,963	25.3	922	11.9	2,563	33.1
1920	1,871	23.2	918	11.4	1,117	13.8	958	11.9	3,205	39.7
1921	984	22.5	692	15.8	670	15.3	399	9.1	1,626	37.1
1922	981	26.1	459	12.2	588	15.6	438	11.6	1,292	34.3
1923	1,202	29.4	257	6.3	583	14.3	564	13.8	1,478	36.1
1927	1,193	25.1	421	8.8	463	9.7	700	14.7	1,982	41.6
1928	1,293	25.7	293	5.8	467	9.3	717	14.3	2,259	44.9

[a] The sixth group of miscellaneous commodities is not given but it usually comprises less than 1 per cent of the total.

TOTAL IMPORTS

(Values in millions of dollars)

Year	Crude material for use in manufacturing		Foodstuffs in crude condition and food animals		Foodstuffs partly or wholly manufactured		Manufactures for use in further manufactures		Manufactures ready for consumption	
	Value	Per cent of total	Value	per cent of total	Value	Per cent of total	Value	Per cent of total	Value	Per cent of total
1910	566	36.4	145	9.3	182	11.7	285	18.3	368	23.6
1911	511	33.5	181	11.8	172	11.3	288	18.8	361	23.7
1912	556	33.6	230	13.9	196	11.9	294	17.8	360	21.8
1913	635	35.0	212	11.7	194	10.7	349	19.3	408	22.5
1914	633	33.4	248	13.1	228	12.0	319	16.9	449	23.7
Average 1910–1914	580	34.4	203	12.0	194	11.5	307	18.2	389	23.1
1915	575	34.4	224	13.4	286	17.1	237	14.2	336	20.0
1916	949	43.2	252	11.5	311	14.1	357	16.2	312	14.2
1917	1,110	41.7	336	12.6	343	12.9	478	18.0	377	14.2
1918	1,230	41.8	373	12.7	380	12.9	541	18.4	403	13.7
1919	1,674	42.9	545	14.0	556	14.2	610	15.6	493	12.7
1920	1,752	33.2	578	10.9	1,238	23.5	803	15.2	877	16.6
1921	853	34.0	304	12.1	369	14.7	344	13.7	619	24.7
1922	1,161	37.3	330	10.6	387	12.4	553	17.8	663	21.3
1923	1,389	36.6	363	9.6	530	14.0	719	19.0	770	20.3
1927	1,601	38.3	505	12.2	451	10.8	750	17.9	879	21.0
1928	1,467	35.9	550	13.4	405	9.9	763	18.6	907	22.2

Export prices more than doubled during the War and advanced in 1920 to a peak almost two and one-half times as high as in 1913. A drastic decline followed in the two succeeding years, but there was a moderate recovery in 1923. After three years of fairly stable prices another decline set in which continued through 1927. This, in turn, was followed by another period of relative stability in 1928, as increases in the average prices of cotton and copper about offset lower prices of wheat, iron and steel, petroleum products, and meats.

Import prices had a very similar trend to that shown by exports, although the magnitude of the changes varied somewhat. The recovery from the post-war deflation in 1922 was much sharper and more prolonged than in the case of exports. As a result the index of import prices, which had shown a smaller increase during the War than hat of exports, in 1925 returned to approximately its pre-war relationship with exports. During the years 1925–28, average import prices showed a considerable decline which about paralleled that shown by exports in 1926 and 1927. The commodities which showed the most marked decreases in price after 1925 were rubber, sugar, silk, wool, and tin. Prices of hides and skins and copper, on the other hand, showed a net increase during this period.

Although both exports and imports were larger in post-war years than they were before the War, imports expanded much more than exports, both in value as stated and in volume. This change in the trend of trade toward a closer balance between exports and imports was largely the natural result of the War and its accompanying developments.

The great expansion of United States industries required larger supplies of raw material, much of which, such as silk and rubber, must be imported. From 1923 to 1927, the rapid economic return of the United States to normality gave it an advantage in the export field, thus promoting export growth. The shift of the United States from a debtor to a creditor nation rendered a large favorable balance in merchandise trade less necessary, as well as less desirable, in some respects, but a large yearly export balance was nevertheless achieved.

TABLE XIX—FOREIGN TRADE OF THE UNITED STATES BY GRAND DIVISIONS

(Values in Millions of Dollars)

Grand Division	Total Exports 1910–1914 Value	Per cent of total	1922 Value	Per cent of total	1928 Value	Per cent of total	Total Imports 1910–1914 Value	Per cent of total	1922 Value	Per cent of total	1928 Value	Per cent of total
Europe	1,350	62.3	2,083	54.4	2,375	46.3	836	49.5	991	31.8	1,249	30.5
North America	501	23.1	916	23.9	1,323	35.7	347	20.6	822	26.4	961	25.3
South America	121	5.6	226	5.9	481	9.4	207	12.2	359	11.5	570	13.7
Asia	121	5.6	449	11.7	654	12.7	259	15.3	827	26.6	1,169	28.6
Oceania	48	2.2	102	2.7	180	3.5	17	1.0	49	1.6	54	1.3
Africa	25	1.1	56	1.5	117	2.3	23	1.3	65	2.1	90	2.2
Total	2,166	100.0	3,832	100.0	5,129	100.0	1,689	100.0	3,113	100.0	4,091	100.0

The increase in the exports of manufactured products is evidenced in the data in Table XVIII. Before the War, crude materials formed approximately one-third of both exports and imports, while manufactured goods ready for consumption formed 31 per cent of exports and 23 per cent of imports.

In 1928 manufactures that were ready for consumption formed over 44 per cent of the total exports and crude materials only 25 per cent. In imports, the opposite tendency was found, with crude materials becoming more important than formerly, although showing a gradual decline after 1925.

TABLE XX—LEADING COUNTRIES IN THE FOREIGN TRADE OF THE UNITED STATES

(Values in millions of dollars)

Country	Total Exports 1910–1914 Value	Per cent of total	1922 Value	Per cent of total	1928 Value	Per cent of total	Total Imports 1910–1914 Value	Per cent of total	1922 Value	Per cent of total	1928 Value	Per cent of total
United Kingdom	568	26.2	856	22.3	847	16.5	279	16.5	357	11.5	348	8.5
France	139	6.4	267	7.0	241	4.7	130	7.7	143	4.6	159	3.9
Belgium	53	2.5	102	2.6	112	2.2	40	2.4	54	1.7	75	1.8
Netherlands	105	4.8	118	3.1	142	2.8	35	2.1	64	2.0	84	2.0
Germany	304	14.0	316	8.2	467	9.1	176	10.4	117	3.8	222	5.4
Scandinavia	33	1.5	100	2.6	126	2.4	20	1.2	53	1.7	72	1.7
Spain	26	1.2	71	1.9	87	1.7	22	1.3	29	.9	35	0.9
Italy	66	3.0	151	3.9	162	3.2	51	3.0	64	2.1	102	2.5
Balkan Countries	5	.2	30	.8	52	0.8	14	.8	35	1.1	36	0.8
Egypt	2	.1	8	.2	11	...	17	1.0	35	1.1	29	...
Argentina	47	2.2	96	2.5	179	3.5	33	1.9	86	2.8	99	2.4
Brazil	31	1.5	43	1.1	100	2.0	111	6.6	120	3.9	221	5.4
Chile	14	.6	22	.6	40	.8	23	1.4	60	1.9	75	1.8
Cuba	63	2.9	128	3.3	128	2.5	122	7.2	268	8.6	203	5.0
Mexico	53	2.5	110	2.9	109	2.3	70	4.2	132	4.2	124	3.0
Canada	315	14.5	577	14.1	916	17.9	117	6.9	364	11.7	489	12.0
China	31	1.4	127	3.3	137	3.2[a]	38	2.3	152	4.9	140	3.8[a]
Japan and Chosen	45	2.1	222	5.8	288	5.6	85	5.0	354	11.4	384	9.4
British East Indies	14	.7	37	1.0	12	0.2	91	5.4	205	6.6	204	5.0
Australia	39	1.8	81	2.1	141	2.8	12	.7	36	1.1	32	0.8
Total of 20 countries	1,953	90.2	3,460	90.3	4,297	83.4	1,488	88.1	2,727	87.6	3,133	66.1

[a] Percentages for China include trade with Hongkong and Kwangtung.

Before 1914 only two of the six grand divisions were important purchasers of products from the United States. These were Europe and North America, which together in the five prewar years, 1910–14, took an average of 85.5 per cent of all exported goods. Europe alone took 62.3 per cent; North America, 23.2 per cent, while 5.6 per cent each went to South America and to Asia, 2.2 per cent to Oceania, and 1.1 per cent to Africa. The significant change after the War was the increased proportion going to Asia, which in 1928 took 12.7 per cent of all exports. The proportions going to North America and to South America also increased, amounting to 25.7 and 9.4 per cent, respectively, in 1928. In the same year, Oceania received 3.5 per cent and Africa, 2.3 per cent, while Europe took only 46.3 per cent. This was the lowest proportion of our exports ever sent to Europe in any year for which records are available.

In the case of United States import trade, some 50 per cent was received from Europe before the War. In 1918 the proportion coming from that grand division fell as low as 14 per cent, but later it increased, amounting to 31.8 per cent in 1922 and 30.5 per cent in 1928. The proportion of imports from North American countries increased from an average of 20.6 per cent for the five pre-war years to 23.5 per cent in 1928, while those from Asia amounted to 15.3 and 28.6 per cent for the same periods. Small increases occurred in the proportion of imports from the other three grand divisions.

The individual countries of most importance in the foreign trade of the United States are shown in Table XX. The five countries which have been the most important purchasers of goods from this country are the United Kingdom, Canada, Germany, France, and Japan. The United Kingdom took an average of 26.2 per cent of our total exports before the War and 16.5 per cent in 1928. Canada took 14.5 and 17.9 per cent in the same two periods, while the trade with Germany declined from 14 per cent pre-war to 9.1 per cent in 1928. Japanese trade increased from 2.1 per cent before the War to 5.6 per cent in 1928, while France took 6.5 per cent of the total in pre-war years and 4.7 per cent in 1928.

In the case of imports, Canada, the United Kingdom, Japan, Cuba, and the British East Indies were of most importance. The proportion from the United Kingdom declined compared with the pre-war period, while that from each of the other countries mentioned increased. Germany, which before the War furnished 10.4 per cent of the total imports, sent only 5.4 per cent in 1928.

As shown in Table XXI, unmanufactured cotton is by far the most important single commodity exported from the United States. Even in recent years, when quantity export was smaller than before the War, the rise in price was sufficient to make the total value much greater than before the War. Petroleum and its products ranked second, while automobiles and parts ranked third as early as 1923, although before the War they were of very much smaller relative importance. Coal, tobacco, pork products, wheat and flour, copper, and lumber were among the other important exports.

TABLE XXI—EXPORTS OF LEADING COMMODITIES

[In millions and tenths of millions of dollars. Reëxports are not included]

Commodity	Value 1910–1914 [a]	 1921–1925	 1927	 1928
Cotton, raw	551.9	805.0	826.3	920.0
Petroleum and products	127.7	405.1	485.9	525.5
Automobiles, parts and accessories	24.1	177.2	388.5	500.2
Machinery [b]	158.2	321.0	436.3	497.2
Wheat, including flour	106.2	321.9	324.8	193.7
Packing-house products	151.1	286.2	187.8	187.2
Iron and steel mill products	91.3	166.8	160.5	179.7
Copper, ore, and mfts.	121.2	129.8	150.2	169.8
Tobacco, raw	44.8	164.6	139.7	154.5
Cotton manufactures	45.2	133.1	133.2	134.7
Fruits and nuts	28.7	82.9	121.7	129.3
Sawmill products	66.0	85.1	107.6	108.8
Coal and coke	55.7	131.1	109.7	99.5
Iron and steel advanced manufactures	45.0	68.6	73.3	82.6
Chemicals	21.8	56.2	72.9	75.3

[a] Fiscal years ended June 30.

[b] Includes office appliances and printing machinery.

Table XXII shows a few of the most important commodities imported into the United States. Of these, silk and coffee are in the first rank, with rubber, sugar, paper, and hides and skins followed in their order. Each of these commodities shows a large increase both in volume and value in the post-war, compared with pre-war, years. The largest increases in the actual quantity imported occurred in the case of paper, rubber, and silk. The decrease of $135,000,000 in imports of crude materials, which was the most noteworthy development in the import trade of the United States during 1928, was very largely the result of lower average prices of rubber and silk, but it was accentuated by decreases in the quantity of leaf tobacco, cotton, wool, and furs imported. See also the articles: SHIPPING; SHIPBUILDING; PANAMA CANAL.

TABLE XXII—IMPORTS OF LEADING COMMODITIES

[In millions and tenths of millions of dollars. Figures represent General Imports]

Commodity	Value 1910–1914	 1921–1925	 1927	 1928
Silk, raw	77.1	348.1	390.4	368.0
Coffee	101.5	205.8	264.3	309.6
Rubber, crude	86.3	192.9	339.9	244.9
Sugar, cane	103.5	295.4	258.2	207.0
Paper and mfts.	10.7	105.2	149.4	156.4
Hides and skins	104.6	93.1	112.8	150.8
Petroleum and products	6.3	90.8	113.4	132.8
Furs and mfts.	22.6	79.8	135.6	118.4
Paper base stocks	27.5	94.2	113.6	112.3
Copper (ore, and mfts.)	47.8	77.8	85.0	98.2
Fruits and nuts	42.3	75.5	84.7	89.5
Tin	41.5	56.5	100.9	87.0

RAILWAYS

The total railway mileage operated in the United States on Dec. 31, 1927, according to the Interstate Commerce Commission, was 262,091, including 1753 miles of American-owned road in Canada, but excluding 782 miles in Alaska, and 289 miles in Hawaii. In 1912 the mileage in operation was 249,852; in 1916 (the peak year) it was 266,381, and in 1922, 261,984. After the beginning of the World War in 1914, railroad building declined, consisting mainly of the completion of unfinished projects. There was considerable abandonment after 1920.

TABLE XXIII—RAILROAD MILEAGE (OWNED) IN THE UNITED STATES BY STATES

	1900	1910	1920	1927
New England	7,521	7,921	7,942	7,636
Maine	1,915	2,248	2,295	2,198
New Hampshire	1,239	1,246	1,252	1,198
Vermont	1,012	1,100	1,077	1,057
Massachusetts	2,119	2,115	2,106	2,019
Rhode Island	212	212	211	196
Connecticut	1,024	1,000	1,001	968
Middle Atlantic	20,708	21,980	22,293	21,919
New York	8,121	8,430	8,390	8,364
New Jersey	2,257	2,260	2,352	2,294
Pennsylvania	10,330	11,290	11,551	11,261
E. North Central	41,006	44,928	44,904	43,684
Ohio	8,807	9,134	9,002	8,881
Indiana	6,471	7,420	7,426	7,182
Illinois	11,003	11,878	12,188	12,004
Michigan	8,195	9,021	8,734	8,261
Wisconsin	6,531	7,475	7,554	7,356
W. North Central	42,988	49,730	52,180	51,650
Minnesota	6,943	8,669	9,114	8,827
Iowa	9,185	9,755	9,808	9,760
Missouri	6,875	8,083	8,117	8,018
North Dakota	2,731	4,201	5,311	5,274
South Dakota	2,850	3,948	4,276	4,235
Nebraska	5,685	6,067	6,166	6,174
Kansas	8,719	9,007	9,388	9,362
South Atlantic	23,362	29,796	32,380	31,859
Delaware	347	335	335	332
Maryland	1,376	1,426	1,436	1,446
Dist. Columbia	32	36	36	36
Virginia	3,779	4,535	4,703	4,528
West Virginia	2,228	3,601	3,996	4,007
North Carolina	3,831	4,932	5,522	5,223
South Carolina	2,818	3,442	3,814	3,744
Georgia	5,652	7,056	7,326	6,835
Florida	3,299	4,432	5.212	5,708
E. South Central	13,343	17,074	17,754	17,563
Kentucky	3,060	3,526	3,929	4,049
Tennessee	3,137	3,816	4,078	4,063
Alabama	4,226	5,226	5,378	5,185
Mississippi	2,920	4,506	4,369	4,266
W. South Central	16,898	31,122	32,972	32,693
Arkansas	3,360	5,306	5,052	4,873
Louisiana	2,824	5,554	5,223	4,790
Oklahoma	828	5,980	6,572	6,601
Texas	9,886	14,282	16,125	16,429
Mountain	17,130	22,956	25,170	24,942
Montana	3,010	4,207	5,072	5,094
Idaho	1,261	2,179	2,877	2,909
Wyoming	1,229	1,645	1,931	1,988
Colorado	4,587	5,533	5,519	5,063
New Mexico	3,075	3,032	2,972	2,998
Arizona	1,512	2,097	2,478	2,496
Utah	1,547	1,986	2,161	2,194
Nevada	909	2,277	2,160	2,200
Pacific	10,389	14,932	17,248	17,183
Washington	2,914	4,875	5,587	5,557
Oregon	1,724	2.285	3,305	3,362
California	5,751	7,772	8,356	8,264
Totals	193,345	240,439	252,845	249,131

Railroad Traffic. Railroad development of late years has reached a culmination of the growth in mileage, but there has been further increase in traffic. Between 1890 and 1920, the operated mileage increased 57 per cent, while the number of passengers carried rose from 492,000,000 to 1,235,000,000, an increase of over 150 per cent. The number of passenger miles increased nearly 300 per cent. The tons of freight carried rose from 632,000,000 in 1890 to 2,260,000,000 in 1920, or more than 250 per cent, while the freight ton-miles increased 432 per cent. The passenger traffic total declined after 1920 to 874,589,000 for 1926. The freight traffic total for 1926 was 2,627, 492,000 tons, not greatly ahead of the 1920 figure. Motor-vehicle competition apparently reduced passenger traffic and captured part of the freight traffic in certain remunerative classes. The Panama Canal route competed for coast-to-coast freight.

TABLE XXIV—RAILROAD TRAFFIC

Item	1900	1910	1920	1927
Number passengers carried	576,831,251	971,683,199	1,234,862,048	840,029,680
Number passengers carried one mile	16,038,076,200	32,338,496,299	46,848,667,987	33,649,706,115[a]
Mileage of revenue passenger trains	363,469,596	549,015,003	561,633,392	706,585,660
Average passengers per train	41	56	80	59[a]
Average journey per passenger	27.80	33.50	37.94	40.55[a]
Tons of freight carried	1,081,983,301	1,849,900,101	2,259,983,278	2,510,054,113[b]
Tons of freight carried one mile	141,596,551,161	255,016,910,451	410,306,209,802	432,013,979,030[b]
Mileage revenue freight trains	492,543,526	635,450,681	607,508,144	588,081,240[a]
Average tons per train	270.86	380.38	646.87	702.41[a][b]

[a] Class I steam railways only.
[b] Excludes non-revenue freight.

Equipment. In the matter of equipment, the railroads showed comparatively small increases after 1910. In that year, the total number of locomotives in service on the steam roads was 60,019, while at the end of 1920, the number was 68,942, and on Dec. 31, 1926, only 66,816. In tractive power, the average steam locomotive had increased from 27,282 pounds in 1910 to 41,886 pounds in 1926. In total tractive power, therefore, the locomotive equipment in 1926 showed a gain of over 50 per cent, compared with 1910.

The number of passenger cars increased from 47,179 in 1910 to 56,855 in 1926; freight cars increased from 2,148,478 in 1910 to 2,403,967 in 1926.

Finances. As a result of the demand made upon the roads during the War, including operation under government management and the difficulties experienced in the reconstruction period, the railroads of the United States suffered financially. The total railroad capital, outstanding, including stocks and bonds, amounted to $18,417,000,000 in 1910. By 1915 this had

TABLE XXV—SUMMARY OF FREIGHT TRAFFIC MOVEMENT ON RAILROADS BY PRINCIPAL GROUPS OF COMMODITIES

		Thousands of Tons Originating on Road			
Commodity group	1910	1915	1918	1920	1927[a]
Products of agriculture	78,737	113,040	116,051	110,840	113,343
Animals and products	20,294	26,660	35,777	26,595	26,002
Products of mines	544,604	556,582	734,796	712,154	713,402
Products of forests	113,011	93,971	97,256	100,766	99,351
Manufactured and miscellaneous	175,397	163,988	226,077	251,864	291,073
Merchandise L. C. L.	36,421	48,163	53,387	53,202	38,440
Total	968,464	1,002,404	1,263,344	1,255,420	1,281,611

		Total Freight Carried			
Commodity group	1910	1915	1918	1920	1927[a]
Products of agriculture	160,402	221,916	228,322	220,050	221,385
Animals and products	38,625	45,254	61,405	44,854	46,696
Products of mines	942,066	951,041	1,263,503	1,209,098	1,272,304
Products of forests	193,240	171,735	192,617	190,580	192,774
Manufactured and miscellaneous	339,392	326,092	463,011	494,556	564,643
Merchandise L. C. L.	71,601	81,275	98,368	89,901	65,838
Total	1,745,325	1,797,312	2,307,226	2,254,038	2,363.639

[a] Figures for 1927 are for Class I steam railways only.

TABLE XXVI—RAILROAD FINANCES

SUMMARY OF REPORTS OF CLASS I ROADS, I.E., ROADS WITH ANNUAL OPERATING REVENUES ABOVE $1,000,000

(Millions of dollars)

Item	1910	1915	1920	1927
Revenue:				
Freight	1,926	2,038	4,324	4,790
Passenger	629	646	1,287	1,346
Other	196	226	614	. . .
Total operating	2,751	2,910	6,255	6,136
Expense:				
Maintenance of way	369	382	1,031	869
Equipment	413	510	1,593	1,219
Transportation	916	1,032	2,902	2,137
Other	125	140	304	349
Total operating	1,823	2,064	5,830	4,574
Net operating revenue	928	846	395	1,562
Net income	379	355	58	672

TABLE XXVII—RAILROAD EMPLOYEES: AVERAGE NUMBER AND COMPENSATION

Year	Average number of employees	Total annual compensation	Average compensation per employee
1900	1,017,653	$ 577,264,841	$ 567
1910	1,699,420	1,143,725,306	673
1915	1,491,849	1,236,305,445	829
1918	1,841,575	2,613,813,351	1,419
1919	1,913,422	2,843,128,432	1,486
1920	2,022,832	3,681,801,193	1,820
1921	1,660,617	2,765,236,353	1,665
1922	1,645,244	2,669,180,772	1,622
1927[a]	1,735,105	2,910,182,848	1,677

[a] Figures for 1927 are for Class I steam railways, which employ 95 per cent of all railway workers.

increased to $21,128,000,000, a gain of $2,711,000,000. During the next five years, the gain was only $663,000,000. The total in 1926 was $23,677,000,000. In 1910, the total dividend and interest payments amounted to $805,000,000, but in 1920 to less than $759,000,000, and in 1926 to $1,055,000,000.

The largest single item of expense in the railroad budget was that for wages. In 1910 the average number of employees on the railroads was 1,699,000, the payroll, $1,144,000,000, which was an average of $673 per employee. In 1920 the number of employees was 2,022,832, while the payroll had increased more than 200 per cent, or to $3,681,801,000, and average annual compensation was $1820. After that, with the railroads under private management, there was some decrease, but in 1926 employees numbered 1,821,804 and compensation was $2,946,114,000 (total), and $1656 (average).

HISTORY

Wilson Administrations. President Wilson was inaugurated on Mar. 4, 1913, the first Democratic President since Cleveland. He was reelected in 1916. During his two terms in office, he selected for his official family the following men: Secretary of State: W. J. Bryan (to 1915), Robert Lansing (to 1920), B. Colby; Secretary of the Treasury: W. G. McAdoo, C. Glass, D. F. Houston; Secretary of War: L. M. Garrison, N. D. Baker; Attorney General: J. C. McReynolds, T. W. Gregory, A. M. Palmer; Postmaster General, A. S. Burleson; Secretary of the Navy, J. Daniels; Secretary of the Interior: F. K. Lane, J. B. Payne; Secretary of Agriculture: D. F. Houston, E. T. Meredith; Secretary of Commerce: W. C. Redfield, J. W. Alexander; Secretary of Labor, W. B. Wilson.

Domestic Legislation.—A Democratic Congress under the leadership of Wilson accomplished much of importance in the country's domestic affairs.

Tariff Revision.—Shortly after his election, President Wilson called the Sixty-third Congress into session (Apr. 7, 1913) to revise the tariff downward. Wilson, believing in a closer relationship between the executive and legislative branches of government, delivered his message to Congress personally, thereby breaking a precedent which had existed from the time of the elder Adams. The leadership in the tariff revision was taken by Oscar Underwood, of Alabama, the chairman of the ways and means committee.

The Tariff bill was passed in the House without any special difficulty, but the Democratic majority of six in the Senate was scarcely large enough to pass it in toto. The usual bargaining and compromises followed. The Underwood Act as finally passed made an average reduction of 26 per cent on the figures of 1907. The protective system was maintained although an attempt was made to allow a moderate amount of foreign competition. The duty on 958 articles was reduced, on 307 it remained unchanged, and on 86 (mainly in the chemical schedule) it was raised. There was to be no duty on wool after Dec. 1, 1913; the duty on sugar was to be gradually reduced and taken off completely on May 1, 1916; duties on woolens and cottons were heavily reduced. The sugar provisions were never completely carried out owing to the international situation. An important feature of the tariff bill was the income-tax provision which was made possible by the Sixteenth Amendment, which was proclaimed in effect Feb. 25, 1913. The law provided a tax of 1 per cent on incomes over $3000 ($4000 in the case of married persons), with an additional 1 per cent on incomes of $20,000 to $50,000; an additional 2 per cent between $50,000 and $75,000; 3 per cent between $75,000 and $100,000; 4 per cent between $100,000 and $250,000; 5 per cent between $250,000 and $500,000; and 6 per cent above $500,000. The tariff board which had been created by the Republicans was allowed to lapse by the Democrats, but was revived in 1916 by the appointment of a bipartisan commission of six members for 12-year terms. See TARIFF IN THE UNITED STATES and TAXATION IN THE UNITED STATES.

Federal Reserve System.—As soon as the question of the tariff was out of the way, Congress and the President turned their attention to banking and currency. The result was the passage in December, 1913, of the Federal Reserve Act. This act continued the prohibition of the issuance of State bank notes; it put the control of the system in the hands of a group of Federal officials known as the Federal Reserve Board; it created 12 Federal banks; to one or another of these institutions, every National bank had to become affiliated; other banks were allowed to become members; to provide for elasticity of currency, the act permitted the issuance of paper money backed up largely by sound commercial paper. (See FINANCE AND BANKING.) In order to relieve the situation of the farmers, the Federal Reserve Act was supplemented by the Federal Farm Loan Act of 1916. Under this law, farm-loan associations were formed in designated areas under conditions prescribed in the law, their members being borrowers only. The borrowers might obtain loans under specified conditions and restrictions as to size, security, and valuation of the land. See AGRICULTURAL CREDIT.

Anti-trust Legislation.—President Wilson appeared before Congress on Jan. 14, 1914, and in introducing the question of trust regulation, he urged that the problem be approached in a friendly way "in a common effort to square business methods with both public opinion and the law." Despite this statement, Wilson said that it was the purpose of the Democrats "to destroy monopoly and maintain competition as the only effective instrument of business liberty." Two important acts were passed in connection with trust regulation, the Federal Trade Commission Act of Sept. 14, 1914, and the Clayton Anti-trust Act of October 15. The first law created a commission of five persons to carry out the anti-trust laws and to prevent unfair methods of competition. The Clayton Act prevented price discrimination, acquisition of stock in competing companies, interlocking directorates, and the so-called "government by injunction." In 1918 a further trust act provided that the anti-trust acts should not apply to companies engaged in export trade. See TRUSTS.

Labor Legislation.—The *Clayton Act* contained very important provisions concerning labor. Human labor was declared not to be a commodity, and therefore labor and agricultural organizations could not be considered combinations in restraint of trade. Injunctions in labor disputes were forbidden unless necessary to prevent irreparable injury to property rights for which there was no remedy at law. Strikes, picketing, and boycotting were declared not to contravene any Federal law. Finally, cases of contempt of court were to be tried by jury, except when the offense was committed in the presence of the court.

In 1915 the *La Follette Seamen's Act* was passed. This required a language test, namely, that 75 per cent of the crew on American-owned or operated vessels should "understand any orders given by the officers of such vessel"; that 65 per cent of the deck crews employed on American vessels should ultimately be able seamen, having passed physical and professional examinations by government officers; made less serious the offense of desertion by members of the ship's crew under special conditions; required half payment of wages to the crew in every port; and required refusal of clearance to a vessel on information of noncompliance in certain particulars This law lost a good deal of its force through its loose phraseology and diverse constructions put on it by the Department of Commerce. American shipowners claimed that they would be unable to meet foreign competition under the provisions of this act and would be compelled to go out of business.

In 1916 the *Adamson Eight-hour Law* was passed, affecting railway labor. This act was virtually forced on Congress by the threat of a great strike by the four railway brotherhoods. The chief provision of this act was that from Jan. 1, 1917, employees engaged in train operation on inter-State steam railroads exceeding 100 miles in length should be paid their present daily wage for the first eight hours and should be paid pro rata for overtime rather than on the basis of time and a half, which was demanded by the brotherhoods. A commission was to be appointed by the President to report back to Congress on the wage increase by Nov. 1, 1917. See RAILROADS.

Further labor measures of importance provided for compensation for Federal employees injured in the performance of their duty, the prohibition of child labor under certain conditions, and an eight-hour day for Alaskan coal miners. For the vicissitudes of the attempt on the part of President Wilson and Congress to regulate child labor through the Federal control over interstate commerce and taxation, see CHILD LABOR. In 1917 Congress passed an act appropriating millions of dollars to the various States in aid of vocational education. See EDUCATION IN THE UNITED STATES.

Prohibition Amendment.—For a complete account of this amendment, including its introduction and passage in Congress, its ratification by the several States, and the passage of the Volstead Enforcement Act, see PROHIBITION.

Woman Suffrage Amendment.—See WOMAN SUFFRAGE.

Colonial and Foreign Policies. *Philippines.* As the question of the independence of the Philippine Islands had figured very importantly in Democratic platforms since 1900, President Wilson continually urged on Congress the advisability of giving the islands greater self-government and of definitely promising them their independence. The result was the Jones Organic Act, passed in 1916, which declared in its preamble that it was the purpose of the United States to recognize the independence of the islands as soon as a stable government should have been established. The Jones measure abolished the old commission and provided for an Upper House elective for all but two members. The suffrage was extended to all males who spoke and wrote a native dialect. Formerly, the vote was limited to some 225,000 inhabitants. Under the Jones Bill, 800,000 could vote. See PHILIPPINE ISLANDS.

Porto Rico.—In 1914 President Wilson, by executive order, directed that the Porto Rican Council be changed, so that natives should have a majority. The question of citizenship was settled on Mar. 2, 1917, when President Wilson signed a Porto Rican civil-government bill that extended the suffrage, granted an elective Upper House, and conferred full American citizenship on all inhabitants. See PORTO RICO.

Alaska.—On Mar. 2, 1914, an act authorizing the President to construct, maintain, and operate railroads in Alaska not exceeding 1000 miles in length, at an expense not exceeding $35,000,000, was approved. The line was built during the years 1915–23. See ALASKA.

The Caribbean.—Although the Democrats followed the policy of granting a greater degree of freedom to the American colonies, they nevertheless greatly expanded the doctrine of Roosevelt in the Caribbean and Latin America by knitting more closely the financial and economic ties which bound the United States to these Spanish republics, and virtually established protectorates over several of them. This policy was contrary to that which many believed the Democrats would follow. (See CUBA and PANAMA.) Roosevelt's financial supervision in Santo Domingo was superseded by a virtual protectorate during Wilson's administration. American Marines were landed in 1914 to "oversee" the elections. In 1916 the entire country was occupied by American military forces. The government and laws of the country were suspended, and the American Marines maintained a military administration until the establishment of a provisional civil government in 1922. See SANTO DOMINGO.

Haiti fell under American domination as a result of revolution in 1915. American marines were landed to restore order. By terms of a treaty virtually forced on the Republic, the control of the finances and the constabulary was taken over by American officers, with the announcement that "the United States government has no purpose of aggression and is entirely disinterested in promoting this protectorate." The occupation was continued until 1924. See HAITI, under *History*.

Nicaragua.—For the terms of the establishment of the protectorate in 1916 and later intervention, see NICARAGUA, under History.

Undoubtedly, one of the prime reasons for this extended American influence in the Caribbean was the protection of the Panama Canal. In consonance with this policy, the American government purchased the Danish West Indies in 1917. See VIRGIN ISLANDS; see also CENTRAL AMERICAN UNION. See NICARAGUA for a discussion of the acquisition of a naval base in Fonseca Bay and a 99-year lease on the Corn Islands.

Panama Canal Tolls Act.—President Wilson by exercising his power as leader of the Democratic Party, secured the repeal of the Canal Tolls Act which had been passed in the latter part of Taft's administration. The issue had arisen because of the protest of Great Britain that the Hay-Pauncefote Treaty had been violated by the exemption of American coastwise vessels from paying tolls. For the treaty with Colombia, see COLOMBIA, under *History*.

Mexico.—President Wilson inherited a jumbled Mexican situation from his Republican predecessor. After the murder of Madero in 1913, the country was torn into factions, and civil strife was prevalent under the leadership of Huerta, Zapata, Villa, and Carranza. The last was succeeded by Obregon. Although President Wilson shortly after his inauguration announced a policy of "watchful waiting," he was embroiled in two serious conflicts with Mexico, the Tampico and Columbus affairs. The tendering of their good offices by Argentina, Brazil, and Chile averted a serious conflict in the former instance. See MEXICO, under *History*.

The Far East.—Relations with Japan were strained by the passage of laws by the State of California prohibiting the ownership of lands by aliens who could not be naturalized. Japan protested against the discrimination and the violation of treaty rights, and the President sent Secretary of State Bryan to California in an effort to secure a change in the State legislation, without success. The countries exchanged notes and a *modus vivendi* was finally arranged whereby the United States agreed to test the laws in the courts, and Japan made promises as to future immigration. In 1917 Secretary of State Lansing and Viscount Ishii, special Ambassador from Japan, concluded an important agreement concerning American relations in the Orient. The United States admitted the interest of Japan in China, but both countries agreed to oppose the acquisition by any country of special rights in China which would tend to impair her integrity and sovereignty. (See JAPAN, under *History*; IMMIGRATION.) On May 2, 1914, President Wilson recognized the Republic of China. See CHINA.

Dependencies. For the outlying possessions of the United States, see the articles: ALASKA; GUAM; HAWAII; PHILLIPPINES; PORTO RICO; SAMOA, AMERICAN; VIRGIN ISLANDS.

Matters pertaining to American activities are also discussed in the following articles: FISHERIES; FINANCE AND BANKING; TELEPHONY; TELEGRAPHY; ELECTRIC MOTORS IN INDUSTRY; ELECTRIC POWER TRANSMISSION; AËRONAUTICS; ARMIES AND ARMY ORGANIZATION; NAVIES OF THE WORLD; EDUCATION; UNIVERSITIES AND COLLEGES; LAW, PROGRESS OF THE. See also the separate articles of the American religious denominations, universities and colleges, and the important cities.

World War. The World War, at the beginning of which the United States promptly declared its neutrality, had immediate important economic and legislative effects on the country. In August, 1914, a bill was passed admitting foreign-built ships to the American registry with certain restrictions as to coastwise trade. A War Risk Insurance Act was adopted, providing for emergency insurance for ships. It was promptly seen that the stopping of a large part of the imports would curtail the revenues and produce a deficit. To prevent this development, an emergency revenue bill was passed, providing for an increased internal-revenue taxation system. The election of 1914 had for its issues the new tariff law and the record of the President. The Democrats were successful in retaining their majorities in Congress, but they were reduced in the House, alignment being 232 Democrats, 194 Republicans, and 7 Progressives. In the Senate, the number of Democrats was increased to 53. The War greatly increased the export trade, especially in foodstuffs and munitions. Nearly all of this went to the Allies, since German shipping had been practically driven from the sea. To meet the demand for more shipping, the President introduced in December, 1914, the request for a ship-purchase bill. The proposition evoked such opposition that the Republicans, in February, 1915, in a prolonged filibuster in which they were aided by seven Democrats, defeated it. As the United States was the leading neutral, the exigencies of war were bound to affect her rights on the high seas. Before the War had lasted very long, intricate complications developed with both Germany and Great Britain. (For details, see WAR, DIPLOMACY OF THE.) To Germany, Secretary Bryan sent a note declaring that the United States would hold her to "strict accountability," and to Great Britain a firm protest against the prevention of legitimate American trade by means of illegal blockade, interference with mail, and vexatious delays in prize proceedings. Deep irritation had been caused by the destruction of the steamer *Gulflight* by a German submarine and by the seizure of the *Wilhelmina* and *Dacia* by Great Britain and France. The United States, however, was horrified when, on May 7, 1915, the *Lusitania* was torpedoed without warning and more than 1000 persons, including 114 Americans, lost their lives. On May 13, Wilson sent to Germany a strong note demanding a disavowal of the act and indemnity for the violation of American rights. A strong party demanded war, and there developed an agitation for military preparation. A large number of Americans of German birth and descent, on the other hand, thought that the United States should preserve neutrality by prohibiting the export of munitions, which because of the control of the sea went to the Allies exclusively. Notes were interchanged, and the tone of the American notes became more insistent, until on September 1, Germany declared that liners were not to be sunk without warning. Despite the fact that the cases of the *Nebraskan* and the *Arabic*, disavowed on October 5, had arisen and depended on separate negotiations, this announcement was hailed as a Wilson victory. There remained the necessity for Germany to disavow the sinking of the *Lusitania* and to indemnify American citizens. Wilson's position in the correspondence had caused the resignation of Secretary Bryan (June), who urged that Americans should be warned to remain off passenger ships of the warring nations. In the meanwhile, among German sympathizers many plans were made for interfering with the supplies to the Allies by fomenting labor disturbances; plots were formed and executed, involving the explosion of bombs in factories and on steamships. The Austrian Ambassador, Dumba, was implicated, and his recall was demanded on Sept. 9, 1915. Attachés Boy-Ed and von Papen, of the German Embassy, had a similar fate on December 3.

In December, 1915, the President's message was almost wholly devoted to the championship of military preparedness, although the year before he had opposed those who would turn America into an armed camp. In February, 1916, Secretary of War Garrison resigned, alleging that President Wilson had not supported his plan of national defense. He was succeeded by Newton D. Baker (q.v.), of Cleveland, Ohio. In December, 1915, the sinking of the *Persia* in the Mediterranean Sea again brought the controversy over submarine warfare to the fore. While negotiations were pending over this incident, the channel boat *Sussex* was torpedoed with a loss of more than 100 lives; the *Sussex* was strictly a passenger vessel and unarmed. The question of arming merchantmen for defense presented a serious problem. A resolution warning Americans not to sail on armed merchantmen, presented in Congress, failed to pass. On Apr. 14, 1916, the United States government demanded that submarine warfare, as it affected neutrals, be abandoned under a penalty of a break in diplomatic relations. For the German reply, see WORLD WAR, DIPLOMACY OF THE.

Election of 1916. In 1916 Charles E. Hughes and Woodrow Wilson were the candidates nominated for the Presidency by the Republican and Democratic conventions, respectively. Charles W. Fairbanks and Thomas R. Marshall were the vice-presidential nominees. An element of the Progressive Party nominated Theodore Roosevelt for President, but he declined, and supported Hughes. Wilson was reëlected by an extremely small margin, and the issue was in doubt for several days. It was decided only by his success in winning the electoral vote in California. The electoral vote stood 277 for Wilson, 254 for Hughes. The popular vote was 9,128,837 for Wilson, 8,536,380 for Hughes. The surprising thing about this election was the fact that Wilson was able to be elected without carrying New York, or any other of the large Eastern States. In the House, 217 Republicans were elected, 212 Democrats, and 6 from other parties. In the Senate, the Democrats retained their majority, which was cut from 14 to 12.

The War Again. Throughout 1916 the United States was brought nearer to war with Germany. The German submarine, *U-53*, entered Newport Harbor on Oct. 7, 1916, and after departing sunk one Dutch, one Norwegian, and three British ships within sight of the American coast. The submarine escaped unharmed. The President during December, 1916, and January, 1917, endeavored to secure from both sides a statement of terms on which the War could be honorably concluded. (See WAR, DIPLOMACY OF THE.) Following closely on these efforts, Germany, intensifying submarine warfare, declared that all merchant ships found in a forbidden zone would be sunk after Feb. 1, 1917, without warning. (See WAR, DIPLOMACY OF THE.) President Wilson addressed both Houses of Congress on February 3 and declared that he had directed the Secretary of State to announce to the German Ambassador that all diplomatic relations were severed. The President further declared that he hoped that Germany would not actually embark on the ruthless submarine warfare and that only overt acts on her part would convince him that she would do so. There followed a period during which the President waited for such overt acts. German submarine warfare was carried on with great ferocity and Allied and American vessels were sunk. Congress was called in special session on Apr. 2, 1917, and the President made an address in which he summarized the offenses of Germany against the United States government and recommended that Congress declare that the course of the German government was nothing less than war against the Government and people of the United States. A resolution declaring the existence of a state of war was passed by both Houses and signed by the President on April 6.

The Mexican Note.—Fuel was added to the rising anti-German feeling in the country by the publication, on March 1, on the authority of Secretary of State Lansing, of a note from Germany to Mexico inviting Mexico to attack the United States and hinting at aid from Japan. Japan hastened to affirm that she had absolutely nothing to do with the affair.

Participation by the United States in the War. Prompt action followed President Wilson's signature to the war resolution. Orders were issued by the Navy Department for the mobilization of the fleet, and the Naval Reserve was called to the colors. The Navy at once proceeded to seize all radio stations. All German and Austrian vessels in the harbors of the country and its possessions were seized. There were 91 vessels, aggregating a gross tonnage of 630,000. On April 15, the President issued "a call to service" in which he appealed especially to the agricultural and industrial workers of the country to devote their utmost efforts to providing and equipping the armies in Europe.

War Preparations by the Army and Navy.—On March 25, an executive order was issued, increasing the enlisted personnel of the Navy to 87,000 men; on March 26, another order was issued, to increase the Marine Corps to 17,400 men. Immediately after the declaration of war, the Naval Militia, Naval Reserve, and the Coast Guard passed under the control of the Navy Department. The War Department prepared to establish training camps, with a capacity of 25,000 men each, throughout the country.

Council of National Defense.—The economic direction of the war was put in the hands of the Council for National Defense, which consisted of the members of the President's cabinet and a civilian advisory committee made up of business men and leaders of industry. Numerous boards were appointed, consisting of groups of experts. The Food Board was placed in the charge of Herbert C. Hoover (q.v.), executive head of the Belgian Relief Commission. This board was to take such measures as would conserve the food supplies of the United States, and at the same time, as far as possible, it was to supply the needs of the Allies. In November, 1917, it held a "conservation" week, and thousands of families received conservation display cards showing that they would observe "wheatless and meatless" days to aid the Government. A committee of five was appointed to direct the operations of American railways, which were taken over by the Government on Dec, 28, 1917 (see RAILROADS). A General Munitions Board had charge of supplying munitions and equipment to the Army. This board was later superseded by the War Industries Board. The Economy Board was organized to take care of the commercial interests of the country and to purchase raw materials for the Government. The Medical Board was formed by many prominent physicians to mobilize and organize the medical men and resources of the country. The Federal Shipping Board was designed to defeat the submarine by building a vast fleet to transport the American Army and great quantities of supplies to Europe. It was organized as a $50,000,000 corporation, with Colonel Goethals as general manager. The efficiency of this board was marred by continual wranglings over the nature of the vessels to be built. Another important board was the Aircraft Board. Congress appropriated $640,000,000 for the aërial service and everyone confidently expected that America would take the lead in supplying machines of all types. In September, 1917, a glowing account of the new Liberty motor was given to the public. It was a false hope, however, and it was many months before the engine was perfect; as a matter of fact, virtually all the machines used at the front were of foreign make. See AËRONAUTICS. Congress made strenuous efforts to prosecute the War effectively. Sums of money undreamed of before were appropriated and many all-embracing war measures, such as the Daylight Saving Law, Espionage Act, Food Act, Fuel Act, Selective Draft Act, etc., were enacted.

Enemy Aliens.—At the outbreak of the War, there were approximately 5,000,000 enemy aliens in the United States. Owing to the activities of many German sympathizers, President Wilson in November, 1917, ordered all enemy aliens to register and gave the Attorney General power to establish forbidden zones. An enemy-property custodian was appointed by President Wilson, with the purpose of seizing all property held by enemy aliens in the United States and of holding it in trust until the close of the War. As each enemy-owned enterprise was seized, an effort was made to convert its products to the use of the Government in the War. More than $700,000,000 of enemy property was taken over by the custodian.

The Draft Act.—In the President's message to Congress on Apr. 2, 1917, he submitted the project of raising a national Army by conscription. There was tremendous opposition to this, but after a month's debate, the President's idea prevailed, and on May 18, 1917, the Selective Conscription Act was passed. June 5 was set aside as the day on which all males who had reached their twenty-first but not their thirty-first birthdays were to register for military service; 9,659,382 men registered, aliens included. The law authorized the President to appoint a local exemption board for each county and one for each 30,000 population in cities of 30,000 or more. The exemption boards were to be made up of civilians only. Those specifically exempted by the law were Federal and State officials and members of religious sects who had conscientious scruples against the War. The President was authorized to exempt "persons engaged in industries, including agriculture, found to be necessary to the maintenance of the military establishments or the effective operation of military forces or . . . the national interest during the emergency." The cards of registrants were numbered in a red-ink serial up to the total number in the district. Alphabetical arrangements were forbidden. Then the numbers were drawn at Washington and the men were called according to the drawing, which took place on July 20. The men were medically examined and those who were physically fit and not exempted were sent to some one of the 16 military cantonments constructed for the training of new recruits; 687,000 were called in this first draft. After this draft was completed, the system of selection was changed (November, 1917). All the remaining registrants were divided into five classes, according to liability for military service. Those in the first class were to be called first, those in the second next, and so on. During 1918, three registration days were set aside on which the various classes of men were to register. What virtually amounted to a second selective draft act was approved by President Wilson on Aug. 31, 1918. It provided for the registration of all males between the ages of 18 and 45, with the exception of those who had already registered or who were in the military or naval service of the United States. Approximately 13,000,000 registered on Sept. 12, 1918. See ARMIES; MENTAL MEASUREMENT.

Financing the War.—Five loans were floated during the course of the War. The first four were called Liberty Loans and the fifth the Victory Loan. The First Liberty Loan books were opened May 14, 1917, and closed June 15. Two billion dollars' worth of 3½ per cent convertible gold bonds were offered. More than 4,000,000 people bought bonds and the offer was oversubscribed by more than 50 per cent, necessitating a pro-rata arrangement for all those who had purchased more than $10,000. A second loan of $3,000,000,000 was offered Oct. 1, 1917, bearing 4 per cent interest. Ten million persons offered $4,617,532,300. The Treasury accepted half of the excess. The Third Liberty Loan was offered on Apr. 6, 1918. It called for $3,000,000,000 at 4½ per cent. More than 18,000,000 persons offered $4,176,516,850. The Fourth Liberty Loan called for $6,000,000,000 at 4¼ per cent. More than 21,000,000 subscribers offered $6,989,047,000. The fifth, or Victory, Loan called for $4,500,000,000, and the rate of interest was fixed at 4¾ per cent. More than 12,000,000 people subscribed $5,249,908,300. For the tax measures passed to help finance the War, see TAXATION IN THE UNITED STATES and FINANCE AND BANKING.

Relations with Austria-Hungary.—Although Austria-Hungary severed diplomatic relations after the break with Germany, the United States did not immediately declare war. Partly as an aid to Italian morale, war was declared on Dec. 7, 1917. Among the reasons given by President Wilson were the sinking of American vessels by Austrian submarines and the unneutral actions of Dumba, the Austrian Ambassador. See AUSTRIA-HUNGARY, under *History*.

Peace and After. On Nov. 18, 1918, President Wilson announced that he would attend the Paris Peace Conference in person. He named as peace delegates Robert Lansing, Secretary of State; Henry White, a Republican, formerly Ambassador to France, Edward M. House, and Gen. Tasker H. Bliss (q.v.). The President was received in Paris with great enthusiasm and prior to the meeting of the Peace Conference he made visits to Great Britain and Italy, where he was hailed as the savior of the world. President Wilson and his party had received a considerable political setback in the elections held in the United States just six days prior to the signing of the Armistice. Despite a personal appeal by the President to return a Democratic majority, the Republicans carried both Houses of Congress and were successful in a majority of the State elections. The President's chief concern at the Peace Conference was the preparation of the Covenant of the League of Nations and he gave his utmost efforts to this object. After the first draft of the Covenant had been prepared, he returned to the United States on Feb. 24, 1919, for a brief visit. There had already developed in Congress, especially in the Senate, a pronounced opposition to the terms of the Covenant. This opposition was chiefly centred on Article X, which pledged the signatory powers "to preserve as against external aggression the territory of all the States in the League." President Wilson, during his stay in the United States, made several addresses in which he defended the

Covenant. He then returned to Paris. When the Treaty of Versailles was signed on June 28, 1919, the President at once returned to the United States. For a complete discussion of the Peace Conference and the various treaties which followed the War, see PEACE CONFERENCE AND TREATIES. See also LEAGUE OF NATIONS. For the controversy over what Germany should pay, see REPARATIONS.

Political interest in the United States centred in the deliberations on the peace treaty in the Senate. The only effective interruption in the controversy was the passage of the Esch-Cummins Bill providing for the return of the railroads to private operation and management (see RAILROADS). The Senate Committee on Foreign Relations having considered the treaty, it was introduced in the Senate on Sept. 28, 1918. There had been added 38 amendments and 4 reservations. The first of these gave the United States the right to withdraw from the League of Nations after due notice had been given. The second freed the United States from any obligations to carry out Article X, noted above. The third reservation provided that the United States should have the power to decide what questions came within domestic jurisdiction. In the fourth reservation, the United States declined to submit for arbitration and inquiry any questions dependent on or relating to the Monroe Doctrine. The President had previously, on the advice of ex-President Taft and others, inserted in the League Covenant a declaration that the Monroe Doctrine continued to be in force. In the face of the outspoken hostility of the Senate, President Wilson determined to appeal directly to the people in behalf of the League. Consequently, he started on a nation-wide speaking tour on September 3. On September 26, he was laid low by an apoplectic stroke which terminated his activity, outside of a few official acts.

After a long debate in the Senate in which much bitterness developed and 14 revised amendments were introduced, the treaty with the Lodge reservations was defeated by a vote of 55 to 39 on November 19. The treaty was reintroduced in the next session of Congress and was again decisively defeated by a vote of 49 to 35. On Apr. 30, 1920, Senator Knox introduced in the Senate a resolution providing for a declaration of peace with Germany. This resolution was adopted by both Houses but was vetoed by the President. In the debate in the Senate, the leaders of the fight for ratification were Senators Swanson of Virginia and Hitchcock of Nebraska. The chief opponents of the ratification were Lodge of Massachusetts, Borah of Idaho, and Johnson of California. Robert Lansing (q.v.), Secretary of State, resigned on Feb. 13, 1920, as a result of severe criticism by the President of his action in summoning the cabinet in session during the illness of the President. He was succeeded by Bainbridge Colby (q.v.).

Election of 1920. The Republican candidates for the nomination prior to the convention were Gen. Leonard Wood, Governor Lowden of Illinois, Senator Hiram Johnson of California, and Herbert Hoover. The leading Democratic candidates were William G. McAdoo and Gov. James M. Cox of Ohio. The Republican National Convention met in Chicago on June 8. The forces of General Wood and Governor Lowden were evenly matched, but both were made unavailable by the disclosures of huge campaign funds which were injudiciously spent in some cases. On June 12, Senator Warren G. Harding (q.v.) was nominated for the Presidency, and Calvin C. Coolidge (q.v.) was selected as vice-presidential candidate. At the Democratic convention which met at San Francisco on June 28, Governor Cox (q.v.) was nominated for President and Franklin D. Roosevelt (q.v.), as his running-mate. The campaign which followed was exceedingly aggressive, especially on the side of Cox, who, touring the country, made speeches in defense of the League of Nations in practically every State. Senator Harding remained at home, where from day to day he addressed delegations. The Republicans for the most part ignored the League of Nations and directed their attacks against the administration of the President. In the election in November, Harding and Coolidge received 16,181,289 popular votes, against 9,141,753 for Cox and Roosevelt. The electoral vote was 404 to 127. The Nineteenth Amendment, providing for woman suffrage (q.v.), had been adopted prior to the election and the women for the first time participated in the election of a president. This caused an increased popular vote to be cast.

Administration of Harding and Coolidge. President Harding was inaugurated on Mar. 4, 1921. He at once announced the members of his cabinet as follows: Secretary of State, Charles E. Hughes, of New York; Secretary of the Treasury, Andrew W. Mellon, of Pennsylvania; Secretary of War, John W. Weeks, of Massachusetts; Secretary of the Navy, Edwin C. Denby, of Michigan; Secretary of the Interior, Albert B. Fall, of New Mexico; Postmaster General, Will H. Hays, of Indiana; Attorney General, Harry M. Daugherty, of Ohio; Secretary of Agriculture, Henry C. Wallace, of Iowa; Secretary of Commerce, Herbert Hoover, of California; and Secretary of Labor, James J. Davis, of Pennsylvania. On March 23, the President issued a call for a special session of the new Sixty-seventh Congress, for May 11, 1921. Congress at once took up the consideration of measures looking toward economic and financial reconstruction. The Immigration Bill, which limited the immigrants of any nationality during the fiscal year to 3 per cent of the number of that nationality in the United States at the Census of 1910, was passed. For further details and later changes in the immigration law, see IMMIGRATION. The Emergency Tariff Bill was passed and approved by the President on May 27. For the provisions of this measure and the subsequent Fordney-McCumber Act, see TARIFF IN THE UNITED STATES. A budget law also was enacted. (See FINANCE AND BANKING.) The appropriations for the Army and Navy were radically cut down, and by the terms of the Army Bill, the Army was limited to 150,000. See ARMIES. For changes in the tax laws, see TAXATION IN THE UNITED STATES.

Washington Conference.—The details of the disarmament agreement and the settlement of the problems of the Pacific will be found under the title, WASHINGTON CONFERENCE.

Industrial Unrest.—The latter half of 1922 and part of 1923 formed a period of industrial unrest. A general strike of the coal miners, threatening for months in both the anthracite and bituminous fields, was declared in the bituminous fields on Apr. 1, 1922, at the expiration of the two-year contracts between the miners and the operators. Work ceased in the anthracite mines a few months later. Serious disorders were prevalent. The situation was the subject of remedial legislation in Congress. (See COAL; STRIKES AND LOCKOUTS.) No less serious than the coal strike was a general strike of the shopmen in all the railroads of the country which was declared on July 1, 1923. See RAILROADS; STRIKES AND LOCKOUTS.

Peace with Germany.—On Apr. 30, 1921, the Senate passed a measure which, previously offered by Senator Knox, declared the War between the United States and the Central Powers at an end, and repealed the declaration of war. This was followed by the preparation and ratification of a peace treaty with Germany. By the terms of this treaty, the United States is not bound by any of the provisions of the Versailles Treaty which relate to the League of Nations. It reserves to the United States whatever favorable concessions are made by Germany to the Allied Powers. The treaty was signed by Germany and the United States on July 2, 1921, and ratifications were exchanged in November of the same year.

Foreign Relations.—During the period, affairs in Europe seemed to go from bad to worse. The foreign policy of the Harding administration was to keep aloof. The American troops were gradually withdrawn from Europe and when France and Belgium, in January, 1923, seized the Ruhr (q.v.), the remaining American troops were withdrawn from the occupied zone. The question of the debt owed by foreign countries to the United States was vexatious. There was much propaganda for the canceling of these debts, but the majority opinion seemed to favor their collection. Early in 1923, a British financial mission, headed by Stanley Baldwin, came to the United States and successfully negotiated for the payment of the British debt. (See FINANCE AND BANKING.) On Feb. 24, 1923, President Harding sent the Senate a message asking for participation by the United States in the Permanent Court of International Justice erected at The Hague by the League of Nations. President Harding emphatically stated, however, that he intended no obligations under the League of Nations Covenant.

Coolidge in Office.—In June, 1923, President Harding (q.v.) started on a trip through the West and Alaska. At Seattle, he became very ill and died at San Francisco on August 2. Calvin Coolidge (q.v.) was sworn into office early in the morning of the next day and immediately assumed the presidential duties. In his first message to Congress, Coolidge favored the World Court but opposed the League of Nations; he favored reduction of taxation and opposed the bonus. The League of Nations issue was raised again in November, 1923, when Woodrow Wilson (q.v.) in a radio message deplored the "shameful fact" of the United States' withdrawal from all "responsible part in the administration of peace." This was Wilson's last public address. In January, 1924, he became critically ill and died on February 3.

Scandals and Investigations.—Unfortunately for him, President Coolidge inherited a series of scandals which involved men holding prominent positions. The resignation of Albert B. Fall (q.v.) as Secretary of the Interior was followed by an investigation of the leasing of the oil fields by the Navy and Interior departments. President Coolidge was advised by Attorney General Daugherty to appoint counsel from both parties to investigate and to prosecute anyone guilty of irregularities or criminal action in connection with the leases. Consequently, President Coolidge, in a statement made on Jan. 27, 1924, said: "Counsel will be instructed to prosecute these cases in the court so that, if there is any guilt, the guilty persons will be punished; if there is any civil liability, it will be enforced; if there is any fraud, it will be revealed; and if there are any contracts which are illegal, they will be canceled." The oil scandal arose from the turning over of public oil reserves in California and Wyoming to the E. L. Doheny (q.v.) and H. F. Sinclair (q.v.) interests by Secretary Fall. This had been preceded by a transfer of the control of the oil fields from the Navy Department to the Interior Department. On investigation, it was discovered that Fall had been the recipient of a $100,000 "loan" from Doheny. His testimony relative to this "loan" was conflicting and unsatisfactory. He and Sinclair were subsequently indicted by a Federal grand jury. Both were convicted in 1929, the former for bribery and the latter for contempt of court. The name of William G. McAdoo was drawn into the controversy when it was shown that his law firm received a large retaining-fee from the oil interests shortly after he resigned from the office of Secretary of the Treasury. This played a prominent part in his failure to receive the Democratic nomination in 1924. Franklin K. Lane was another former cabinet official employed by the oil interests. Senator Pomerene and Mr. Roberts were appointed by President Coolidge as special counsel to investigate and prosecute the oil frauds. Secretaries Denby and Daughtery were compelled to resign. They were succeeded by Curtis D. Wilbur (q.v.) and Harlan Stone (q.v.).

Another amazing and serious scandal arose in connection with the administration of the United States War Veterans' Bureau. A senatorial investigation committee reported that the bureau should be completely reorganized. It had failed miserably to provide for disabled veterans and the efficiency of the bureau had been impaired by corruption, inefficiency, extravagance, political pressure, etc. The former director, Col. Charles R. Forbes, and James Thompson, a contractor, were indicted by a Federal grand jury on charges of bribery and corruption in connection with the award of contracts for building veteran hospitals.

Elections of 1924. The Republican convention met on June 10, 1924, at Cleveland, Ohio. The platform continued the policy of aloofness in foreign affairs, although it approved the World Court idea. It also provided for the collection of foreign debts and continuance of the high protective tariff. The question of the Ku Klux Klan (q.v.) was completely ignored. Calvin Coolidge was nominated on the first ballot for the presidency and Gen. Charles G. Dawes (q.v.) was nominated for the vice presidency. Governor Lowden (q.v.) of Illinois was previously nominated, but refused to run.

The national campaign of 1924 was marked by serious dissension in both the leading parties. Among the Republicans existed a faction disposed to the view that the party had failed to give the farming element fair treatment and that capitalism was reaping undue advantage. Among the Democratic group, the cleavage was between the faction predominant in the large cities of the North and the East, which opposed the prohibition system and the anti-foreign attitude of the Ku Klux Klan, and the Southern Democratic faction, which was essentially in favor of the prohibition system and antagonistic to the non-native and non-Protestant element. The rift in the Republican Party was outwardly the more serious, for it led to the withdrawal of Senator Robert M. La Follette, of Wisconsin, a popular leader in the Middle West, endowed with great political acumen and committed to views tending toward radicalism. LaFollette declared against the Republican Party and created a third party, bearing the name of Progressive and threatening to renew the Progressive secession that had cost the Republicans the Presidency in 1912. For a time, it seemed likely that LaFollette might obtain from the dissatisfied agricultural vote enough electoral support to keep either of the major parties from obtaining a clear electoral majority, and thus might throw the election into the hands of Congress. This failed to occur for two principal reasons—one was the turn for the better in the crop situation of the Northwest during the summer of 1924, which greatly allayed the farm discontent; the other was the dissension among the Democrats. At the Democratic convention, held in New York in June and July, 1924, William G. McAdoo, son-in-law of President Wilson, had the support of the greater part of the Prohibitionist and nativist Democrats, while Governor Alfred E. Smith, of New York, had strong backing from New York and other States with large urban populations. The two elements clashed over a proposal to censure the activities of the Ku Klux Klan. In the nomination balloting, a deadlock was reached, no candidate having anything like the two-thirds majority needed for nomination under the Democratic-convention system. After 103 ballots, the convention finally nominated for President John W. Davis, New York lawyer, who though acceptable as a compromise candidate, had but slight national influence as a political leader. Davis made an active campaign and attacked corruption under the Republican régime; he likewise taxed the Ku Klux Klan with endeavoring to make racial origin or religious belief a test of fitness for public life. He failed, however, to carry his home State of New York, almost essential to a Democratic victory, and gained but 136 electoral votes in 12 States. The LaFollette vote, while numerically considerable, was insufficient to carry any State save Wisconsin, so that 382 electoral votes went to Coolidge. The popular vote was: Coolidge, 15,725,016; Davis, 8,386,503; LaFollette, 4,822,856.

Second Coolidge Administration. The chief features of the second Coolidge administration (1925–29) were those having to do with, first, the reorganization of international relations on a stable peace basis; second, the liquidation of incumbrances left by the War in the domestic field; third, an economic policy leading to a renewal of prosperity; fourth, the discipline of those who had been concerned in official scandals of the Harding administration; and fifth, the enforcement of prohibition.

Foreign and International Policy. The administration continued to regard the election of 1920 as having settled in the negative the question whether the United States should enter the League of Nations. There remained the question whether the United States should join the group of governments submitting to the jurisdiction of the Permanent Court of International Justice, a body owing its existence to League action, but having separate existence and authority. President Coolidge recommended adherence to this court in 1925 in his inaugural address and in his message of December 8. On Jan. 27, 1926, the Senate finally adopted a resolution by which it made five reservations as the conditions of adherence. These stipulated non-connection with the League of Nations, a voice for the United States in the election of judges, the right of Congress to determine the United States' contribution to the court's upkeep, liberty of withdrawal from the court's jurisdiction, and the right for the United States to refuse consent to the court's rendering any advisory opinion "touching any dispute or question in which the United States has or claims an interest." This last stipulation proved inacceptable to certain of the governments subscribing to the court. On November 22, President Coolidge apprised the Senate that he did not intend to ask it to modify its position. The matter remained at this impasse until within a few weeks of the end of the Coolidge administration, when in February, 1929, Secretary of State Kellogg issued a note to the court powers, offering to consider a new formula for the American stipulations.

While the United States abstained from direct relations with the League of Nations itself, it participated in certain of the activities with which the League was connected. Among these was a series of meetings of the Preparatory Conference on Disarmament and the conference on the restriction of the opium traffic.

The policy of funding the debts of foreign governments to the United States Treasury into obligations of definite maturity to be repaid in specified installments had been initiated by an agreement with Great Britain in the matter of its debt as early as 1923. A Foreign Debt Funding Commission had been created to negotiate subsequent agreements of this type with the rest of the 14 governments indebted to the United States government, chiefly on account of advances made during and immediately after the War. This commission carried out its work in 1925 and 1926, so that at the end of its existence, in 1927, funding agreements had been negotiated with all debtor governments save one, that of Greece, with which was concluded an agreement in like form somewhat later. The agreement with France was not ratified by that country's Parliament until 1929, but the French government provisorily met the payments as they came due. The administration was criticized at home in some quarters as having exacted terms that, while defensible with regard to the abstract rights of the creditor, nevertheless demanded more than the debtors could find means to pay and, particularly, means to transmit to the United States without upsetting the balance of American trade.

The matter of limitation of naval armament by the chief maritime powers had been settled, as to capital ships, by the Washington Conference of 1922. There remained, however, liberty to the powers to increase as they would their armaments in submarines and in cruisers of not over 10,000 tons. In order to extend the armament limitation, the United States Government invited the other naval powers to a conference in 1927 held at Geneva and attended by representatives of Great Britain and Japan. This conference ended without reaching an agreement, as the American representatives stood against the British demand of a considerable allowance of small cruisers of 7000 tons and under. There followed in 1928 an effort in the United States to bring about the enactment of a measure for the construction of fifteen 10,000-ton cruisers in 5 years, and this measure was finally passed early in 1929, with the proviso that, in case of the attainment of an international cruiser agreement, the construction work might be halted.

The most noteworthy proceeding of the second Coolidge administration with regard to the firmer establishment of peace was the negotiation in 1928 of the Paris Treaty against war. In its inception, this treaty was in part the idea of the French statesman, Aristide Briand, who in 1927 proposed to the United States a treaty by which the French and United States governments should pledge themselves mutually not to resort to war in the future. Secretary of State Kellogg, after the lapse of some time, took up the idea and expanded it to include all governments. A treaty was accordingly executed at Paris, Aug. 27, 1928, by plenipotentiaries of Germany, Belgium, the United States, France, Great Britain and the British Dominions, Italy, Japan, Poland, and Czechoslovakia, by which the signatories condemned "war as an instrument of national policy" and pledged themselves to seek resolutions of disputes only by pacific means. The treaty contained no sanctions. It was subsequently subscribed by 48 other governments, including Russia.

Domestic Sequels of the War. The matter of disposal of alien-property claims arising from seizure of enemy aliens' property during the period of the War remained unsettled until the enactment of the War Claims Act of Mar. 10, 1928. By this act, the United States undertook to meet claims, within certain limits, of former enemy aliens for property seized by the United States during the War. Up to the end of October, 1928, the Mixed Claims Commission administering judgment of claims had passed 4403 awards carrying $167,019,069. The administration of the Soldiers' Bonus, or Adjusted Service Compensation Act was placed in the hands of the Veterans' Bureau, which reported that up to June 30, 1928, 3,508,549 veterans of the World War had obtained adjudication of claims to the total of $3,408,643,666. As the adjusted-service certificates for these claims were good for payment only after 20 years or at death and not negotiable, many of the holders sought to borrow on their present worth, and the Veterans' Bureau organized the means of making loans in such cases.

With regard to the merchant fleet left on the hands of the Government at the close of the War, a difficult problem had to be met. It was found impossible to make satisfactory arrangements either to operate the vessels as a government-run industry or to let or sell them at suitable prices to private operators. Operating deficits occurred yearly. Eventually, in 1928, the policy of selling the chief vessels and lines to the best bidders was definitely adopted and early in 1929 the sale of two of the chief government-owned lines was affected. A measure was enacted in 1928 to encourage American privately owned shipping by the offer of increased facilities of credit from a government fund, to help meet shipbuilding costs.

The most conspicuously successful dealing of the Coolidge administration with incumbrances left by the War was in the reduction of the national debt. This was effected largely by Secretary of the Treasury Mellon, who by advantageous refunding operations and purchases of government securities out of yearly Treasury surplus reduced the debt principal at more than the projected rate. Debt retirement averaged about $500,000,000 a year from ordinary receipts for the fiscal years 1925–28 and about $230,000,000 yearly in addition from the general fund balance. The outstanding debt at the end of the fiscal year 1928 stood at $17,604,293,201, as against almost $25,500,000,000 at the end of the fiscal year 1919.

Economic Policy. Closely related to the liquidation of the encumbrances left by the War was the matter of the administration's general economic policy. In the economic field, it was necessary to face problems of taxation, difficulties occasioned by widespread agricultural depression, troubles in the coal industry incidental to overproduction and an excess of labor, tariff problems, and the widely asserted need to restrict the incoming of immigrants. Revenue acts were passed by Congress in 1926 and in 1928. That of 1926 considerably lightened the burden of the income tax at either end of the range of incomes. It was the contention of the administration that the reduction of an excessive burden placed on very high incomes must have the effect of bringing great private aggregations of capital out from the refuge that they had found in tax-exempt securities. The merit of this contention was borne out by the results both of the Revenue Act of 1924 and of that of 1926. The Treasury met, however, with a serious problem in the matter of demands for the return of income and other taxes that had been illegally collected under the intricate and frequently changing revenue law. The amount of such refunds became so great that in 1928 there arose in Congress a serious demand for an investigation of the subject.

The depression in the farming industry, although less pronounced after 1924, gave rise to repeated political agitations. These had for their chief aim the enactment of a measure to enable the growers of certain staple crops to form an organization that, with the financial aid of the Government, might purchase the surplus supply of such crops, sell it abroad at a possibly considerable loss, and assess the loss eventually on the growers, who would recoup by receiving a higher price for the portion of their crops consumed within the country. This general plan was embodied, with variations of detail, in a series of measures generally known alike as the McNary-Haugen Bill. A bill of this name was passed by Congress in 1927 and vetoed by President Coolidge with strong expressions of disapproval. An altered measure, still carrying, however, the features chiefly objectionable to the President was passed in 1928, and he vetoed this measure also, causing widespread discontent among the farming population of Republican sections of the Middle West.

The Fordney-McCumber Tariff Act of 1922 remained in force throughout the second Coolidge administration; but the feature of this act which placed it in the power of the President to alter tariff rates within limits by executive action, in such a way as to meet disparities in foreign production costs, gave rise to considerable criticism based on the idea that the function was properly a legislative one and that continued uncertainty as to the immediate future of tariff rates tended to depress business. The policy of President Coolidge was to alter rates sparingly and seldom to reduce them in commodities of importance.

There arose difficulties with certain foreign countries by reason of the provision made in the act for inquisitions into the business of producers abroad, designed to elicit information as to their production costs. In 1927 the French government put into force a tariff unfavorable to certain importations from the United States and, upon protest from the United States, offered a counter-demand for more favorable tariff treatment to be accorded to importations from France. The disposition of this dispute was put off throughout 1928, France having provisorily suspended its tariff increase in the expectation of reciprocal concessions.

With regard to the difficulties in the coal industry, which led to a series of labor troubles, 1927–28, the administration held firmly to a policy of hands off. As an outcome of the coal strike, temporarily composed in 1927 but resumed in 1928, bituminous-coal labor unions had to give up the hope of maintaining a solid front in their wage disputes and to resign themselves to making the best terms they could by districts. There resulted in western Pennsylvania and eastern Ohio a return to the open shop, with considerable unemployment. Congress took some steps in the direction of investigating conditions in some of the strike areas, but attempted no major action.

The immigration policy of the second Coolidge administration was largely formed upon the Immigration Act of May 26, 1924, an act having for its effect the reduction of the influx of immigrants from the Eastern Hemisphere, and particularly from those sources which had contributed but slightly to the American stock before 1890. The number of immigrants from Europe declined sharply under the application of this law, thus alleviating the apprehension, particularly strong in labor circles, that a wave of impoverished foreigners would arrive and would depress wage levels. The law, however, proved unenforceable in certain of its provisions, onerous in others, and in some directions inadequate. Congress was forced to take action to extend the date for the application of the provision known as the "national origins" clause, a feature providing that after a certain date, originally July 1, 1927, quotas of immigrants admissible to the country year by year should bear fixed proportion to the number of persons of each "national origin" residing in the Continental United States in 1920. Those having to do with the preparation of quotas on this basis revealed doubt as to whether it could be made to operate. The onerous features of the law were chiefly those operating in such a manner as to separate families some of whose members were in the United States and others of whose members sought unavailingly to come in. Hardships at the points of admittance were reduced by examining intending immigrants in their home countries. Great numbers of immigrants continued to arrive from Canada and Mexico, as the quota law did not apply to New World countries. Through Canada entered an undetermined number, supposedly large, of English-speaking people who had become naturalized Canadians or who had merely made a sojourn in Canada as a halfway point to the United States. A border patrol, started in 1924 and later steadily increased, was maintained against illicit immigration from Canada. An effort was made to stop the daily crossing without restriction of persons from residence in Canada to employment in the United States, but this was declared by the Supreme Court in 1928 to be in contravention of a treaty with Canada.

Political Corruption and Campaign Squandering. The second Coolidge administration on entering office had on its hands the matter of the allegedly corrupt leases of naval oil-reserve lands made by Secretary of the Interior Fall under the Harding administration, the frauds of Charles R. Forbes, former head of the Veterans' Bureau, and the alleged corrupt dealings of former Attorney General Harry M. Daugherty, of Harding's cabinet, and former Alien Property Custodian, Thomas W. Miller, in the disposal of alien property. The party in power took the part of facing these scandals and subjecting the accused men to investigation and trial. Forbes was convicted of corrupt acts in office and condemned to prison in 1926. Miller was likewise convicted and sent to prison. Daugherty, who was tried with him in the same matter, escaped conviction through a disagreement of the jury. Efforts made at various times to convict Fall and the oil operators, Harry F. Sinclair and Edward L. Doheny, on the charge of conspiring to defraud the United States through corrupt bargaining for the leasing of the Elk Hills and Teapot Dome oil reserves were unsuccessful at first. A jury finally acquitted Sinclair in 1928 in spite of testimony indicating that he had paid Fall several hundred thousand dollars. Later, he was convicted as already stated. Civil suits for the breaking of the Fall leases were more successful. These were carried up to the Supreme Court, which in both cases declared the leases corrupt and canceled them. In accordance with the principle of eliminating any possible suspicion of partisan favor, the President appointed two special counselors to prosecute the oil-lease cases, one of the appointees being Owen J. Roberts, a prominent attorney, and the other, ex-Senator Atlee F. Pomerene, of Ohio, a Democrat of distinction. The investigation of divers features of the activities of the men concerned in the oil leases was carried on by the Senate Lands Committee and continued into 1928. Revelations as to the transactions of the Continental Trading Company, a petroleum resale company in which Sinclair had a hand, brought to view persons not originally implicated in the scandals. Among these was another former member of the Harding cabinet, Will H. Hays, ex-Postmaster General, who had served as chairman of the Republican National Committee. Hays testified that he had received from Sinclair some $260,000 in Liberty bonds, traced as coming to Sinclair from the Continental Company, and had sought to present some of these to prominent Republicans, in return for their checks, which were to appear as contributions to meet the Republican presidential campaign deficit of 1920. The effect of such an operation was apparently to disguise the source of a contribution actually emanating from Sinclair. Fall was convicted of bribery in October, 1929.

The Senate campaign of 1926 gave rise to expenditure on a gigantic scale by candidates in Pennsylvania and Illinois. There followed an extended investigation by a special Senate committee headed by the Democratic Senator James A. Reed, of Missouri. As a result of this investigation, the Senate in December, 1927, refused to seat Senators-elect Frank L. Smith, Republican, of Illinois, and William S. Vare, Republican, of Pennsylvania.

Latin-American Relations. The administration found itself after 1925, as before, with the problem on its hands of obtaining from the Government of Mexico a satisfactory recognition of the property rights of American petroleum and mine operators in that country. President Calles, after his election in 1924 and the subsequent suppression of a rebellion, stood on the basis of the Carranza constitution, which provided for the virtual expropriation of foreign holders of mineral exploitation rights. There followed a long diplomatic dispute, aggravated by the unofficial publication of falsified documents purporting to show on the one side that American officials had taken an underhand course, and on the other, that the Mexican authorities had corrupted three prominent members of the United States Senate. It was further aggravated by Secretary of State Kellogg's declaration that Mexicans were under Bolshevistic influences and were secretly supporting a rebellion in Nicaragua. Eventually, however, at the end of 1927, a conciliatory spirit prevailed and United States Ambassador Dwight W. Morrow reached an understanding with the Mexican government, by which the operation of Mexican laws was made more favorable to foreign mineral interests.

The situation in Nicaragua in 1926 compelled the renewal of American armed intervention in Nicaragua. The last detail of Marine troops, a legation guard, had retired from Managua in 1925, terminating a stay of 13 years. Two months later, in October, 1925, Chamorro, the defeated Conservative candidate for President, drove out President Solorzano and seized the Government. His act provoked an uprising of the Liberals and there followed a period of civil war. Marines were landed in 1926 to protect American and foreign interests in Nicaragua. There occurred serious encounters between the American forces and insurgent bands. In April, 1927, President Coolidge sent to Nicaragua as his personal representative, Col. Henry L. Stimson. Colonel Stimson arranged an armistice under which both parties were to lay down their arms and abide by the result of an election to be held under United States supervision in November, 1928. Although one of the Liberal leaders, Sandino, refused submission and continued to operate against the Marines, order was generally reëstablished in the country and the proposed election was held without disturbance.

Prohibition. There were many public expressions of dissatisfaction, in certain of the States, with the workings of the Federal prohibition system in the second Coolidge administration. In 1926 New York State and likewise Illinois voted by a heavy majority a popular referendum in favor of amending the Volstead Law; and in 1928 Massachusetts and at various times Wisconsin and some other States took analogous action. No attempt occurred, however, on the part either of the administration or of any strong group in Congress, to curtail any feature of the system of Federal enforcement. Conventions were negotiated with Canada, Mexico, and Cuba in 1925 and 1926, by which these countries undertook to coöperate to some extent in restricting shipments from their territories to the United States. Partly by means of this aid and partly by the activity of the Coast Guard service, the ingress of liquor into the United States by sea was greatly diminished. In March, 1927, Congress passed an act separating the prohibition unit from the Bureau of Internal Revenue and erecting it into an independent bureau of the Treasury Department. This act brought the enforcement agents within the Civil Service system. There followed civil-service examinations, which were too much for the majority of the employees, these failing to pass and being disqualified for their employment. The prohibition question played an important part in the National campaign of 1928.

Elections of 1928. President Coolidge rejected the solicitations of strong elements in the Republican Party in 1927, by issuing the brief and downright announcement: "I do not choose to run for President in 1928." This withdrawal left the field open to Republican aspirants, among whom the chief were Herbert Hoover, Secretary of Commerce; ex-Gov. Frank O. Lowden, of Illinois; Senator Frank B. Willis, of Ohio; and Senator Charles Curtis, of Kansas. Secretary Hoover gained a lead in the State presidential primaries early in 1928. Senator Willis died shortly before the primary in Ohio. The Lowden supporters numbered many followers in some of the agricultural Western States, but the influence of this element was insufficient to prevent the nomination of Hoover. The Republican National Convention, held at Kansas City, Mo., nominated Hoover June 14, on the first ballot, giving him 837 votes, Lowden 74, Curtis 64, and lesser totals for several other nominees. Senator Charles Curtis was nominated for Vice President.

Governor Alfred E. Smith, of New York, gained a predominant position in the Democratic preconvention proceedings, largely by reason of his favorable record in the course of four terms as Governor of the Empire State. The Democratic National Convention met at Houston, Tex., and on June 28 nominated him on the first ballot. This result, remarkable in the face of the Democratic two-thirds rule, was effected by the action of the Ohio delegation, which first voted for Pomerene but shifted to Smith before the ballot was declared closed. Smith's vote before this shift was 724⅔ votes. Joseph T. Robinson, Senator from Arkansas, was nominated for Vice President.

The party platforms were not strikingly opposed. The Republican platform endorsed the Coolidge administration, pledged a continuation of its policies of economy and tax reduction, and promised enforcement of prohibition. The Democratic platform promised "an honest effort to enforce" the Prohibition Amendment, attacked corruption in Republican officialdom under the Harding administration, and proposed further reduction in expenditures and taxation.

The attitude of Mr. Hoover during the campaign was restrained; he expressed himself as in favor of a considerable programme of Federal public works, and promised the dissatisfied farming element that he would call a special session of Congress if elected. He endorsed prohibition as a "noble experiment," which he undertook to support. Governor Smith, on the other hand, conducted a campaign in which his personal views played a dominant part. While undertaking faithfully to enforce prohibition so long as it remained in force, he condemned the existing prohibition system, and proposed a change to allow latitude to such States as might wish it. He strongly controverted a numerous element that attacked him as a member of the Roman Catholic faith, and asserted the right of every citizen to seek office upon his merits, irrespective of religion. He attacked the figures of Secretary of the Treasury Mellon with regard to reduction in government expenditure under Republican rule. With regard to the agricultural element, he promised to consider all proposals for relief with an open mind and expressed himself as confident that a sound method of relieving the farmers' need could be found; he promised to summon an advisory conference on the subject, immediately after his election, should he win. It was this proposal that drew from Mr. Hoover the counter-proposal to summon a special session of Congress.

The popular vote was extremely large, far exceeding in its total any previously cast. For Hoover, 21,429,109 votes were cast; for Smith, 15,005,497. In spite of the higher totals, the Republican plurality was less than in 1924 or in 1920. The vote was anomalous in that several of the formerly solid Democratic Southern States gave majorities for Hoover, or more properly speaking, against Smith. As a consequence of this secession, Smith carried but four Southern States and but eight States in all: Alabama, Arkansas, Georgia, Louisiana, Massachusetts, Mississippi, Rhode Island, and South Carolina. He lost New York by a narrow margin. The Republicans gained a majority of 17 in the Senate of the Seventy-first Congress and of 87 in the House of Representatives.

Congressional Legislation in 1929. Congress was three times in session in 1929. The final session of the Seventieth Congress was resumed at the opening of the year and continued until March 4, when President Hoover was inaugurated. The Seventy-first Congress, summoned by the incoming President in special session, sat from April 15, except for a Summer recess, until November 22nd. Convening again in December in its first regular session, Congress continued its work to the end of the year.

The closing period of the last session of the old Congress was devoted largely to legislation on matters previously considered but not concluded. There was passed a measure requiring that 15 naval cruisers of 10,000 tons each and one airplane carrier be constructed at an authorized cost of $274,000,000; the cruisers were to be laid down at the rate of five in each of the three succeeding fiscal years. An effort made by President Coolidge to have it left to the President's discretion to suspend this building programme in case that the interest of an international understanding on naval restriction should demand it was defeated. The apparent intent of Congress in this enactment was that the construction of cruisers should be assigned to navy yards and to private shipyards alternately. But the wording of the bill specified only that the first and every succeding odd-numbered ship should be constructed in a government navy yard, thus leaving open the possibility that the Administration might at its discretion place the orders for the intervening cruisers in the navy yards as well—a proposal that was agitated later on as a means of reprisal against shipbuilders for alleged lobbying activities.

The Senate ratified on January 15 the Treaty of Paris for the renunciation of war, commonly known as the Kellogg-Briand Peace Pact. The ratifying vote was 85 to 1. There had been previously an effort among a group of the Senators to attach to the ratification some reservatory clause by which the United States might specifically retain its right to use armed force in support of the Monroe Doctrine and might divest itself of implied obligation to punish a treaty violator. Instead of a reservation on the part of the Senate, there was incorporated in the report of the Committee on Foreign Relations an understanding of its view on the matter. Senator Capper of Kansas, however, introduced on February 10 a Senate resolution providing that the President could by proclamation forbid the commerce in articles of use in war with any nation violating the treaty. This resolution was left for consideration by the succeeding Congress.

A step for the more effectual enforcement of the prohibition laws was taken by the enactment of the Jones Law, a measure raising the maximum penalties for offenders to a fine of $10,000 and five years of imprisonment. Likewise intended to promote the better enforcement of Prohibition was a measure sponsored by Senator Glass of Virginia, which appropriated $250,000 for the purpose of an investigation, under the President, of the entire problem of law enforcement, including Federal Prohibition. This measure as enacted left it to the President to create a commission for the purpose of the intended investigation. Cognate legislation was that in the form of measures creating additional Federal judges in certain of the judicial districts, these having been in some cases overwhelmed with cases by reason of the influx of Prohibition prosecutions.

An effort was made in Congress to effect a change in the method that was followed by the Treasury Department in granting refunds of income tax payments where the Treasury took the view that the payment had not been legally due. Senator McKellar of Tennessee offered a bill to require that all claims for refund, credit or abatement on an internal revenue tax, in excess of $10,000, must go to the Board of Tax Appeals for determination. Secretary Mellon opposed this bill on the ground that the Board of Tax Appeals was already overburdened and more especially on the ground that a tax that could be administered only by resort to litigation would be collected with difficulty. Owing largely to his stand the proposal made no progress. An effort, unsuccessful likewise, was made to postpone the operation of the system of restriction of immigration based on national origins of the existing inhabitants of the country. The Administration view that this system of restriction was not workable inspired the proposal to postpone it, and the House voted for postponement, but the failure of the Senate to act left the national origins clause to go into effect.

Among other measures enacted by the session was a resolution providing for a survey of the route of the projected ship canal through Nicaragua, at the judgment of the President. The shipment of convict-made goods in interstate commerce was restricted by the Hawes-Cooper Bill, which was enacted. The Norbeck-Andresen Bill, likewise enacted, made provision for the conservation of migratory birds by the establishment of bird sanctuaries in all States of the Union, subject to enabling acts on the part of the State legislatures.

One of the most important administrative acts of the last days of the Coolidge administration was the sale by the Shipping Board to a private bidder, P. W. Chapman & Co., of two leading Government-owned steamship lines, the

United States Line and the American Merchant Line. The total price was $16,300,000. The Senate Commerce Committee gave its assent to the sale.

President Coolidge signed the instrument ratifying the Kellogg-Briand Treaty on January 17. The construction of works in the Niagara River, to improve the scenic effect of Niagara Falls and at the same time to permit the diversion of more water to power purposes, for some time a subject of negotiation with Canada, was provided by an accord signed at Ottawa January 2, by the Prime Minister of Canada and the American Minister.

President Hoover Inaugurated. Herbert Hoover was inaugurated President of the United States on Mar. 4, 1929. His official views as outlined in his inaugural address were in one respect conspicuous, in that they dwelt with chief emphasis on the need of correcting the "disregard and disobedience of law" which was characterized "the most malign of all the dangers" besetting the nation at the moment. The reform and reorganization of the whole system of justice and enforcement was set forth as a requirement not to be delayed. With particular reference to the enforcement of the prohibition laws, the President declared the duty of the citizens to support the laws of the land to be coequal with that of the Government to enforce them. The policy of governmental regulation of private enterprise as the alternative of governmental ownership or operation was affirmed. The belief was expressed that the United States would enter the jurisdiction of the Permanent Court of International Justice by a way that would be found, and the peace of the world was characterized as "interlocked with our own progress and prosperity." It was declared, however, to be the Nation's will that it should not commit itself to engagements such as membership in the League of Nations. The cabinet drafted by the President was as follows: Secretary of State, Henry L. Stimson; Secretary of War, James W. Good (died Nov. 18, 1929); Attorney General, William D. Mitchell; Postmaster General, Walter F. Brown; Secretary of the Navy, Charles Francis Adams; Secretary of the Interior, Ray Lyman Wilbur; Secretary of Agriculture, Arthur M. Hyde; Secretary of Commerce, Robert P. Lamont. Omitting two members retained from the Coolidge cabinet, this list was sent on March 5 to the Senate, convened in a separate short session for the purpose of considering nominations, and was confirmed. The omitted members were Andrew W. Mellon, Secretary of the Treasury, and James J. Davis, Secretary of Labor. Taking an uncustomary course, the Administration held that these two, being already incumbents, did not require renomination. In the case of Secretary Mellon, who had bitter opponents in the Senate, the move was later met by an endeavor to investigate the Secretary on the Senate's own initiative, but eventually his retention as Secretary of the Treasury was allowed to stand.

The first major act of President Hoover was to summon Congress to a special session convening on April 15. The proclamation of March 7, calling this session, stated the need of "legislation to effect further agricultural relief and legislation for limited changes in the tariff." Congress convened approximately as made up by virtue of the elections of the previous autumn. A vacancy was left in the Senate by the withdrawal of Curtis of Kansas to assume the office of Vice President. The place was filled by the nomination of Henry J. Allen, former Governor of Kansas, at the end of April. President Hoover presented to Congress on April 16 a message in which he detailed handicaps of the farming industry and recommended for its relief "an effective tariff upon agricultural products," the further development of waterways and the creation of a Federal Farm Board as an agency for the reorganization of the agricultural marketing system. With regard to tariff matters outside the agricultural schedule the message alluded to "necessity for some limited changes in the schedules and in the administrative clauses of the laws as written in 1922." The President stated his adherence to the principle of the flexible tariff, recommended strengthening the Tariff Commission and mentioned weaknesses in the system of valuation of imported goods. He approved limiting the session to farm and tariff legislation and to a few emergency matters, among which he included the census and reapportionment measure.

Congress did in fact so limit its activities in the special session, but its work was greatly delayed by the inability of the members of the majority party to unite in sufficient numbers on the President's policy. In the case of the Senate, a strong Republican group from the agricultural States created trouble by its stubborn efforts to insert into the farm relief bill and later into the tariff bill a provision for a system of rebates to farm exports, known as the farm export debenture plan. The principle of this plan was that those exporting certain agricultural products should receive, in proportion to the amount of such exports, debentures or evidences of indebtedness of the Government, which the possessors might employ for certain limited purposes, as for tender in payment of tariff dues. The apparent tendency of the plan was to extend to the exporters of these farm products an inducement of value, or, as some called it, a subsidy, without, however, defraying the resulting cost to the Government by appropriation, and without placing any definite limit on its total in any given period. The debenture plan received the support not only of many Republican but of a large number of Democratic senators.

Farm relief by consent of leaders in both houses obtained the right of way over the tariff. The committees on agriculture of the two Houses prepared measures, both of which provided a Federal Farm Board with the financing of crop-stabilizing corporations by means of loans from a revolving fund of several hundred millions of dollars as one of its chief functions. Both committees did away with the scheme of the equalization fee, upon which the McNary-Haugen bills of previous sessions had come to grief. The House committee made no provision for the automatic reimbursement of agriculture for losses on farm exports sold at less than the domestic price; but the Senate committee after some delay declared in favor of the farm debenture as the means for this purpose. The Senate bill as drafted by Senator McNary of Oregon and his associates provided that the Government issue a debenture on each export shipment of specified agricultural products, to the amount of one-half of the tariff on imports of the product in question, and that all such debentures might be redeemed by presentation in payment of import duties. In advance of the introduction of the bill, President Hoover on April 20 wrote Senator McNary an open letter setting forth ten reasons for which the President regarded the debenture plan as unwise. He characterized it as a direct subsidy from the Treasury, which so far as it brought advantage to the farmer would stimulate overproduction and would upset the basis of farm diversification and that of import tariff rates.

Nevertheless, the bill, with the debenture plan attached, was introduced in the Senate. In the course of a protracted debate on the subject, Senator Norris of Nebraska proposed an amendment designed to check agricultural overproduction, such as debentures might occasion, by providing a sliding scale under which the debentures would become less in value as the quantity of farm exports rose. This amendment the Senate accepted on April 30. Finally, it passed the Senate bill on May 14, by a vote of 54 to 33, all but two of the nays being Administration Republicans and 33 of the ayes being Democrats.

In the meanwhile, the House, on April 25, had passed its own bill, which provided no debentures and which in general followed the ideas of the President. The House vote was 367 to 34, and the ayes included the majority of the Democratic members. By a special rule, the House sent the bills to joint conference committee without direct vote on the Senate measure. A protracted conference ended in the elimination of the debenture clause on June 5. The Senate on June 11 rejected the conference report. This action drew from the President a somewhat sharp published statement that the whole measure was being jeopardized. The Senate then gave in, passing the conference measure three days later. The act was signed April 15; in its final form, it provided a Farm Board of ten members and created for their employment a revolving fund of $500,000,000, of which the initial $151,500,000 was shortly afterward appropriated by separate act.

The Census of 1930. Provision for the taking of a census in 1930 and, in the same measure, for the automatic reapportionment of the representation of the States in the House of Representatives, by administrative procedure, was made in an act signed by President Hoover on June 18. The census features of the measure differed from its predecessors in authorizing a census of unemployment, as well as one of agriculture and of irrigation; a proposal to put virtually all of some 100,000 census workers under the Civil Service rules was defeated, but 500 special agents were rendered subject to Civil Service certification. With regard to reapportionment, there took place in the House a struggle over the proposal to amend the method of counting so as to exclude alien inhabitants and disfranchised Negroes as a component of the population totals on which representation was to be based. This proposal found favor with some sections who apprehended otherwise losing representatives to the more rapidly growing States where aliens were present in higher number. The House defeated this proposal by a vote of 271 to 104. The act in its final form required the President to submit to Congress in December computations of apportionment both according to the system of major fractions and to that of equal proportions, and thus made it possible for Congress still to pass an apportionment act later on. In its failure to do so, the membership of the House was to remain at 435.

Tariff Discussions. The enactment of a tariff measure was the feature of the special session of Congress in which progress was the least rapid. The House Committee on Ways and Means, which had been busy on a tariff measure during the Congress interim, presented its bill on May 7. This bill, instead of meeting the expectation of those who had founded on the President's message an expectation of very limited tariff increase, raised the duties on hundreds of articles. Such commodities as some of the building materials, clothing, certain chemicals, and many metal products were made subject to higher duty. At the same time, the expected increases in agricultural tariffs were made, but agricultural sentiment was largely adverse none the less, holding that the farmers would lose more by the higher duties on goods they must buy than they would gain by higher duties on imports of commodities they themselves produced. The rate on Cuban raw sugar was sharply raised from 1.76 cents a pound to 2.4 cents, in the interest of domestic growers of cane and the sugar beet. Chairman Hawley of the Ways and Means Committee frankly represented the bill, in evident contrast to that sought by the President, as having the greater protection of American labor for one of its major aims. In its administrative features, the bill provided for the transfer of disputes over the basis of valuation of imports from the Customs Court to the Treasury, and for altering the status of the Customs Court to that of a board. The measure was passed by the House with relatively few amendments on May 28.

In the Senate, the tariff progressed less smoothly. At the outset, on the receipt of the bill by the Senate, an effort was made to commit the Upper House to a measure of revision applying to farm products and related schedules alone. A resolution to this purpose, offered by Senator Borah of Idaho, was narrowly defeated on June 17, by 39 against to 38 in favor. Thereupon, facing the prospect of a slow task of tariff framing in Senate committee, the two Houses, by concurrent resolution took recess, the Senate until August 19 and the House of Representatives until September 3. The committee work of revising the House tariff bill was carried on not by the Senate Finance Committee as a whole but by a subcommittee of the majority members. The resulting bill differed widely from the House measure in detail, but as it in many cases raised the proposed duties on non-agricultural products, it also failed to conform with the President's recommendations. The fact that Senator Bingham of Connecticut had employed as an aid in tariff revision one C. L. Eyanson, an employee of the Connecticut Manufacturers' Association, led to a vote of censure of his course being passed by the Senate and to a Senate investigation of lobbyists' activities.

Premier MacDonald's Visit. The most conspicuous occurrence bearing on the foreign relations of the United States in 1929 was the visit of Prime Minister Ramsay MacDonald of Great Britain at Washington, in connection with plans of the United States and Great Britain for a conference on naval restriction. While Prime Minister MacDonald was at Washington, the invitation of the British government, in which it was stated that the Government of the United States concurred, was issued to France, Italy and Japan to attend the proposed conference. In the financial field; the occurrence in October and November, 1929, of a violent collapse in the stock market, led President Hoover in mid-November to undertake emergency measures for the provention of the spread of depression to the field of general business.

UNITED STATES MILITARY ACADEMY. A government institution at West Point, N. Y., for the practical and theoretical training of cadets for the military service of the United States, opened in 1802. By act of Congress in May, 1916, the maximum number of cadets permitted to be enrolled in the academy was raised to 1334 by the appointment of one additional cadet from each congressional district, additional cadets from the United States at large, and from the ranks of the enlisted men in the Regular Army and the National Guard who are between the ages of 19 and 22, and have served not less than one year. Under this act, the enrollment reached its highest mark, 1272, in 1928, as compared with 661 in 1914. In the latter year, there were 215 members of the faculty and 108,000 volumes in the library. The academy is a component part of the Regular Army of the United States and is maintained solely by appropriation from the War Department, which in 1928 amounted to $2,246,587 for salaries and maintenance of public works, and $861,000 for continuing construction. A plan was adopted in 1916 admitting applicants on certificates from accredited schools and colleges, as well as by examination. This applied to mental qualifications only. The maximum age for admission to the academy was extended in 1920 from 22 to 24 years for men who served in the armed forces of the United States during the World War. A cadet hospital was completed in 1923 and a new schedule of studies went into effect on Jan. 1, 1924, in which year an athletic stadium was dedicated. A combination mess hall, drawing academy, and cadet store were under construction in 1928. The superintendents and commandants since 1914 have been as follows: Col. Clarence P. Townsley, 1914–16; Col. John Biddle, 1916–17; Col. Samuel E. Tillman, 1917–18; Brig. Gen. Douglas MacArthur, 1919–22; Maj. Gen. Fred W. Sladen, 1922–26; Brig. Gen. Merch B. Stewart, 1926–27; Maj. Gen. Edwin B. Winans, 1927–28; Maj. Gen. William R. Smith, since 1928.

UNITED STATES NAVAL ACADEMY. A school for the education and training of naval cadets at Annapolis, Md., founded in 1845. By Act of Congress of Feb. 15, 1916, the number of midshipmen appointed from each congressional district was increased from two to three; an act of Mar. 4, 1917, permitted the Secretary of the Navy to appoint 100 midshipmen from the enlisted force of the Navy; an act of Apr. 25, 1917, increased the number of appointments to four, which was still further increased to five by act of July 11, 1919. On graduation, midshipmen are commissioned as ensigns in the United States Navy, and occasionally to fill vacancies in the Marine Corps and in certain staff corps of the Navy. Forty appointments may be made by the President from among the sons of officers, soldiers, sailors, and marines of the Army, Navy, and Marine Corps who were killed in action or died prior to July 2, 1921, of wounds or injuries received or disease contracted in line of duty during the World War. The regiment of midshipmen in the fall of 1928 numbered 1790; there were 245 members of the faculty of the academy and the library contained 70,000 volumes. Superintendent, Rear Admiral S. S. Robinson, U. S. N.

UNITED STATES OF EUROPE. European federation as a political concept was discussed at intervals during the nineteenth century. In 1898–99 it was revived by William T. Stead, of London, in connection with the Peace Congress at The Hague. The idea had a place in the international peace propoganda of that period, but nowhere won official recognition. Long before the outbreak of the World War, in 1914 it had ceased to have importance even as a Utopian dream.

The rearrangement of boundaries following the Treaty of Versailles tended to intensify nationalistic feeling in the smaller states and to make more remote any attempt at political federation, but at the same time certain economic evils inherent in the European system were more fully exposed to the light and in every country there were those who thought they saw advantages in union. In 1923 Count Richard Coudenhove-Kalergi, a citizen of Czechoslovakia, issued his appeal for a "Pan-Europa." He promised that a federation of the 27 states on the Continent of Europe, excluding Russia, would give its members security from inter-European war, would neutralize the Continent as a whole in the event of any outside conflict, would offer protection against Russian invasion, would hold out a prospect of disarmament, and would insure the ability of the member states to compete industrially in the world's markets.

Like Stead and other earlier writers on the subject of European federation, Count Coudenhove-Kalergi had been impressed by the success of the United States of America in maintaining a union of 48 states, each sovereign in its own sphere, with a powerful centralized government of proscribed sovereignty. Those writers saw that without tariff barriers the 48 states were free to develop their resources as they could not possibly have been if they had grown up into separate nations, like those of Europe. They saw that to the rest of the world the American commonwealth presented an unbroken front, but that from Delaware to Texas each controlled its own affairs and retained its own individuality. American prosperity with such a system was an object lesson that Europeans could not overlook. Obstacles of language, custom, and national and racial prejudice in Europe seemed to dwindle as America's economic triumph grew more distinct.

The new school of Pan-Europa propaganda, which had its seat at Vienna, conceived of the nations as divided into five general groups: The British Empire, Pan-America, Mongolia (China and Japan), the Russian states, and Pan-Europa. Russia was regarded as an Asiatic, rather than a European, power. Furthermore, the fact that Soviet rule is inconsistent with European democracy was thought a disqualification for membership in the federation.

Britain's exclusion seemed to be regretted by some of the advocates of Pan-Europa, but was based on the extension of British interests in other continents. However, much thought was given to an outline of a prospective British-European Entente, embracing the following principles: Compulsory arbitration of disputes, the disarming of European submarine fleets, the most-favored-nation system and a possible customs union, including British Africa, the exchange of British West Africa for Europe's East African colonies, Britain to assume the protection of Europe's Asiatic colonies (the French and Dutch Indies) against attack, Europe to bind herself to ward off outside attack on England and the British Dominions to accord the same rights to European as to English immigrants.

Instances could be cited from Europe's economic experience to show that international trade combines might be made effective. There was the Zollverein, and in post-war years the steel, potash, and wire cartels, involving France, Germany, and other countries, and the enamel-ware combine affecting Germany, Austria, Czechoslovakia, and Poland. These had been highly successful. Whether because of such practical examples, or for less obvious reasons, the Pan-Europa propaganda made headway among statesmen.

One of the first Europeans in office to indorse the movement was President Herriot of France, in October, 1924, and in a notable address on Jan. 29, 1925. In the following year, sufficient interest had been aroused to warrant the assembling of a Congress at Vienna in October. Chancellor Seipel of Austria presided over the gathering, in which 24 European nationalities were represented. Former Chancellor Wirth of Germany, M. Delbos, former French Minister of Education, M. Politis of Greece, and other well-known public men were among the delegates. With the exception of Lithuania, all the continental nations had some part in the proceedings. The German, French, and Polish youth movements were enlisted in the cause; the Austrian Socialists held aloof. In France, besides M. Herriot, the friends of the Pan-Europa project included Briand, Painlevé, Loucheur, and Cailloux; the two great leaders of Czechoslovakia—Masaryk and Benes—were both said to favor it.

In the summer of 1929, the agitation for a federated Europe went into a second phase when Premier Briand of France announced his intention to work, through the League of Nations, for the founding of a "United States of Europe"—an economic federation at first, to be developed politically later. In conversations with the French journalist, Jules Sauerwein, M. Briand spoke of existing conditions in Europe which he thought might be changed for the better by a form of federation such as he advocated. As reported in the *New York Times*, he said:

"Europe is not organized at all. It is in a chaotic state which, when we examine it attentively, is at once shocking and disquieting. In one country, there are 1,200,000 unemployed who live upon the charity of the State. In another, the farmers, who get scarcely 6 or 7 per cent return for their labor, must pay 12 to 15 per cent for loans when they need them. You see small countries which could sell their agricultural produce at a good profit straining themselves to create national industries, while almost impassable tariff barriers rise between them and their neighbors.

"You see regions, such as Austria, which ought to be prosperous, but are living in misery, which is absolutely paradoxical. Austria is admirably situated for serving as a point of transit for merchandise crossing Europe from north to south, and from east to west, which passes normally through Vienna. Moreover, it possesses a banking and commercial machinery that is first-class, and reliable and experienced specialists in commerce.

"If Europe were not cut up into a series of separate compartments, if the goods which are exported and imported were not heavily taxed, if there were a European treasury to supervise money and keep it at a judicious and reasonable rate, do you think the city of Vienna and its 2,000,000 inhabitants would not be able to prosper?

"On the other hand, consider a country such as Italy, which lacks raw materials. In a Europe federated and organized on reasonable principles, Italy would be assured of getting the raw materials she needs without difficulty."

Exponents of Pan-Europa had stressed the idea that political alliances are out of date, that economic solidarity alone can bring about stability. M. Briand, experienced in statecraft, let it appear that he was hopeful of improving existing political machinery, that he did not find it necessary to discard it altogether. He believed that states closely united by common economic interests would find it easy to come to an agreement for creating a police force to serve the group as a whole, thus making separate armament needless.

At Geneva on Sept. 9, 1929, while the Assembly of the League of Natioons was in session, M. Briand explained his ideas to the delegates of European nations there present. He was seconded by Dr. Gustav Stresemann of Germany, whose death occurred a few weeks later. Dr. Hjalmar Schacht, president of the Reichsbank, had already pronounced the project economically sound. M. Briand promised to give more definition to his plans and to prepare questionnaires to be submitted to the several governments. The United States of Europe, as visioned at Geneva, would occupy an area of 1,932,000 square miles with a total population of about 250,000,000.

While M. Briand's conception of a United States of Europe proved alluring to many minds, serious objections to it were soon disclosed. Thus, Salvador de Madariaga, of Spain, as a supporter of the League of Nations, was evidently fearful lest the idea of regionalization would be applied to the Council itself, impairing the League's universality; but Senor Madariaga was unwilling to take even the Continent of Europe as the regional basis of union. He believed that "the Atlantic nations, in whichever continent placed, are in closer solidarity than the European nations as such." Moreover, he questioned the logic of attempting to find an economic basis of union while the countries concerned are still without a common political consciousness. "A zollverein will not be the preface, but the epilogue, of union." Besides, a zollverein will give rise to complex problems that can only be adjusted by governmental agencies. He further insists that non-European nations "intimately connected with the European economy" (e.g., the United States of America and Argentina) should be included.

Protests had already been made against the exclusion of Great Britain from the Pan-Europa scheme (notably by the *Journal de Genève*) and in 1926 the English economist, J. A. Hobson, showed that the expected economy of European cartels in various manufactured articles would be greatly restricted if Britain did not come in. Assuming that a continental tariff barrier would be raised to keep British goods out of Europe, British exporters would use pressure to hold their non-European markets against the cartels, and it might drive Britain into a closer relation with the United States of America.

In November, 1929, Dr. Hobson elaborated his views on M. Briand's United States of Europe in the *Contemporary Review*. As a project for a Europe built on the lines of the United States of America, he regards it as chimerical. If, however, it should take shape as an organization for European coöperation in commerce and industry, Dr. Hobson visualizes it as "a stumbling-block to the genuine progress of free trade and coöperation in the entire world." He thinks that reprisals might be provoked in other countries excluded from their former European markets and he concludes that "a union in which two great European countries, Russia and Britain, were not participants, while another country in intimate cultural, economic, and political relations with the Western European nations, the United States of America, was excluded, cannot be deemed to have a footing in the world of political realities."

Nevertheless, it was everywhere admitted that the services of transportation and communication in Europe depended for efficiency on international coöperation. Since the World War, through-train service in Europe has been improved. Air transport, Señor Madariaga conceded, is international in its nature and calls for coöperative control. Some observers who have not yet been convinced that such a structure as the United States of Europe can be erected with any promise of permanency, were still questioning whether cooperation in a few definite activities of international scope and character may not be immediately practical. By making such an attempt, it might soon be determined how far the lack of "a common political consciousness" among the European nations militates against common social and economic enterprise. Federal control of money, the post, and other functions of national sovereignty, presents additional problems, which are assuredly not to be solved by a superficial analogy with American conditions.

Assuming that a United States of Europe in operation would adopt the bicameral legislative system, following the example set by the United States of America, Prof. Albert Bushnell Hart, of Harvard University, pointed out (in *Current History* for November, 1929) that the number of European states with very small populations would make the problem of representation more difficult than in America. Taking a strict population basis and allowing one representative for every million inhabitants, France would have 41 and Albania 1. If in the upper house of the legislature each state should have one vote, Germany, France, Italy, Poland, and Spain together could be outvoted by a combination of states having a total population of less than 2,000,000 out of Europe's 250,000,000.

Pan-Europa, an interesting discussion by Count R. Coudenhove-Kalergi (in English translation, with an introduction by Nicholas Murray Butler) was published in 1926. Other discussions of this topic are to be found principally in reviews and other publications of current politics and history.

UNITED STATES STEEL CORPORATION. One of the world's greatest steel manufacturing organizations, incorporated in New Jersey in 1901. It absorbed the Federal Steel, National Tube, American Steel & Wire, National Steel, Lake Superior Consolidated Iron Mines, Union Steel, the Carnegie Company, and other corporations. It owns and operates 3796 miles of railroad. The capital stock outstanding in February, 1929, consisted of $711,623,500 of common, and, $360,281,100 of preferred, out of an authorized total of $753,321,000 and $400,000,000, respectively. On Apr. 15, 1929, the common stock was increased to $1,250,000,000. In the same year important infringement suits were settled. General offices, Hoboken, N. J., and 71 Broadway, New York. See TRUSTS.

UNIVERSALISTS. A denomination founded on Universalism, the doctrine or belief that it is the purpose of God to save every member of the human race from sin through the grace revealed in Jesus Christ. Thus, it is claimed that Universalism is as old as Christianity, while the Universalist denomination is of modern origin and is confined mostly to North America. The denomination dates from the arrival of the Rev. John Murray of London, in Good Luck, N. J., in 1770, and under his ministry spread throughout New York, Pennsylvania, and Massachusetts, and later into the Middle West and South. The ecclesiastical organization of the church is under the jurisdiction of the General Convention, which meets biennially. In polity, the parish or society is independent in the management of its temporal affairs and worship. The different parishes within a State are organized into the State Convention, which meets annually, and these in turn constitute the General Convention. In 1929 the churches were grouped in 28 State conventions and two State conferences. The membership of the denomination decreased from 51,716 (estimated) in 1913 to 50,078 in 1929; the number of churches decreased from 709 to 609; and the number of ministers, including lay licenses, decreased from 702 to 546.

Home missionary work was sponsored by the State Conventions; the Women's National Missionary Association, which confined its efforts largely to North Carolina and Tennessee; the Young People's Christian Union, which supported missionaries in Texas; and the General Sunday School Association, which supported a school for colored children in Suffolk, Va. The total amount expended for home missions in 1926 was $87,160. In 1919 a drive was launched to reëstablish the church more firmly and raise $1,000,000 to carry on its work. With the receipts from this drive, new mission churches were established in the South and West, new buildings were erected in Japan for church, school, and residence purposes, and a better organization and more perfect supervision of mission work were made possible. By 1926 the Japanese mission, established in 1890, consisted of 8 centres of work and employed 7 American and 5 native missionaries, and a number of teachers and helpers. The educational activities of the denomination included 3 colleges, among them Tufts College at Medford, Mass., 3 academies, and 3 theological schools, with a total registration of 6166, and property valued at $12,892,008. Between Oct. 1, 1925, and Oct. 1, 1926, scholarships amounting to $3775 were distributed to students in the theological schools. The Women's National Missionary Association has increased its home and foreign missionary work, and purchased the birthplace of Clara Barton, a loyal Universalist, for use as a shrine and for some form of social-service work.

The General Convention established the department of social welfare on a permanent basis with a full-time director who aided the churches in making the most of their opportunities in this line of work. The Murray Anniversary Crusade was carried on in 1920 in celebration of the one hundred and fifteenth anniversary of the foundation of the denomination, and was continued thereafter under the name of the Christ Crusade. The Universalist Comrades, an organization for men, was established in 1919 to aid the larger projects of the denomination. The 1927 Convention, which was held at Hartford, Conn., went on record as favoring the abolition of capital punishment, and also as favoring the outlawry and abolition of war, both offensive and defensive. During 1927 the convention commenced the construction of a Universalist National Memorial Church in Washington, D. C., and put in operation a ministers'-pension plan.

At the biennial General Convention, held in Washington from Oct. 23 to 27, 1929, the tower of the National Memorial Church was dedicated to the ideal of international justice and world peace and as a grateful tribute to Owen D. Young, a Universalist layman. This convention created a department of religious education and favored conducting a school for religious leadership for ministers and encouraging local churches to conduct discussion classes dealing with the implications and applications of Universalism. Resolutions were adopted indorsing President Hoover's request for stricter law observance and pledging him support in his efforts toward the lessening of the burden and danger of armaments; urging the Senate to adopt the Root formula and to approve the Pan-American Arbitration Treaty; favoring the abolition of capital punishment; and authorizing the appointment of a commission on world-wide free religious fellowship to survey the possibilities of religious fellowship and cooperation between Universalists and liberals in non-Christian fields. The president of the 1929 General Convention was the Rev. Frank D. Adams, D.D., of Detroit, Mich. The headquarters are at 176 Newbury Street, Boston, Mass.

UNIVERSAL LANGUAGE. See INTERNATIONAL LANGUAGE.

UNIVERSITIES AND COLLEGES. STATISTICS. The U. S. Bureau of Education in 1929 published the statistics of universities, colleges, and professional schools for the college year 1925–26. The report deals with 975 institutions, of which 154 were under public, and 821 under private, control, with a total of 156 independent professional schools. Including these independent institutions with departments of universities, there were the following schools: theology, 180; law, 136; medicine, 77; dentistry, 43; pharmacy, 67; osteopathy, 5; and veterinary medicine, 12.

Enrollment. The total number of students enrolled in the 975 institutions reporting to the Bureau of Education was 822,895, of which 509,732 were men and 313,163 were women. These totals included 33,185 men and 22,447 women in preparatory departments; 20,159 men and 12,341 women in graduate departments; 92,591 men and 5822 women in professional departments; and 23,211 men and 30,355 women registered as unclassified and special students.

Schools of engineering enrolled 59,314 students; of law, 40,359; medicine, 19,682; theology, 13,655; dentistry, 11,777; pharmacy, 10,815; osteopathy, 1588; and veterinary medicine, 537.

The enrollment in summer schools was 209,454; in winter short courses, 3772; and in extension and correspondence courses, 268,481.

The institutions under public control had 290,893 students, while those under private control had 532,002 students.

Excluding those enrolled in summer schools, short, extension, and correspondence courses, the largest four institutions under public control were: University of California, 18,969 students; University of Minnesota, 13,225; University of Michigan, 10,134; and University of Illinois, 10,073. The largest four institutions under private control were: New York University, 20,383 students; University of Chicago, 14,472; Columbia, 12,527; and University of Pittsburgh, 12,052. The largest four women's colleges are Hunter, 4401 students; Smith College, 2158; Wellesley College, 1599; and Simmons College, 1531 students. The Carnegie Institute of Technology had an enrollment of 2899; the Massachusetts Institute of Technology, 2813; and the Renesselaer Polytechnique Institute, 1251.

The average annual increase in the number of strictly college students for the six years ending in 1926 was 50,786. Between 1910 and 1920, the average annual increase was 19,600 students; from 1900 to 1910, it was 9900; while from 1890 to 1900, it was approximately 4600. Enrollments in the graduate departments increased 47 per cent from 1920 to 1922; 25 per cent from 1922 to 1924, and 13 per cent from 1924 to 1926.

Professors and Instructors. The total number of professors and instructors in the 975 institutions reporting was 62,224, of which 48,649 were men and 13,575 were women. The 154 institutions under public control employed 20,890 professors and instructors, of whom 16,815 were men and 4075 were women. The institutions under private control employed 41,334, of whom 31,834 were men and 9500 were women. The percentage of increase in faculty members was not so large as that of students. In 1926 the ratio of students to professors was 13.2; in 1924, 12.9; in 1922, 12.4; and in 1920, 12.2.

Income. The total income reported by the 975 institutions was $479,774,664; this included $72,374,608 received for endowment. The sources of income was as follows: Student fees, $101,499,120; room rent and board, $42,346,924; productive funds, $49,748,999; appropriations from city or State for increase of plant, $18,355,836; appropriations by State or city for current expenses, $81,522,432; from the United States government, $16,144,147; from private benefactions for current expenses, $16,396,853; from all other sources, $51,912,421. Excluding additions to endowments, student fees were 24.9 per cent of all college and university receipts for the year.

Property. In 1926 the total property belonging to these 975 institutions was valued at $2,334,307,221. The value of grounds was $225,721,958; buildings, $911,498,850; libraries, apparatus, furniture, and other equipment, $219,073,684; productive funds, $978,012,929.

Degrees. During the college year 1925–26, the universities and colleges conferred a total of 71,529 baccalaureate degrees; of these, 41,106 were earned by men and 30,423, by women. A total of 11,451 graduate degrees were conferred; of these, 1302 were Ph.D. degrees, conferred upon 1115 men and 187 women. A total of 1214 honorary degrees were conferred; of these, 397 were the degree of D.D.; 374, LL.D.; 74, Litt.D.; and 3, Ph.D. Schools of law conferred 7938 first professional degrees; medicine, 4122; pharmacy, 3492; dentistry, 2666; theology, 1357; osteopathy, 393; and veterinary medicine, 123.

Accredited Higher Institutions. In the United States, there is no central agency with authority to accredit or classify institutions of higher learning. There are, however, various bodies which establish standards for the accrediting of institutions and, in certain cases, publish lists of institutions that meet their requirements. The most prominent of these are the following:

American Council on Education.—Committees from this organization have formulated certain standards for colleges, junior colleges, normal schools, and teachers' colleges. These have been accepted by most other organizations.

The Association of American Universities publishes a list of approved colleges and universities. This association accepts in a general way the statement of principles and standards for accrediting colleges developed by the American Council of Education.

The Association of Colleges and Secondary Schools of the Middle States and Maryland makes use of the principles and standards recommended by the Council of Education. It publishes a list of accredited institutions located in its own territory.

The Association of Colleges and Secondary Schools of the Southern States accepts, in general, the recommendations of the American Council on Education and publishes lists of colleges, junior colleges, and teacher-training colleges that meet its requirements. In addition, this association has published a list of colleges whose graduates may be employed as teachers by the accredited secondary schools in the association.

The North Central Association of Colleges and Secondary Schools accepts the recommendation of the American Council on Education and publishes a list of accredited colleges and universities, junior high schools, and teacher-training institutions.

The Northwest Association of Secondary and High Schools accepts the recommendations of the American Council on Education and publishes a list of accredited colleges, junior colleges, and teacher-training institutions located in its territory.

The New England Association of Colleges and Secondary Schools has adopted the minimum requirements for an accepted college of liberal arts. It has no published list of accredited institutions.

The American Association of Junior Colleges has set up no formal requirements for accrediting junior colleges, but it has defined a junior college and has suggested a set of standards which it hopes may serve as a guide to individual institutions and perhaps to accrediting agencies.

The American Association of Teachers' Colleges has adopted standards for accrediting teacher-training institutions. The association made provision for the inspection of teacher-training institutions in the country and proposed to prepare a classification of them based upon the standards adopted.

The Council of Medical Education and Hospitals of the *American Medical Association* has a schedule for grading medical schools. After careful inspection, medical schools are rated on a civil-service basis on a scale of one hundred points. Data relating to each school are grouped under the four general heads: faculty, product, administration and supervision, and buildings and equipment. Each of these groups is allowed a possible 25 points. Medical schools obtaining 70 or above are rated in class A; those obtaining from 50 to 70, in class B; and those obtaining 50 or less, in class C. The association publishes accredited lists.

The Dental Educational Council of America has developed standards for dental schools and publishes a list of class A and class B schools.

The American Association of Colleges of Pharmacy employs its requirements for membership in the association and has in effect a set of standards. It publishes a list of members and associate members.

The American Bar Association has approved a set of resolutions presented to it by its council on legal education and admission to the bar. It publishes a list of law schools meeting the association standards. The standards adopted by the association are practically the same as those set up for membership by the *Association of the American Law Schools.*

The Council of the American Library Association has adopted minimum standards for junior undergraduate, senior undergraduate, graduate, and advanced graduate, library schools. On the basis of these standards, it publishes a list of accepted institutions.

Educational Boards and Foundations. *American Council on Education.* This organization is the central one in which the great national educational associations and societies are represented. Its general object is to promote and carry out coöperative action in matters of common interest to the association and the institutions composing it. There are three classes of members—constituent, associate, and institutional. The constituent members include 16 national educational associations. Each is represented by three delegates who vote as a unit at meetings of the council. Associate members are educational or scientific organizations having interests related to the work of the council. Each associate member may send one representative to the meetings of the council without the right to vote. There are about the same number of associate as constituent members. Institutional members are colleges, universities, and professional and technical schools contributing not less than $100 a year to the council. Each may be represented at meetings of the council by two delegates without the right to vote. There are more than two hundred institutional members. The directors' budget for 1926–27 estimated resources of $105,740.45. Among the projects receiving attention of the various committees of the council are Federal legislation, international educational relations, education for citizenship, and educational standards. Headquarters are in Washington, D. C.

The Carnegie Corporation. The report for the year ending Sept. 30, 1928, showed that the corporation had total funds amounting to $128,691,443.59; total income for the year, $7,103,279.58; donations paid during the year, $5,923,689.25, which included $50,000 for buildings, $270,734.67 for library and other buildings for institutions, and $3,346,666.68 for endowments. The total charges against future income were $20,418,581,84. The corporation also had a special fund, the income of which is to be used in Canada and the British Colonies. The total amount of this fund was $13,862,088.90. The income for the year ending Sept. 30, 1928, was $679,873.16; donations by the corporation, $209,-528.15, of which $25,000 was given to the Royal Society of Canada. Of the remainder, a considerable portion was given to the furtherance of an African programme. See CARNEGIE CORPORATION.

Carnegie Foundation for the Advancement of Teaching. The total resources of this Foundation are $30,857,000, of which $15,647,000 was held as permanent general endowment; $1,351,000, as endowment of the Division of Educational Enquiry; $12,428,000, as a reserve for liquidating pension liabilities accruing after 1928; $830,000 to assist colleges and universities to adopt the contributory plan of annuities; and $601,000, as an emergency reserve. During the year ending June 30, 1927, the total expenditure from general funds was $1,403,188.42. Of this sum, $1,314,419.92 was for retiring allowances. The expenditure for the Division of Educational Enquiry was $73,394.96. Of this sum, $22,806.77 was used for a study of college athletics. See CARNEGIE FOUNDATION.

The Teachers Insurance and Annuity Association of America, which was organized in 1918 by the Carnegie Foundation and financed by the Carnegie Corporation, reported that deferred annuity contracts provided by the association had been adopted by 176 institutions. Teachers in 400 other institutions had taken contracts in the association. The number of annuity contracts in force at the end of 1926 was reported as 4542, representing a total annual annuity of $7,151,070. There were 3715 insurance policies amounting to $20,448,651. The premium income for 1926 was $1,982,547. The association had resources of $9,092,558. See CARNEGIE CORPORATION; CARNEGIE FOUNDATION.

The Commonwealth Fund. For the year closing Sept. 30, 1928, the Commonwealth Fund reported assets amounting to $39,650,994.70; its receipts for the year were $2,581,066.69 and expenses, $2,387,449. This organization was chiefly concerned with the following eight programmes: child-health demonstrations; Commonwealth Fund fellowships (by means of which 51 British graduate fellows were supported in American institutions), Austrian health programme, division of publications, division of rural hospitals, legal research, and two for mental hygiene and school guidance (United States and England). For these purposes, the Commonwealth Fund spent a total of $1,675,191.45.

General Education Board. The General Education Board was founded in 1902. Its assets June 30, 1927, were $98,353,706.23. The receipts during that year were $19,664,854.24, which included a balance on June 30, 1926, of $13,336,767.61. The disbursement for 1927 from income was $5,460,271.60, leaving a balance on June 30, 1927, of $14,204,582.64. From the date of the board's foundation in 1902 to June 30, 1927, there had been appropriated from principal funds a total of $159,965,821.97. Of the amounts appropriated, $111,549,540.39 had been paid, leaving unpaid a total of $48,416,281.58. In addition to the above payments, $195,691.81 had been appropriated and paid, from the income of the Anna T. Jeanes Fund, to rural schools for Negroes.

John Simon Guggenheim Memorial Fellowships. This foundation was established in 1925, with a capital fund of $3,500,000. It grants fellowships which are "awarded only to young scholars and artists who have given unequivocal evidence of marked gift for research or for creative work, and who are engaged in constructive projects requiring special facilities available abroad." Both men and women are eligible. The stipend is usually $2500, and is awarded for one year. For the year 1928–29, the awards totaled $173,000 and were given to 75 candidates, 16 of whom were reappointed in order to enable them to complete studies or projects begun during the previous year.

Institute of International Education. This institute was established in February, 1919, by the Carnegie Endowment for International Peace. The general aim is to develop international good will by means of educational agencies and to act as a clearing house for information and advice for Americans concerning things educational in foreign countries and for foreigners concerning things educational in the United States. The institute has paid the salary of professors on sabbatical leave who were willing to lecture in foreign universities and have been invited to do so. It also entertains distinguished visitors and educational commissions upon their arrival in the United States. The institute administers exchange fellowships and other foreign-study opportunities. Exchange relations are now maintained with Austria, Czechoslovakia, France, Germany, Hungary, and Switzerland.

Applicants for foreign-study fellowships in these countries must (1) be citizens of the United States or one of its possessions; (2) be graduates of colleges, universities, or professional schools of recognized standing; (3) be of good moral character and intellectual ability and of suitable personal qualifications; (4) present evidence of good health; (5) possess ability to do independent study and research; and (6) have a practical reading, writing, and speaking knowledge of the language of instruction in the particular country.

Opportunities are open to both men and women. Preference in selection is given to candidates under 30 years of age. Scholarship and fellowship holders must have sufficient means of their own to cover travel, vacation, and incidental expenses.

In addition to the opportunities for study in the countries named, the institute administers the American Field Service Fellowships for advanced study in French universities, the Germanistic Society Fellowship for study of German culture, and the scholarship for the Junior Year Abroad. It also arranges for the placement of a number of American men in *postes d'assistant d'Anglais* in French lycées and écoles normales, and cares for the activities of the American University Union.

Rhodes Scholarships. The system of Rhodes Scholarships was created by the will of Cecil Rhodes, who died in 1902. He states their purpose in his will as follows: "I also desire to encourage and foster an appreciation of the advantages which I implicitly believe will result from the union of the English-speaking peoples throughout the world, and to encourage in the students from the United States . . . an attachment to the country from which they have sprung, without, I hope, withdrawing them or their sympathies from the land of their adoption or birth."

Provision is made for supporting at Oxford University, for a period of two years each, about 176 selected scholars. The period may be extended to three years. There is an annual stipend of about $2000. Rhodes scholars are selected without examination on the basis of their school and college records. The will outlines the basis of selection as scholarship, character, interest in out-of-door sports, interest in one's fellows, and capacity for leadership.

Candidates must be unmarried male citizens of the United States, between the ages of 19 and 25, and must have completed at least two years of college work in that country.

In 1929 each State is entitled to two scholars. The trustees of the Rhodes Trust have prepared a bill to introduce into Parliament to alter the method of selection so as to enable the trustees to end selection by States. This measure does not contemplate changing the number of Rhodes scholarships.

Junior Colleges. Since 1917, 15 different States have passed laws dealing with junior colleges. The report of the U. S. Bureau of Education shows that the number of junior colleges in 1926 was 153, located in 31 States. Of these, 47, enrolling 13,850 students, were under public control and 106, enrolling 22,660 students, were in private institutions. In general, junior colleges had not been prominent in Eastern States. In the statistics for 1925–26, the only New England State that reported was Massachusetts, with 375 students. That same year, New York reported only 127 students. There was none in Pennsylvania, Delaware, or New Jersey.

During 1928, however, two noteworthy institutions were opened in New York State. Columbia University organized the Seth Low Junior College, as a Brooklyn part of the university. The college was designed to care for the first two years of college work, after which the students might enter Columbia College or some of the professional schools.

The Sarah Lawrence College, a new junior college for girls, opened in October, 1928, in Bronxville, New York. The aims of the college have been described as follows: "To graduate women in whom interests have been so stimulated that they will continue as an animating principle throughout life. To graduate women whose experience in group activities has shown them the value of coöperative effort, so that they become either fruitful as leaders or skilled in rendering service under the effective leadership of others. To graduate women who have experienced the value of leisure and whose varied interests insure the profitable use of whatever leisure time shall be theirs." The college was founded by the late William Van Deuser Lawrence in memory of his wife. It opened with 150 students. It is expected that this number will be increased to 250 as soon as dormitory accommodations can be provided.

Limiting College Attendance. The remarkable increase in the number of students enrolled in colleges and universities has led to the consideration of methods for controlling enrollment. Some of the institutions have set arbitrary limits on the number of students they will receive. Naturally, such institutions endeavor to select those who are best qualified to profit by higher education.

Other institutions have relied upon the raising of their entrance requirements to bring about a lessening of students. There has been no attempt to require more college admission units, but rather to seek a higher standard among those who are accepted. In the case of applicants who come from schools having certification privileges, it has been possible to fix requirements so that only the upper 25 per cent will be certified by the school for admission. The difficulty has been that there exists such a wide range of standards among secondary schools that the highest 25 per cent in one school may not be so well qualified for college admission as a much lower 25 per cent would be from some other secondary school having a higher standard.

Another condition that has had the effect of decreasing enrollment has been increased tuition charges. A large number of institutions now have a tuition charge of $300 a year and there are a few that place it at $400. The fear has often been expressed that these high tuition charges will prevent the attendance of thoroughly worthy students. To offset this possibility, many of the institutions provide a generous number of scholarships or student-loan funds.

Most institutions now submit their candidates to a general intelligence test. The results of these tests are not often used in making the selection of students who will be admitted, but they are used to help place the student in such work as will be most profitable to him. There is still a large amount of discussion as to whether such tests are effective. Many institutions are conducting extensive researches in order to determine their validity.

See also Education in the United States and articles on the different universities and colleges under their respective heads.

UNRUH, Fritz von (1885–). A German dramatist, born at Oranien. His early plays, reflecting the attitude of an ardent pacifist toward militarism, aroused much comment. They included *Offiziere* (1910); *Stürme* (1914), and *Prinz Louis Ferdinand von Preussen* (1914). He also wrote a volume of verse, *Vor der Entscheidung* (1915); a story founded on his experiences at the front, *Opfergang* (1915), translated into French as *Verdun*; and the plays, *Ein Geschlecht* (1916); *Platz* (1920); and *Rosengarten* (1923), which continue his independent line of thought. His later works are *Buch einer Reise* (1924), *Flügel der Nike* (1925); the plays *Heinrich von Andernach* (1925) and *Bonaparte* (1926). The latter was translated into English in 1928.

UNTERMEYER, Louis (1885–). An American poet and journalist (see Vol. XXII). The fifth edition of his *Challenge*, which was first published in 1914, appeared in 1920. Among his other productions since 1914 were: —*And Other Poets*, parodies (1916); *These Times* (1916); *Translations from the Poems of Heinrich Heine* (1917); *Including Horace*, translations and parodies (1919); *The New Adam* (1920); *Heavens, a Book of Burlesques* (1922); *Burning Bush* (1928); *Moses*, a novel (1928). He edited: *Modern British Poetry* (1920); *Modern American Poetry* (1921); *Poems of Anna Wickham* (1921); *New Songs for New Voices* (1928).

UNTERMYER, Samuel (1858–). An American lawyer (see Vol. XXII). In 1916 and for several years following, he was a member of the United States section of the International High Commission. He was special adviser to the Government on the interpretation of income-tax and war-emergency-tax laws and in 1922 was counsel for a legislative committee investigating the building situation in New York City. He acted as special counsel for the New York Transit Commission in its investigation of the New York City traction lines and in arguing the seven-cent fare case before the United States Supreme Court on appeals.

UPSON, Ralph Hazlett (1888–). An aëronautical engineer, born in New York City, who started lighter-than-air-machine training for the United States Navy in 1914. He designed the first improved kite balloon in 1915 and developed lighter-than-air construction at Goodyear, principally kite balloons and navy airships (1917). He started the Wingfoot Lake Flying School in 1917 and flew the first navy coast-patrol ship from Chicago to Akron in demonstration flight (1917). He won the National Balloon Race in 1913, 1919, and 1921. During 1918–19 he was a member of the Navy Design Mission in Europe. He wrote many articles on aëronautical subjects. Since 1922 he has been chief engineer of the Aircraft Development Corporation, and has been a leader in the development of all-metal construction for airships.

URAL AREA. See Siberia.

URANIUM. See Radium.

URBAN, Joseph (1872–). An Austrian architect and designer of stage settings (see Vol. XXII). He was primarily responsible for the establishment of a new standard of beauty in stage settings in America during and after the World War. A modernist who stopped short of impressionism, he substituted imagination and simplicity in his settings for the prevailing mode of realism in scenic design. Urban was naturalized as an American citizen in 1917. For a time, he was general production manager of the International Film Studio, New York, and created settings for the Metropolitan Opera Company. Later, he added to his interior and stage art work the practice of architecture in New York City and Palm Beach, Fla.

URBAN GOVERNMENT AND POPULATION. See Municipal Government.

URUGUAY, u'rōō-gwā. The smallest of the South American republics, with an area of 72,153 square miles and an estimated population (Dec. 31, 1928,) of 1,807,538. In 1908 the population was 1,042,686. The density increased from 12.9 per square mile in 1908 to 20.4 in 1928. Montevideo, the capital, had 458,633 inhabitants in 1928, as against 291,465 in 1908. Other large cities were: Paysandu, 26,000; Salto, 30,000; Mercedes, 23,000. Immigrants, chiefly seasonal agricultural laborers, came from Spain, Italy, Brazil, England, France, and Germany. In 1927 immigrants numbered 202,468 and emigrants, 183,386. The registration during the school year 1927 was 160,169 in the 1464 primary schools, as compared with 91,746 in the 976 schools of 1913. State expenditures on education amounted to 4,981,783 pesos in 1927 (par value of the peso is $1.034). Vocational training, in particular, is much more general. The University of Montevideo in 1927 had 2230 students.

Industry and Trade. Under the spur of an enlightened government policy, economic activity has shown great advances. A national agricultural college was formed, immigration was officially encouraged, and money was set aside annually, beginning with 1913, to furnish free seed to farmers. The area devoted to agriculture increased from 1,961,515 acres in 1908 to 2,681,613 in 1927. Production of wheat, corn, oats, and linseed, in particular, have shown an increase. Still, 20 per cent of the total imports continue to be food products, and cattle raising remained the leading pursuit, animals and animal products making up 95 per cent of the country's exports. About 60 per cent of the country is devoted to stock raising. In 1925 there were 8,431,613 head of cattle, 597,176 horses, 14,443,000 sheep, 17,500 mules, 18,800 goats, and 251,000 swine. The packing industry was rapidly being developed, and by 1927 upward of 31 plants were devoting themselves to chilling, salting, and canning meats. In 1921 there were altogether 3704 industrial establishments with 36,872 workmen. The state's interest in industrial affairs is evidenced by the passage of a child-labor law, the regulation of hours in industry, the creation of a national insurance bank (1912), an old-age-pension law (1919), etc. The Uruguayan quarries are becoming important, and granite, marble, and agate are being produced and exported. The foreign trade for the period 1912–29 showed a consistent advance, with a temporary set back in 1920–22, when the world-wide depression affected Uruguay too. Principal imports in 1927, in order of value, were foodstuffs, fuel, hardware, and textiles; principal exports, meat and extracts, wool, hides, agricultural produce, and live animals. Exports and imports in 1918 were valued at $139,481,000 and $121,161,000; in 1928, $104,138,036 and $96,447,638, respectively. The United States supplied 30.0 per cent of the imports in 1928 and purchased 10.2 per cent of the exports; the United Kingdom, 15.3 and 22.8; Germany, 11.5 and 14.7.

Finance. The estimated receipts and expenditures for the fiscal year 1928–29 totaled 55,066,351 and 57,986,674 pesos, respectively. In 1927–28 actual receipts totaled 59,986,427 pesos and expenditures 55,946,242 pesos. The 1914 receipts were 36,597,360 pesos; expenditures, 36,516,877. Deficits were frequent in recent years, that of 1921–22 being 7,000,000 pesos, and as much in 1922–23. On Dec. 31, 1922, the internal debt was 47,509,387 pesos (15,620,423 in 1913); foreign debt, 128,851,536 (118,487,935 in 1913); total, 178,603,923 pesos. On Dec. 31, 1928, the public debt stood at 213,999,318 pesos, representing a reduction of 5,431,600 pesos during the year. Payments on foreign debts, suspended during the War, were resumed in 1923. Notes in circulation on Oct. 31, 1928, totaled 63,403,766 pesos with a gold reserve of 53,510,020 pesos in all banks.

Communications. In 1928 there were 1757 miles of railway, of which 205 miles were state owned; the remainder was financed by British capital. There were some 700 miles of navigable waterways, largely on the Uruguay and Plate rivers. In 1927, 7684 steamers of 13,525,071 tons entered the ports of Uruguay.

History. The country's prosperity continued unhampered by internal dissension under the administrations of Feliciano Vieira (1915–19) and Baltasar Brum (1919–23). The sympathies of the people were with the Allies in the World War, and on Oct. 6, 1917, following the lead of the United States and Argentina, Uruguay broke relations with Germany. On Mar. 1, 1919, the new federal constitution was put into affect. By the new instrument, the executive power was divided between the President, popularly chosen for four years, who controlled the departments of the Interior, Foreign Affairs, Army and Navy, and a National Administrative Commission of nine popularly elected for six years, which controlled the departments of finance, education and industry, and public works. Minority representation was assured, based on plural voting. Congress retained the legislative power, elected the Supreme Court, passed on treaties, and was vested with the right of interpreting the constitution. Cabinet members might present bills as in England. Church and State were separated, and woman suffrage was provided for, subject to acceptance by a two-thirds majority of each House. Local autonomy was granted the 19 departments, each of which had its local government board and representative assembly. Under Presidents Brum and José Serrato, elected in 1923, progress was made in education and public works, and friendship with the United States was cemented by an increasing number of advanced students sent to American colleges. In December, 1920, United States Secretary of State Bainbridge Colby visited Uruguay.

As a representative of the American Continents, Uruguay was several times elected to a nonpermanent seat on the Council of the League of Nations. Treaties of obligatory arbitration were concluded with Venezuela and Spain. On Mar. 30, 1925, Uruguay signed a treaty with Brazil providing that neither country should permit its inhabitants to take part in internal disorders within the boundaries of the other. On Aug. 25, 1925, the centenary of the founding of the Republic was celebrated with much ceremony.

In 1926 Dr. Juan Campistegui, quite a prominent journalist belonging to the "Colorado" Party, was elected President. He began a four-year term on Mar. 1, 1927. He was the founder of the influential newspaper, *El Dia*, and had seen much service with the Government. In November, 1926, diplomatic relations with Cuba were broken off for a short time because of a statement purporting to come from the Uruguayan delegate to the League of Nations to the effect that Cuba's sovereignty was infringed by her relations with the United States. The difficulty, however, was soon satisfactorily adjusted.

UTAH. The tenth State in size (84,990 square miles) and the fortieth in population; capital, Salt Lake City. The population increased from 373,351 in 1910 to 449,396 in 1920, or by 20.4 per cent; estimated population, 1928, 331,000. The white population increased from 366,583 (1910) to 441,901 (1920). The Indians decreased in number from 3123 to 2711; Chinese, from 1305 to 1137; the number of Japanese increased from 2110 to 2956; of Negroes, from 1144 to 1446. The native white population showed an increase from 303,190 to 385,446, while the foreign-born white decreased from 63,393 to 56,455. Both urban and rural populations mounted; the former from 172,934 to 215,584; the latter from 200,417 to 233,812. The growth of the principal cities was as follows: Salt Lake City (q.v.), 92,777 in 1910 to 118,110 in 1920; Ogden, 25,580 to 32,804; Provo, 8925 to 10,303.

Agriculture. Farming made substantial progress in the decade 1910–20 and maintained it thereafter. The number of farms in Utah increased 18.4 per cent, or from 21,676 in 1910 to 25,662 in 1920 and made a farther slight increase to 25,992 in 1925; the total acreage in farms increased from 3,397,699 in 1910, to 5,050,410 in 1920, or by 48.6 per cent; it was 5,000,724 in 1925. The improved land in farms totaled 1,715,380 in 1925. The percentage of the total area used for agricultural purposes was 6.5 in 1910; 9.6 in 1920; 9.5 in 1925. The total value of farm property more than doubled, from $150,795,201 in 1910 to $311,274,728, but receded to $250,317,551 in 1925; the average value per farm was $6957 in 1910, $12,130 in 1920, and $9631 in 1925. In interpreting these values, the inflation of the currency incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 23,013 were operated by owners; 90, by managers; and 2889, by tenants. The comparative figures for 1910 were 19,762; 194; and 1720. White farmers in 1920 numbered 25,248, of whom 21,276 were native, 3972 were foreign born. There were 414 colored farmers, of whom 209 were Indians. In 1910 there were 21,400 white farmers; 15,948 were native; 5452 were foreign born. Farms reported as under mortgage were 9916 in 1920; 10,190 in 1925. The number of dairy cows in 1920 was 80,801; 71,330 in 1925; "beef" cows, 228,953 in 1920; 180,240 in 1925; sheep, 1,691,795 in 1920; 2,355,038 in 1925. The area under irrigation was 999,410 acres in 1909; the irrigated acreage was 1,371,651 in 1919. The estimated production of the principal farm crops in 1928 was as follows: Corn, 522,000 bushels; wheat, 6,861,000; oats, 2,475,000; barley, 1,666,000; potatoes, 3,312,000; hay, 1,500,000 tons; sugar beets, 623,000 short tons. Comparative figures for 1913 are corn, 340,000 bushels; wheat, 6,420,000; oats, 4,140,000; barley, 1,155,000; potatoes, 3,600,000; and hay, 909.000 tons. The apple crop amounted to 350,023 bushels in 1909; to 880,000 in 1928. The production of peaches increased from 143,237 bushels in 1909 to 612,000 in 1928.

Mining. Utah produces large amounts of minerals, among which the chief are coal, silver, lead, and copper, the last named being the most important. The progress of the mining industry is indicated by the table. In the total production of copper, Utah ranks second, being surpassed only by Arizona. In the production of silver, Utah is first among the States. (By the terms of the Pittman Act in 1918, silver was valued at $1 an ounce.) The State also produces gold to the value of nearly $4,000,000 a year, as well as zinc, clay, iron ore, and uranium and vanadium ores. In 1928, 38 mines produced 4,842,544 tons of coal, valued at $12,253,000. The total value of the mineral products in 1926 was $98,985,218, compared with $76,536,657 in 1920; $64,165,525 in 1919; $105,785,474 in 1918; and $45,636,198 in 1914.

PRODUCTION OF COAL, COPPER, LEAD, AND SILVER IN UTAH

Year	Coal Net tons	Copper Pounds	Lead Pounds	Silver Fine ounces
1914	3,103,036	152,034,002	171,323,137	11,154,916
1915	3,108,715	187,671,188	....	....
1916	3,567,428	240,275,222	201,490,075	13,253,037
1917	4,125,230	246,674,153	....	....
1918	5,136,825	227,169,630	167,008,224	13,455,597
1920	6,005,199	116,931,238	140,838,113	13,106,976
1921	4,078,784 [a]	30,891,403	89,187,269	....
1926	4,373,793	257,464,482	295,270,000	12,079,755

[a] Decreased production due chiefly to business depression.

Manufactures. Although not one of the chief manufacturing States, Utah has industries of great importance, chiefly related to the smelting and refining of metals. There were three cities in the State with more than 10,000 inhabitants in 1920. These contained 35.9 per cent of the total population, and reported 33.8 per cent of the value of Utah's manufactured products in 1919. There were 749 manufacturing establishments in the State in 1909; 1160 in 1919; 517 in 1925; and 556 in 1927. Wage earners in manufactories numbered 18,868 in 1919; 15,077 in 1925; and 13,585 in 1927. Capital invested amounted to $52,626,640 in 1909 and $140,785,034 in 1919. The value of manufactured products amounted to $61,989,277 in 1909; $156,933,071 in 1919; $177,224,538 in 1925; and $163,118,376 in 1927. The increase in the value of products evidenced in 1919 was due in great measure to altered values incident to the War, and cannot be taken as an index of the increase of manufactures between the years 1914 and 1919. Lead smelting is decidedly the most important industry in point of value, with a production valued at $13,170,000 in 1909; $27,518,000 in 1919; $45,482,711 in 1925, and $34,513,685 in 1927. The manufacture of beet sugar in 1919 furnished products totaling $518,000. The canning and preserving industry produced $10,127,554 in 1925, and $6,349,806 in 1927. The principal manufacturing cities are Salt Lake City and Ogden. There were 245 manufacturing establishments in Salt Lake City in 1909, with products valued at $13,351,000; 415 in 1919, with $33,357,000; the 1925 products totaled $32,589,000. There were 68 establishments in Ogden in 1909, with a product valued at $3713; 110 in 1914, with $6,014,000; and 128 in 1919, with $18,150,000.

Education. The educational system of Utah has always been among the best and most efficiently administered State systems. The Legislature has been diligent in passing necessary legislation; in successive legislative sessions, steps were taken toward further improvement. Among the measures affecting recent development is one providing for the appointment of a person to act as State high-school supervisor and also as supervisor of vocational education. While in other States it is common for the director of vocational education to be quite independent of the direction of the high-school supervisor, it is believed in Utah that the single appointment would have a tendency to coördinate the vocational with the regular work of the high school, making all phases of high-school education fit as perfectly as possible into a unified whole.

The Utah Legislature of 1921 made it possible for the State Board of Education to appoint a State primary supervisor, which greatly improved the work of the teachers and the schools. The Legislature of 1917 accepted the provisions of the Federal Smith-Hughes Law, designating the State Board of Education as the State board for vocational education; and, under this law, agricultural, trade, and industrial education, home economics, and teacher training were being carried on with excellent results. The compulsory-education law of the State requires attendance in school until the age of 18, unless the high-school course has been completed. The total enrollment in the public schools of the State in the academic year 1925–26 was 141,788; of this number, 110,695 represented enrollment in the kindergarten and elementary grades and 31,093, the high-school enrollment. Expenditure on the public day schools, 1925–26, was: current, $8,470,359; outlays, $1,542,535. The percentage of illiteracy in Utah decreased from 3.1 in 1910 to 2.5 in 1920: among the native white population, from 0.7 to 0.5 per cent; among the Negro, it decreased from 5.3 to 5; among the foreign-born, it increased from 5.9 to 6.5.

Finance. State expenditures in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $8,003,287 (of which $3,712,725 was aid to local education); for interest on debt, $457,633; for permanent improvements, $1,974,947; total, $10,435,867 (of which $2,645,779 was for highways, $860,832 being for maintenance and $1,784,947 for construction). Revenue was $11,062,291. Of this, property and special taxes formed 51.0 per cent; departmental earnings and charges for officers' services, 7.5 per cent; sales of licenses and taxation of cigarettes and gasoline, 22.1 per cent. Property valuation was $696,061,566; State taxation thereon, $5.244,841. Net funded State debt on June 30, 1927, was $6,594,750.

Political and Other Events. In the elections of 1914, Senator Smoot was a successful candidate for reëlection on the Republican ticket. In 1915 the Federal government sent Gen. Hugh L. Scott to Utah to adjust a situation which threatened to start an uprising of the Piute Indians. Conditions peculiar to an "open range" country were brought to a head by the alleged murder of a Mexican by an Indian and an attempt to arrest the Indian. In 1916 the Democrats elected practically all county officers, the entire State ticket, headed by Simon Bamberger for governor, the two Representatives in Congress, and William H. King as United States Senator. For President, Wilson received 84,025 votes; Hughes, 54,136. In 1920 the Republicans elected Charles R. Mabey governor. Senator Smoot was reëlected. In the presidential election, Harding received 81,555 votes; Cox, 56,639. In 1922 Senator King, Democrat, was reëlected, although the State generally went Republican and both Republican Congressmen were reëlected. George H. Dern, Democrat, was elected governor in 1924 and was reëlected in 1928. In 1924 the vote for President was: Coolidge, 77,327; Davis, 47,001; LaFollette, 32,662. In 1928 it was: Hoover, 94,618; Smith, 80,985. The State continued to have one Senator of each party, Smoot, Republican, being reëlected in 1926 and King, Democratic, also reëlected in 1928.

Legislation. The Legislature of 1915 enacted a State-wide prohibition law; this, however, was vetoed by the governor. A second law was enacted, modeled after the Webb-Kenyon Law and enforcing heavy penalties for its infraction. In 1917 the Legislature created a State budget system and a public-utilities commission, and passed workmen's-compensation, cold-storage, corrupt-practices, and the initiative-and-referendum acts, and it passed also a most stringent State-wide prohibition law, which went into effect in August, 1917.

An amendment providing for constitutional prohibition was proposed by the Legislature and was voted into the constitution in 1919. The Legislature of 1919 passed statutes defining and punishing criminal syndicalism and sabotage and created the State Securities Commission. In 1921 the Legislature passed bills remodeling the State government. In 1923 laws were passed allowing suspension of sentence on the conviction of any crime or offense in which suspension appeared to the court compatible with the public interest, the defendant in such a case to be put on probation. Provisions for city and county budget systems were enacted in 1925. Utah had entered into the seven-State Colorado River compact, and an effort to withdraw her assent to this document failed of achievement in the legislative session of 1927.

UTAH, University of. A coeducational State institution of higher education at Salt Lake City, Utah, founded in 1850. The student enrollment increased from 944 in 1914 to 2791 in 1928; the faculty from 80 to 184 members, and the library from 38,757 to 95,319 volumes. The income of the university during the same period was increased from $250,000 to $895,489. James McGregor of Terre Haute, Ind., gave $50,000 in 1918 to endow the School of Mines and Engineering, and in the following year a building for the medical school, a dining hall, Stewart Hall, and an observatory were built. President, George Thomas, Ph.D.

UTICA. A city of New York State. The population increased from 74,419 in 1910 to 94,156 in 1920, to 101,604 in 1925 (State Census), and to 104,200 in 1928 by estimate of the U. S. Bureau of the Census. In 1921 the city built a conduit for water and a roadway over the abandoned Erie Canal at a cost of approximately $150,000. The park system of the city also was expanded until in 1928 it embraced more than 600 acres. In 1924 construction of the Marcy division of the Utica State Hospital for the Insane was begun at a cost to the State of more than $10,000,000. In 1928 a new $275,000 municipal court and police building was erected. Utica manufactures a third of all the knitted underwear made in the United States, ranks first in New York in the production of cotton cloth, and is also an important centre for the manufacture of ventilating and heating apparatus, cotton yarn, sheets and pillow cases, and men's clothing. In 1927, 14,175 persons were employed in 191 industrial establishments and received $16,221,363 in wages; the value of products manufactured was $70,240,110. Hydroelectric power, which is developed at Trenton Falls, 15 miles north of the city, is distributed to points throughout the Eastern States. The assessed valuation of property in 1927 was $131,483,000; the net debt was $8,276,000.

V

VACUUM TUBES. See Radio Telegraphy.

VAIHINGER, vīhĭng-ẽr, Hans (1852–). A German philosophical critic (see Vol. XXII). He continued his professorship of philosophy and pedagogy at the University of Halle. His later works include *Nietzche als Philosoph* (1916); *The Philosophy of "As if"* (Eng. trans., 1924); *Der Mythus und das Als Ob* (1927).

VAIL, Theodore Newton (1845–1920). An American capitalist (see Vol. XXII). When the telegraph and telephone systems were taken over by the Government in 1918, the Postmaster General appointed him as adviser, and when private operation was resumed in 1919, he was made chairman of the board of directors of the American Telephone and Telegraph Company. He died in Baltimore in 1920, leaving an estate of about $2,000,000.

VALDEMARAS, Augustinas (1883–). A Prime Minister of Lithuania. A prominent member of the Nationalist Party and known as a scholar and writer, he was virtual dictator of Lithuania from November, 1926, when he ascended to power through a military *coup d'etat,* until September, 1929. During this period, he held both the Premiership and the portfolio for Foreign Affairs. He dealt severely with the Communists, executing a number, and quickly suppressed a popular rising at Tauroggen in September, 1927. His conciliatory attitude toward Poland alienated a section of the army and in October, 1927, he with difficulty survived a cabinet crisis. The ensuing month, following representations from the League of nations, he met Marshal Pilsudski and Foreign Minister Zalewski of Poland at Geneva and ended the technical state of war which had existed between the two countries since 1920. See Poland and Lithuania, under *History.* An attempt was made to assassinate him in the spring of 1929 and further repressive measures were taken against the opposition elements. Notwithstanding these, he was forced to resign the following September.

VALENTINER, vä′len-tēn′ẽr, Wilhelm Reinhold (1880–). A German art historian (see Vol. XXII). In Germany at the outbreak of the World War, he enlisted in the army and took part in the entire struggle. On the entry of the United States into the War, he resigned his position as curator of decorative art in the Metropolitan Museum of New York City. Following the War, he frequently visited the United States and became European adviser to the Detroit Museum. He wrote catalogues of important American collections, such as the Johnson and Widener in Philadelphia and that of Henry Goldman in New York (1922). His later works included *Rembrandt van Rijn: Wiederfundene Gemälde* (Stuttgart, 1921).

VALÈRY, Paul (Ambroise) (1871–). A French poet and philosopher who was elected to the French Academy to succeed Anatole France in 1925. A disciple of Mallarmé, laying stress on the form, sounds, and music of his poems and prose, who was called the poet of the intellectuals. He wrote *Introduction à la méthode de Léonard de Vinci,* whom he admired greatly (1894), and after 23 years of inaction, *La jeune parque,* poems which he called exercises (1917); *La soirée avec M. Teste,* prose (1919); *Album de vers anciens* (1920); *Le Cimetière marin* (1920); *Le Serpent* (1922, tr. 1924); *Charmes* (1922); *Eupalinos; ou, L'architecte,* preceded by *L'âme et la danse,* plays (1923); *Variété,* essays (1924, tr. 1927); *Une conquête méthodique* (1924), and *Poésie,* a discussion of poetics (1928). Consult *Paul Valéry,* by Alfred Thibaudet (1923); *M. Paul Valéry et la tradition poétique française,* by Alfred Droin (1924); and *Paul Valéry, philosophe de la danse,* by André Levinson (1927).

VALETTE, Mme. Alfred. See Rachilde.

VALLÉE POUSSIN, Charles de la (1866–). A Belgian professor of analytical mechanics on the faculty of the University of Louvain. He was a member of the executive committee of the International Research Council and in 1929 was elected a foreign associate of the National Academy of Sciences (American). His works include *Cours d'analyse infinitésimale* (1903–06), and *Leçons sur l'approximation des fonctions d'une variable reélle professées à la Sorbonne* (1919).

VALLE-INCLÁN, Ramón del (1870–). A Spanish poet and novelist. He is acclaimed by some critics as Spain's most skillful lyricist. In prose, he is an exquisite stylist. Among his most important works are *Las mieles del rosal* (1910); *La media noche: Visión estelar de un momento de guerra* (1917); the novels *Flor de santidad, historia milenaria* (1913); *Sonata de estío: memorias del marqués de Bradomín* (1913); and *Sonata de invierno: memorias del marqués de Bradomín* (1913); and the plays *El embrujado, tragedia de tierra de salnes* (1913); *La marquesa Rosalinda, farsa sentimental y grotesca* (1913); and *Romance de lobos: o, Comedia bárbara* (1915).

VANCOUVER. The metropolis of western Canada and the third city in size in the Dominion. The population in 1928 was estimated to be 250,000. The population of the metropolitan area, including Vancouver, Point Grey, and South Vancouver (which became one civic unit Jan. 1, 1929), North Vancouver, West Vancouver, Burnaby, and New Westminster, was 344,160. Of the estimated 600,000 population for the Province of British Columbia, more than half resided in Greater Vancouver. The city is the most important Canadian port in shipping tonnage. The total foreign trade, including lumber, handled through this port in 1928 amounted to 5,602,000 tons; the trade outward was 4,302,000 tons, the trade inward, 1,300,000 tons. During 1928, 21,806 vessels of 11,644,000 net tons entered the port and 1337 vessels of 4,695,000 net tons were cleared. The port of Vancouver owes its development largely to the growth in grain shipments. A trial shipment of 100,000 bushels in 1917 through the Panama Canal showed that grain could be shipped through the tropics without deterioration. The commerce in grain grew from practically nil in 1917 to 97,394,934 bushels in 1928. The capacity of the grain elevators in 1928 was 10,400,000 bushels with 13 loading berths. The water frontage of the harbor was 98 miles.

Between 1923 and 1925, a second Narrows Bridge over Burrard Inlet, connecting Vancouver and North Vancouver and carrying both railway and highway traffic, was constructed at a cost of $1,800,000. In 1928 the City Council of Vancouver approved plans for the construction of a combined vehicle and railroad bridge within the business district to cost approximately $3,180,000. The plans called for a double-track structure, the upper deck to be used for pedestrian and vehicular traffic and the lower one for a four-track railroad. In 1929 the Canadian Pacific Railway began the elimination of seven grade crossings in the city and rerouted its English Bay branch by constructing a tunnel beneath the downtown streets of Vancouver at a cost of $1,720,000. The same year, the taxpayers of Vancouver approved a $5,500,000 municipal-improvement programme which provided for the extension of sewers and water mains, construction of schools and buildings, and improvement of streets. Industrial undertakings included the construction of extensions to power plants, gas plants, lighting systems, and street-car tracks at a total cost of $5,100,000. In 1928, 15,000 persons were employed in 1500 industrial establishments whose capital investment was $85,000,000. Bank clearings amounted to $1,110,000,000, and building permits to $20,000,000. The assessed valuation of property in 1928 was $232,335,046.

VANDERBILT, CORNELIUS, III (1873–). An American capitalist, born in New York City, and educated at Yale University. He was a director in many important financial institutions in New York and elsewhere. He was for many years connected with the State Militia of New York and in 1917 was commissioned colonel in command of the 102d United States Engineers, with which regiment he served in France. In 1918 he was commissioned brigadier general in the National Army and later brigadier general in the Officers' Reserve Corps.

VANDERBILT UNIVERSITY. A nonsectarian coeducational institution at Nashville, Tenn., founded in 1873. The student enrollment increased from 1112 in 1914 to 1404 in 1928. The number of members in the faculty likewise increased during the same period from 125 to 180, and the library from 53,000 to 144,000 volumes. Productive funds in 1928 amounted to $9,000,000, the annual income to approximately $800,000, and the value of university property to $5,650,000. In 1918, $1,000,000 was added to endowment, of which $725,000 came from the Vanderbilt family and the General Education Board. In 1919 the General Education Board gave $4,000,000 for the school of medicine, to be followed in 1921 by an additional appropriation of $1,500,000 from the same source, and a like amount from the Carnegie Corporation. These gifts were for the purpose of building a new medical plant on the main campus of the university and for reorganizing the school of medicine. These buildings were opened in 1925, as were Alumni Memorial Hall and the G. N. Neely Memorial Chapel. Chancellor, James H. Kirkland, Ph.D., D.C.L., LL.D.

VANDERLIP, FRANK ARTHUR (1864–). An American financier and writer (see VOL. XXIII). During the World War, he was chairman of the War Savings Committee. In 1920 he visited Japan and on his return wrote many articles in regard to Japanese-American relations. Also in 1920, his book, *What Happened to Europe*, appeared. This was followed by *What Next in Europe* (1922). In 1924 he organized the Citizens' Federal Research Bureau to investigate graft in government circles and took out a $1,000,000 insurance policy on his life in its favor. He received the honorary degree of LL.D. from Princeton in 1919 and was decorated by several European governments.

VAN DOREN, CARL (1885–). An American editor and author, born at Hope, Ill., and educated at the University of Illinois and Columbia University. After several years on the faculty of the University of Illinois, he was appointed instructor in English at Columbia in 1911 and became assistant professor in 1914 and associate in English in 1916. From that year to 1919, he was headmaster of the Brearley School and, from 1919 to 1922, was literary editor of the *Nation*. He was on the staff of the *Century Magazine*, 1922–25. Since 1926 he has been an editor of the Literary Guild of America. Besides editing selections from the works of American writers, he wrote *The Life of Thomas Love Peacock* (1911); *The American Novel* (1921); *Contemporary American Novelists* (1922); *The Roving Critic* (1923); *Many Minds* (1924); *James Branch Cabell* (1925); *Other Provinces* (1925); *American and British Literature Since 1890*, with Mark Van Doren (1925); *The Ninth Wave* (1926).

VAN DOREN, MARK (1894–). An American literary critic. He was born at Hope, Ill. (a younger brother of Carl Van Doren), was graduated at the University of Illinois, and received the Ph.D. degree from Columbia in 1920. He has been assistant professor of English at Columbia and literary editor of the *Nation*. His writings include: *Henry David Thoreau—a Critical Study* (1916); *Poetry of John Dryden* (1920); *Spring Thunder and Other Poems* (1924); *American and British Literature since 1890* (with Carl Van Doren, 1925); *Seven P. M. and Other Poems* (1926); *Edwin Arlington Robinson* (1927); and *Now the Sky* (1928).

VAN DYKE, HENRY (1852–). An American author and diplomat (see VOL. XXIII). He resigned his post as United States Minister to the Netherlands and Luxemburg in 1917, and when America entered the World War he served as a chaplain in the Navy. His later books include *Fighting for Peace* (1917); *The Red Flower* (1917); *The Valley of Vision* (1919); *Golden Stars* (1919); *Camp Fires and Guide Posts* (1921); *Companionable Books* (1922); *Six Days of the Week* (1924); *Half-Told Tales* (1925); *The Golden Key* (1926); *Chosen Poems* (1927); *Even Unto Bethlehem* (1928); *The Man Behind the Book* (1929).

VAN DYKE, JOHN CHARLES (1856–). An American art historian (see VOL. XXIII). After 1914 he published a large number of critical handbooks of the great European galleries, with original and stimulating comments on the paintings. His publications include also *American Painting and Its Tradition* (1919); *Grand Canyon of the Colorado* (1920); *The Open Spaces* (1922); and *Rembrandt and His School* (1923). In the last, he endeavors to prove that only about 50 of the thousand pictures which he claims are ascribed to Rembrandt are genuine; the remainder, according to his theory, are by pupils of Rembrandt. For example, of the many Rembrandts in the Metropolitan Museum, New York City, not one is genuine, Van Dyke believes. This book made a great sensation, but its conclusions were not generally accepted. He also wrote *The Meadows* (1926) and *The Rembrandt Drawings and Etchings* (1927).

VAN DYKE, PAUL (1859–). An American historian and university professor (see VOL. XXIII). While continuing in his Princeton professorship of modern European history, Dr. Van Dyke served as secretary of the American University Union at Paris and as lecturer for the Y. M. C. A. during the World War. In 1921–23 he was director of the American University Union in Paris. He has written biographies of *Catherine de Medici* (1923); *Ignatius Loyola* (1926); and *The Story of France* (1928).

VANE, SUTTON (1888–). An English dramatist. During the World War, he served in Egypt, was shell-shocked, and was invalided home in 1917. After producing several unsuccessful plays, he wrote *Outward Bound* (1923). Its success was instant. The play was produced in London and New York during 1924. His other plays include *Falling Leaves* (1924) and *Overture* (1925).

VANGEON, HENRI-LÉON. See GHÉON, HENRI.

VAN GORDON, CYRENA (1893–). An American dramatic mezzo-soprano, born at Camden, Ohio. After completing her studies under Louise Dotti at the Cincinnati College of Music, she made her début with the Chicago Opera Association as Amneris in *Aïda* (Nov. 23, 1913) with such success that she was engaged as a regular member. She then became one of the principal stars of the company. A splendid singer and superb actress, she is equally convincing in German, French, and Italian rôles. Her Wagnerian repertoire is especially varied, including Venus, Ortrud, Brangäne, Erda, Flosshilde, Fricka, and Brünnhilde (*Walküre*). In 1912 she married Dr. Shirley B. Munns.

VAN HOOGSTRATEN, WILLEM (1884–). A Dutch conductor, born at Utrecht. For six years, he studied the violin under Eldering at the Cologne Conservatory, at the same time playing in the Gürzenich Orchestra under such conductors as Steinbach, Nikisch, and Mahler. After further study under O. Sevčik at Prague, he began his career as a virtuoso, making tours of Germany. A most successful début as conductor, in Hamburg, was followed by appearances as guest-conductor in other German cities, in Sweden, and in Holland. From 1914 to 1917, he was conductor of the Städtisches Orchester in Crefeld, where he also formed a trio with his wife, Elly Ney, whom he had married in 1911, and Fritz Reiss ('cello). At his American début with the Philharmonic Society (New York, Jan, 2, 1922), in an all-Brahms programme, he made a deep impression, which was even heightened at his second concert two weeks later. As a result, he was engaged to conduct the second half of the society's summer concerts at the Stadium of the College of the City of New York in 1922, when his brilliant performances attracted record audiences. The following summer, as sole conductor of the series, he repeated his triumphs. In the fall of 1923, he appeared as regular conductor of the winter series, succeeding Stransky, and alternating with Mengelberg. In 1925 he became conductor of the Portland (Oreg.) Symphony Orchestra, at the same time retaining his position as principal conductor of the summer concerts of the New York Philharmonic Society.

VAN LOON, HENDRIK WILLEM (1882–). An American author and lecturer, born at Rotterdam, Holland, and educated at Cornell, Harvard, and Munich universities. During the revolution in Russia, in 1906, he went to Moscow, St. Petersburg, and Warsaw as war correspondent. He lectured on history at several universities in the United States from 1911 to 1914. When the World War broke out, he went to Belgium and reported the siege of Antwerp for the Associated Press. The Germans expelled him from Belgium in December, 1914. He lectured on modern European history at Cornell during 1915 and 1916 and later held the chair of history at Antioch College (1922–23). He wrote: *The Fall of the Dutch Republic* (1913); *The Rise of the Dutch Kingdom* (1915); *The Golden Book of the Dutch Navigators* (1916); *A Short History of Discovery* (1918); *Ancient Man* (1920); *The Story of Mankind* (1921); *The Story of the Bible* (1923); *Tolerance* (1925); *America* (1927); *Peter Stuyvesant and His Times* (1928); *Man, the Miracle Maker* (1928).

VAN PELT, JOHN VREDENBURG (1874–). An American architect, born in New Orleans. He studied art and technical education in Paris and, from 1897 to 1900, was assistant professor of architecture at Cornell University. After several years spent in travel abroad, he was professor of design and dean of the College of Architecture at Cornell (1902–04). After 1904 he practiced in New York. From 1904 to 1913, he was associate director of the Atelier of Columbia University, and from 1914 to 1917, professor of architecture at the University of Pennsylvania. From 1923 to 1927, he was in charge of the Columbia University extension studios in architecture. He received many medals for the excellence of his designs and plans and was the author of *Essentials of Composition as Applied to Art* (1902).

VAN VECHTEN, CARL (1880–). An American author, born at Cedar Rapids, Iowa, and educated at the University of Chicago. He became assistant musical critic of the *New York Times* in 1906 and that newspaper's Paris correspondent in 1908. He edited the programme notes of the Symphony Society of New York (1910–11) and was dramatic critic for the New York *Press* (1913–14). He wrote: *Music After the Great War* (1915); *Music and Bad Manners* (1916); *Interpreters and Interpretations* (1917); *The Merry-Go-Round* (1918); *The Music of Spain* (1918); *In the Garret* (1920); *The Tiger in the House* (1920); *Lord of the Housetops* (1921); *Peter Whiffle, His Life and Works* (1922); *The Blind Bow-Boy* (1923); *The Tattooed Countess* (1924); *Red* (1925); *Firecrackers* (1925); *Excavations* (1926); *Nigger Heaven* (1926); *Spider Boy* (1928).

VAN VLIET, CORNELIUS (1886–). An American 'cellist, born at Rotterdam, Holland. At the age of six, he received his first instruction on the piano and the violin from his father. In 1895 he began to study the 'cello with O. Eberle in Rotterdam and later continued with J. Mossel in Amsterdam. In 1901 he joined the Concertgebouw Orchestra in Amsterdam. In 1903 he was solo 'cellist of the Leipzig Philharmonic Orchestra; in 1904, of the Prague Philharmonic Orchestra; and in 1905, of the Helsingfors Symphony Orchestra. He also taught in Helsingfors, at the conservatory. From 1905 to 1908, he was solo 'cellist of the Kaim Orchestra in Munich and in 1908–11, of the Royal Opera in Vienna. In 1911 he came to America on a concert tour. From 1912 to 1919, he was solo 'cellist of the Minneapolis Symphony Orchestra and a member of the Minneapolis Trio. He then moved to New York, where from 1921 to 1929, he was solo 'cellist of the Philharmonic Society, jointly with Leo Schulz. In 1919 he formed, with Scipione Guidi (violin) and Clarence Adler (piano), and New York Trio.

VAQUEZ, Louis Henri (1860–). A French physician, known especially in connection with diseases of the heart, circulation, and blood. Several years after his graduation from the University of Paris, he described a new disease of the blood, polycythemia, known also as Vaquez's disease. He became professor of clinical therapeutics, Paris Faculty of Medicine. One of his earliest publications was *Hygiène des Maladies du Cœur.* With the exception of his *Précis de Thérapeutique* (1907), all his major works have been concerned with heart disease: *Les Arythmiés* (1911); *Le Cœur et l'Aorte,* on radiology of the heart, in collaboration with Bordet (1913); *Radiologie des Vaisseaux de la Base du Cœur,* also with Bordet (1920); *Maladies du Cœur* (1921); *Appareil Circulatoire,* in collaboration (1922); *Médicaments et médications cardiaques* (1925); and *Les troubles du rhythme cardiaque* (with Donzelot, 1926). His work on radiology of the heart also appeared in English translation. Vaquez is editor of the periodical, *Archives des Maladies du Cœur.*

VARIATION. See Heredity.

VASSAR COLLEGE. A nonsectarian institution for the higher education of women at Poughkeepsie, N. Y., founded in 1861. The student enrollment in 1914 was 1120, as compared with 1155 in 1928; the faculty numbered 121 at the beginning of this period and 152 at the close; the library was increased from 86,000 to 156,000 volumes; and the productive funds of the college reached $6,884,056 from $1,655,257. New admission requirements were adopted in 1919 to replace the old method of admission by certificate from approved schools and colleges. The new requirements took the form of comprehensive examinations in four general subjects, as well as a satisfactory school record of the candidate, and could be replaced at will by the old examinations in individual subjects. Alumnæ House, a club and meeting place for both educational and social purposes, was opened in 1923. Cushing Hall, a dormitory named in honor of Florence M. Cushing of Boston, Kendrick House, for women members of the Faculty, a nursery school, and the Minnie Cumnock Blodgett Hall of Euthenics, were opened in 1927 and 1928. In the latter year, a new curriculum was adopted which (1) diminishes and limits, ordinarily to the first year, the fixed requirements; (2) helps the student in her first years to find a purpose; (3) helps her to develop her field of major interest. President, Henry Noble McCracken, Ph.D., L.H.D., LL.D.

VATICAN. See Roman Catholic Church.

VATICAN CITY. A sovereign state, officially known as the State of Vatican City, established within the city of Rome as the seat of the Papacy under the terms of the political treaty signed between the Italian Government and the Vatican on Feb. 11, 1929, and ratified by the Italian Parliament in May. Vatican City came into existence June 10 with the exchange of ratifications. Ruler, Pope Pius XI (Achilles Ratti).

Vatican City has an area of 108.7 acres. It embraces St. Peter's Church and Piazza, the Vatican with its administrative buildings, gardens, and observatory, and adjoining territory mostly in the rear of these establishments. A census in 1929 showed 518 legal subjects, including 389 Italians, 118 Swiss (100 of whom were members of the Swiss Guard), 11 Frenchmen, five Germans, two Spaniards, a Norwegian, an American, an Austrian, a Netherlander, and an Ethiopian. Citizens include all those having permanent residence there and the cardinals residing in Rome.

The State of Vatican City exercises all the prerogatives of a sovereign state, having separate coinage and postal systems and direct telegraphic, telephonic, and wireless communication with other foreign states (see under Lateran Treaty). Flying machines of Italy and other states are prohibited from passing over the Vatican territory. Vatican City high officials and cardinals are granted diplomatic immunity and the inviolability of the Pope is enforced by the Italian Government. The territory contains a railway station and a track 600 meters long connecting with the Italian State Railways.

Government. Under the fundamental law, which became effective June 10, 1929, all executive, legislative, and judicial powers are vested in "the Supreme Pontiff as sovereign of the State of Vatican City." Some of his powers are delegated to the Governor of Vatican City, the Papal Secretary of State, and others. The Sacred College of Cardinals exercises virtually no authority except in the period between the death of a Pope and the election of his successor. A legislative measure adopted during the interregnum by the cardinals, to be valid, must be ratified by the new Pope.

An appointive court tries civil cases in Vatican City territory. Cases may be appealed to the sacred tribunal of the Rota and, as a final judicial resort, to the Supreme Tribunal Segnatura. A court of one or more judges appointed by the Governor of Vatican City tries all penal cases. The constitution provides also that persons may appeal to the Pope through the Councilor General of State for redress of injuries suffered by reason of administrative acts of Vatican City authorities. The Pope exercises the sole pardoning power. The legal system is based on canon law and pontifical constitutions and rules.

The fundamental law represents a modification of the former governmental system of the Papal Curia in line with its changed status under the Lateran Treaty. With the exception of St. Peter's Piazza, which remains open to the public and under the jurisdiction of the Italian authorities, Vatican City is policed by the Pontifical Gendarmerie Corps. The acquisition or sale of goods or foodstuffs within its boundaries is a state monopoly and duties are imposed on goods imported and exported.

The chief officials of Vatican City in 1929 were Commendatore Serafini, the governor, who is assisted by a treasurer and secretary general; Professor Francesco Pacelli, general councilor; Monsignor Pizzardo, secretary of the Congregation of Extraordinary Ecclesiastical Affairs; and Monsignor Antonio Sabatucci, auditor general of apostolic revenues. Other officials of the Roman Curia previous to the Lateran settlement, including Cardinal Gasparri, Secretary of State, retain their posts.

Finances. Treasury officials estimate that the expenditures of the State of Vatican City will slightly exceed those of the Vatican under its former status. With the interest from the indemnity of 750,000,000 lire cash and 1,000,000,000 lire in Italian 5 per cent bonds paid by the Italian Government, surpluses from the Vatican City financial operations are expected to be even greater than before.

In 1928 the Vatican received an income of $13,500,000 from "Peter's pence," fiscal dues, private offerings, and other sources. Since 1917 the average ordinary expenditures have not exceeded $1,400,000 (7,000,000 lire) annually, dispensed (in lire) chiefly as follows:

Entertainment of cardinals and diplomats	500,000
Administration of Vatican, Lateran palaces, and Villa Castel Gandolfo	2,500,000
Charities and school subsidies	1,500,000
Presents and extraordinary aid	1,500,000
Miscellaneous	1,000,000

The greatest expense is incurred in connection with the maintenance of the Swiss Guard of 100 members and the gendarmerie of 120. Two volunteer corps, the Noble Guard and the Palatine Guard, bring the total force of the Papal Army to 598 men and officers. There is no public or state debt.

History. The State of Vatican City concluded with Prussia on June 14, 1929, its first treaty with a foreign state other than Italy. On June 25, 1929, the Pope, as sovereign of Vatican City, received the credentials of the Italian Ambassador, Senator Cesare Maria de Vecchi, the first diplomat accredited to the new state. The first arrest was that of a Norwegian subject, Ramstad Margaret Gudum, who was charged with attempting to shoot one of the canons of St. Peter's, Archbishop John Smit, on Nov. 25, 1929. On December 5, King Victor Emmanuel and Queen Elena of Italy paid an official visit to the Pope.

One of the first controversies involving the new state arose when the authorities of the British Crown Colony of Malta refused to issue a passport to a monk ordered to Sicily by the Italian superior of his monastery, on the ground that he was a British subject who was being sent away against his wishes and for political reasons. Cardinal Gasparri addressed a formal protest to Lord Strickland of Sizergh, the British Prime Minister of Malta. The latter's sharp reply, accusing Roman Catholic prelates of Malta of attempting to undermine British authority on the island, led to a discussion of the matter in the British House of Commons. Negotiations for the settlement of the difficulty by treaty were then undertaken.

Opposing views as to the extent of the sovereignty of Vatican City were expressed by Mussolini and the Pope while the Lateran treaties were before the Chamber of Deputies.

On Nov. 4, 1929, the *Osservatore Romano,* official organ of the Vatican, transferred its offices to quarters within the Vatican City. Extensive alterations and improvements on Vatican City property were commenced in 1929. See Lateran Treaty; Italy, under *History,* and Roman Catholic Church.

VAUGHN, Samuel Jesse (1877–). An American college president, born in Elkton, Mo., and educated at Drury College, Mo., and the University of Chicago. He was director of industrial education at several schools in Illinois until 1921, when he was chosen president of Hardin College, where he remained six years. Since 1926 he has been president of Colorado Women's College. Since 1914 he has been editor of the *Industrial Arts Magazine.* During the World War, he served in the Sanitary Corps. He is the author of *Content and Methods of the Industrial Arts* (1922). He lectured much on educational, social, and economic problems.

VEATCH, Arthur Clifford (1878–). An American geologist, born at Evansville, Ind., and educated at Indiana, Cornell, and Wisconsin universities. He was assistant State geologist of Louisiana (1898–1900). In 1902 he became assistant geologist with the United States Geological Survey and, from 1906 to 1910, held the rank of geologist. He took charge of the foreign petroleum developments of S. Pearson & Sons of London in 1912. During 1919 he became connected with the Sinclair Consolidated Oil Corporation, in charge of the exploration department, at the same time serving as consulting petroleum technologist to the U. S. Bureau of Mines.

VEBLEN, Thorstein B. (1857–1929). An American economist (see Vol. XXIII). In 1918 he became a teacher at the New School for Social Research in New York City, retiring in 1927 to devote his time to translations and essay writing. Among his later publications are *An Inquiry into the Nature of Peace and the Terms of Its Perpetuation* (1917); *The Higher Learning in America* (1918); *The Vested Interests* (1919); *The Place of Science in Modern Civilization and Other Papers* (1920); *The Engineer and the Price System* (1921); *Absentee Ownership and Business Enterprise in Recent Times* (1923). He translated *The Laxdœla Saga* (1925).

VENETIA JULIA. See Fiume-Adriatic Controversy.

VENEZUELA, vĕn′ē-zwē′lȧ. A republic on the north coast of South America with an estimated area of 393,874 square miles. The census of December, 1926, gave the population as 3,026,878; in 1928 it was estimated at 3,124,421. In 1928 the gain from immigration was only 438. Populations of the important towns in 1926 were: Carácas, the capital, 135,253; Maracaibo, 74,767; Valencia, 36,804; Barquisimeto, 23,109; San Cristobal, 15,295. On Jan 17, 1929, Cumana, a seaport of 25,000 inhabitants and the oldest city on the South American continent, was partially destroyed by a severe earthquake. After 1913 great administrative activity in the field of education was evident; in 1914 primary education was made free and compulsory; in 1915 vocational and art schools were provided for; in 1916 schools of pharmacy and dentistry were established. At Caracas, the Central University was reopened in 1922 after a lapse of 10 years. In 1927 there were 70.151 pupils registered in the government primary schools, 14,487 in private schools, 9648 in municipal schools, and 9689 in State primary schools.

Industry. Agricultural, pastoral, and woodland products and petroleum are the leading factors in the country's economic life. Coffee is first in importance, with some 500,000 acres under cultivation in 1928 on 33,000 plantations, with an average annual production of 69,000,000 kilos valued at $30,000,000. The annual production of cocoa is about 20,000 metric tons; of sugar about 60,000. Cattle, sheep, and goat raising remain important, and in the years 1915–22, the herds and flocks showed increases. The annual crop of cotton is about 20,000 bales. Gold, petroleum, copper, salt, and asphalt are the leading mineral resources. From leases, etc., the Government derived an annual revenue of some 3,400,000 bolivars in royalties. In later years, petroleum was mined in increasing quantities. The oil wells, principally in the Maracaibo district are worked by American and British interests. In 1923 the production of petroleum was 4,201,000 barrels; for the fiscal year 1927–28, this had increased to 107,235,094 barrels, making Venezuela second in the world as an oil producer. Gold production has increased considerably since 1925; 51,472 ounces were mined in 1927. Imports and exports in 1923 were valued at $17,731,000 and $28,985,000; similar figures for 1927–28 were $69,184,577 and $98,103,683. The large increase was due in a considerable measure to the discovery and exploitation of the oil wells. In 1927 the United States supplied more than 50 per cent of Venezuela's imports ($36,056,000), and purchased about one-quarter of her total exports.

Finance. In 1914 revenues were 67,414,974 bolivars; expenditures, 72,278,987. In 1928–29 expenditures were 195,450,000 bolivars ($37,721,850) and revenues 204,345,961 bolivars ($39,438,770). The budget for 1929–30 calls for revenues of 193,189,750 bolivars and expenditures of 192,450,000 bolivars. In January, 1914, the internal debt amounted to 61,607,179 bolivars. In December, 1923, it had been reduced to 41,603,245 bolivars. Similarly, in 1914 the foreign debt was 114,853,071 bolivars; in 1923, 67,122,880. By August, 1929, the external debt had been reduced to 29,249,417 bolivars (about $5,600,00). On the same date, the current internal debt of Venezuela amounted to 28,735,884 bolivars, or about the same amount as the foreign debt. On Dec. 31, 1925, the Treasury reserves amounted to 74,000,000 bolivars. In 1925 notes in circulation were 33,600,000 bolivars.

Communications. In 1927, 660 miles of railway were in operation, a gain of 120 miles over 1914. The number of vessels with cargo entering Venezuelan ports in foreign trade in 1926 was 1963 of a capacity of 2,460,000 net registered tons. Clearances of vessels with cargo were 3797 of a capacity of 4,720,000 tons, the marked difference, as compared with entrances, being largely due to the outgoing movement of petroleum. There are 11,160 miles of navigable rivers and lakes, 6244 miles of telegraph line, and 359 post offices.

History. After 1914 internal affairs remained orderly. The chief concerns of the Government were the readjustments necessary to meet war conditions. Venezuela maintained her neutrality throughout the World War and on Mar. 3, 1920, joined the League of Nations. Gen. Juan Vicente Gómez continued as President holding the office uninterruptedly since 1909, although for a time he relinquished the post to a provisional President to act as commander-in-chief. In 1922 he was reëlected for the next seven years' term. The long-standing boundary dispute with Colombia was, as a result of a convention signed in 1916, first submitted to the Swiss President as arbiter, and then to the Swiss Federal Council. On Mar. 24, 1922, it was announced that a decision had been reached, although the terms were not made public. On June 30, 1923, the first Vice President of the Republic, Juan C. Gómez, brother of the President, was murdered in the palace at Caracas, as a protest against the nepotism practiced by the administration. On the other hand, in justification of the Gómez régime, it was pointed out that the country remained peaceful, foreign capital was steadily being invested in the oil fields, the public debt was reduced, and the bolivar consistently remained at par. As for the debt, the figures indicated that the diplomatic debt of 1905, which amounted to £5,229,700 originally, had been reduced to £2,794,380 by 1922.

On July 1, 1925, a new constitution became effective, superseding that promulgated three years before. It provided for a Congress of two Houses, members of each of which were elected for three years, and for a President to be elected by Congress for a seven-year term. Under the strong hand of General Gómez, the country for the most part continued quiet, although a certain restiveness was at times apparent under the surface. In April, 1928, it broke out in open revolt, which was soon suppressed. Throughout the first months of 1929, revolutionary movements were continually being reported, but the rumors were consistently denied by the Government, which insisted that perfect order was being maintained throughout the country. When his seven-year term as President expired in the spring of 1929, General Gómez was unanimously reëlected by Congress, May 3, 1929, but most unexpectedly, refused the office. When he persisted in his refusal, Congress created for him the position of commander-in-chief of the army and chose as President, on May 30, Juan Bautista Pérez, Chief Justice of the High Court of Cassation. The most notable development in Venezuela was the swift rise of petroleum production, giving the country a prominent rank among the world's leading producers.

VENICE. A seaport of Italy and capital of the province of the same name. The population in 1928 was estimated to be 253,608. To help relieve the city's great congestion, the Italian government in 1926 incorporated in Greater Venice the five mainland townships of Mestre, Fusina, Chirignago, Favoro Veneta, and Zellarino. The aggregate area of these towns is twice as large as that of Venice. The construction of the new port at Marghera on the mainland is restoring Venice's commercial prestige. Access to the port is by the Victor Emanuel III Channel, a direct prolongation of the Guidecea Canal. This channel, which was finished in 1922, is 4100 meters (4383.8 yards) long, 40 meters (131.2 feet) wide, and 10 meters (32.8 feet) deep. The port has been under construction since 1918 and comprises a series of large jetties, or piers in parallel lines, each 1000 meters (1093.6 yards) in length and 220 meters (721.7 feet) in breadth. It covers a total area of 3½ square kilometers (1.3 square miles), with 10,000 lineal meters (10,936 yards) of quayage which will suffice for an annual traffic of 8,000,000 to 10,000,000 tons. The industrial zones, which have been reclaimed as a result of the dredging of the channels and the basins, extend to the north, south, and west of the port. Each zone occupies an area of approximately 3 square kilometers (1.15 square miles). In 1928 more than 40 manufactories had been established in these zones, and 35 others were either under construction or were planned. Beyond the industrial zones is the residential district, which has been laid out in the form of a garden city for the accommodation of a population of 30,000. A necessary sequel to the construction of the port at Marghera has been the improvement of the entrance channel from the Lido to the port of Venice, providing for a depth of 11 meters (36 feet) and a width of 150 meters (492.1 feet). In 1927, 3465 vessels of 3,418,226 tons entered the port of Venice and 3467 vessels of 3,410,812 tons were cleared. Saint Elena, on an island near the Lido, is another suburb which has been developed since the War, as a result of the city's need for expansion. In 1928 it had 5000 inhabitants, representing mostly the business and professional classes. The style of architecture is Venetian, in harmony with the more elaborate palaces on the mainland.

VENIZELOS, vȧ'nė-zȧ'lȯs, ELEUTHERIOS (1864–). A Greek statesman (see VOL. XXIII). In 1914 he favored the cause of the Allies, and during that year and the next was in and out of office due to King Constantine's German sympathies. In 1916 he established a so-called Provisional Government of National Defense at Saloniki and gathered a volunteer army of 60,000 men. His government was recognized by England, France, and Russia, and when Constantine was dethroned, Venizelos returned to Athens, took control of Greece, and declared war against Germany and her allies (1917). He represented Greece at the Peace Conference, where he achieved brilliant results for his country, but an attempt was made on his life. In the fall elections (1920), he was overwhelmingly defeated and was exiled, coming to the United States in 1921. Urged repeatedly to return to Greece, he finally arrived in Athens in January, 1924, after the abdication of King George. He favored a plebiscite on the question of a monarchy or a republic, formed a cabinet, and was named president of the National Assembly. Ill health compelled him to decline the premiership of the new Republic, and to retire from politics. In May, 1928, after Greece had had a series of unstable governments and uprisings, he returned to Athens to prevent further conflicts between the Royalists and Anarchists. In July, 1928, after a sweeping victory in the elections, he again became Premier. See GREECE, under *History*.

VENTILATION OF TUNNELS. See TUNNELS.

VERBRUGGHEN, HENRI (1873–). A British conductor, born at Brussels. He studied the violin under Hubay and Ysaÿe at the Conservatoire there (1887–92). In 1893 he became a violinist in the Scottish Orchestra at Glasgow, played a season in the Lamoureux Orchestra in Paris (1894–95), and returned to his former post in Glasgow. During the summers of 1895–97, he was concert master and assistant conductor of Rivière's Orchestra in Llandudno, Wales, and during 1898–1902, conductor of the summer concerts at Colwyn. In 1903 he settled in Glasgow as concert master of the Scottish Orchestra and director of the orchestral and chamber-music classes at the Athenæum; in 1911 he assumed also the conductorship of the Glasgow Choral Union. In 1903 he founded, with J. Cullen, D. Nichols, and J. Messeas, his own string quartet, which soon became famous. In 1915 he moved to Sydney, Australia, where he organized the National Conservatory and founded the State Orchestra, with which he gave regular series of symphony concerts in Sydney, Melbourne, Brisbane, and Adelaide, besides making an annual tour of New Zealand, thus totaling about 150 concerts a year. In 1918 he visited the United States, primarily for the purpose of studying American methods of instruction. He appeared successfully as guest-conductor of some of the great American orchestras. In 1921 he returned to conduct several concerts of the Minneapolis Symphony Orchestra, of which he was appointed regular conductor in 1923. He also organized the Minneapolis Symphony Chorus.

VERDUN, BATTLES OF. See WORLD WAR,

VERHAGEN, BALTHAZAR (1881–). A Dutch author and professor of drama at the Municipal University of Amsterdam. Since 1915 he has been director of the School for Dramatic Art and he is also president of the League for Classical Drama at Amsterdam. His works include the plays *De heks van Overholland of eene, Schaking aan de Vecht* (1910); *The Tree of Life,* and *Orpheus;* the translations *Antigone, Cyclop,* and others; and *De tragische Maskers van Hellas* (1924); and various other books on the drama.

VERMONT. The forty-second State in size (9564 square miles) and the forty-fourth in population; capital, Montpelier. Vermont is one of the few States which showed a decrease in population in the decade 1910–20, when the population fell from 355,956 to 352,428, a loss of 1 per cent. The white population decreased from 354,298 to 351,817; the Negro, from 1621 to 572. The number of native whites rose from 304,437 to 307,291; that of foreign-born whites decreased from 49,861 to 44,526. The urban population mounted from 98,917 to 109,976, while the rural population fell from 257,039 to 242,452. The only important cities are Burlington and Rutland. The former increased from 20,468 in 1910 to 22,779 in 1920, and the latter from 13,954 to 14,954.

Agriculture. In common with the other New England States, Vermont has experienced a considerable decline in agriculture. The number of farms decreased 11.1 per cent, or from 32,709 in 1910 to 29,075 in 1920, and farther to 27,786 in 1925. The acreage in farms fell from 4,663,577 in 1910 to 4,235,811 in 1920 and to 3,925,683 in 1925. The improved land in farms totaled 1,691,595 acres in 1920. The percentage of the total land area used for agricultural purposes decreased from 79.9 in 1910 to 72.5 in 1920 and 67.2 in 1925. The total value of farm property rose from $145,399,728 in 1910 to $222,736,620 in 1920, or 53.2 per cent, but diminished to $180,911,645 in 1925; the average value per farm was $4445 in 1910, $7661 in 1920, and $6511 in 1925. In interpreting these values, the inflation of the currency incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 24,889 were operated by owners; 307, by managers; and 2590, by tenants. The corresponding figures for 1910 were 28,065; 636; and 4008. White farmers in 1920 numbered 29,047, of whom 25,280 were native and 3767, foreign born. White farmers in 1910 numbered 32,689; 28,968 were native and 3721, foreign born. Farms reported under mortgage diminished in number from 12,225 in 1920 to 10,850 in 1925. The number of dairy cows was 345,643 in 1920; 279,448 in 1925. "Beef" cows numbered 4242 in 1920; 2135 in 1925; sheep, 62,756 in 1920, numbered 34,670 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 3,520,000 bushels; oats, 2,686,000; barley, 110,000; potatoes, 2,982,000; apples, 560,000, and hay, 1,497,000 tons. Comparative figures for 1913 are corn, 1,665,000 bushels; oats, 3,081,000; barley, 384,000; potatoes, 3,175,000; and hay, 1,280,000 tons.

Manufactures. Although one of the smallest States in population and area, Vermont has considerable industrial importance. There were three cities with more than 10,000 inhabitants in the State in 1920. These contained 13.5 per cent of the total population and in 1919 reported 20.6 per cent of the State's manufactured products. There were 1958 manufacturing establishments in the State in 1909; 1790 in 1919; 951 in 1925; and 880 in 1927. Wage earners in manufactories numbered 33.491 in 1919; 27,563 in 1925; and 26,241 in 1927: Capital invested amounted to $73,470,107 in 1909 and $134,314,391 in 1919. The value of manufactured products was $68,309,824 in 1909; $168,108,072 in 1919; $138,269,861 in 1925; $134,029,978 in 1927. The large increase in the value of products evidenced in 1919 was partly due to the change in industrial conditions brought about by the War and cannot be properly used to measure the growth of manufactures during the war period. Marble and stone work is first among the industries in value of product. This amounted to $12,395,000 in 1909; $17,426,000 in 1919; the value of marble, slate, and stone products for 1927 was $21,317,503. Woolen and worsted goods attained a production of $4,497,000 in 1909; $4,635,000 in 1914; $17,426,000 in 1919; and $10,939,729 in 1927. The manufacture of wood pulp and paper amounted to $3,902,000 in 1909; $10,863,000 in 1919; $9,744,845 in 1925; and $9,751,433 in 1927. Butter, cheese, and condensed milk products attained $8,112,000 in 1909; $8,696,000 in 1914; $9,829,701 in 1919; and $6,036,403 in 1927. The most important manufacturing cities are Barre, Burlington, and Rutland.

Mining. Vermont has no metal mining; the only mineral products of importance are stone, slate, lime, and talc. In the production of both granite and marble, the State continued to hold an important rank. In 1914 the value of the stone produced was $6,635,477; 1918, $5,505,895; 1920, $10,065,759; 1921, $7,322,843; 1926, $9,244,465. The total value of the mineral products of the State in 1926 was $14,955,161, compared with $15,008,894 in 1920; $11,728,052 in 1919; $9,158,945 in 1918; and $8,665,867 in 1914.

Education. Educational development in Vermont, in its more recent stages, has been marked by many important legislative and administrative measures. Especial attention was given to training teachers. High-school teacher training, or normal, courses, established throughout the State in 1912, were opened to high-school seniors or graduates, and have graduated some 2500 elementary teachers. The Legislature of 1921 enacted a new law under which the State Board of Education established three two-year teacher training, or normal, courses, at the University of Vermont and Castleton and Lyndon institutes. A director of teacher training was employed and special efforts were made to enroll a large number of prospective teachers; over 420 students were entered in all courses in that year, as compared with 280 in the year preceding. In 1922 the standard of admission for all classes was raised to high-school graduation. The growth in number of trained teachers had been very encouraging. The Legislature of 1923 changed the law relating to the supervision of schools in several important particulars. The local support of schools increased greatly. Special efforts were made to improve rural-school conditions: to better the quality of supervision, training of teachers, buildings, and the health and physical vigor of the children. Vocational work was carried on under the provisions of the Smith-Hughes Act after 1917. The total enrollment in the public schools in 1913 was 64,825; in 1925–26 it was 64,046. In the high schools in the latter year, there were enrolled 10,495 pupils. Expenditure for schools was: current, $4,248,718; outlays, $277,113. The percentage of illiteracy in the State decreased from 4.6 in 1910 to 3.8 in 1920; in the native white population, from 0.9 to 0.6 per cent; in the foreign-born white, from 15.4 to 16.4; in the Negro, from 13.3 to 7.7.

Finance. State expenditure in the year ended June 30, 1928, as reported by the U. S. Department of Commerce, was: for maintenance and operation of government departments, $6,365,784 or $18.06 per capita. Of this amount, $527,479 was aid to local education; for interest on debt, $63,277; for permanent improvements, $2,998,807; total, $9,427,868 (of which $5,345,505 was for highways, $2,716,534 being for maintenance and $2,628,971 for construction). Revenue was $8,085,277 or $22,94 per capita. Of this, property and special taxes formed 36.4 per cent; departmental earnings and charges for officials' services, 5.2 per cent; sales of licenses and taxation of gasoline, 43.6 per cent. Property valuation was $321,485,115; State taxation thereon, $1,174,203. Net funded State debt on June 30, 1928, was $6,701,532, due to the issues of flood bonds aggregating $5,000,000.

Political and Other Events. The State, always steadily Republican, remained politically true to form from 1914 on. In 1914 Senator Dillingham was reëlected and C. W. Gates, Republican candidate, was elected governor. During this year, a commission carried on a survey of the educational system. In accordance with a constitutional amendment adopted by the people, the State courts were reorganized. In 1916 Horace F. Graham, Republican, was elected governor. At this election, a constitutional amendment providing for a direct primary law was adopted. Carroll S. Page was reëlected to the United States Senate. By the amended State constitution, as ratified by popular vote in 1913, State elections formerly held in September were held in November, starting with 1916. For President, Hughes received 40.250 votes; Wilson, 22,708. In 1918 the Republican candidate for governor, P. W. Clement, was elected. In the elections of 1920, James Hartness, Republican was elected governor, and Senator Dillingham was reëlected. For President, Harding received 68,212 votes; Cox, 20,919. Redfield Proctor, Republican, was elected governor in 1922, and Frank L. Green, Republican, was elected United States Senator. Senator Dillingham died in 1923, and Porter H. Dale was elected to succeed him. The vote for President in 1924 was: Coolidge, 80,498; Davis, 16,124; LaFollette, 5,964. Franklin S. Billings was elected governor. John E. Weeks was elected governor in 1926, and Senator Dale was reëlected. The heaviest rains in many years caused, in the first week of November, 1927, a calamitous flood, particularly on the Winooski. In all, 84 lives were lost and damage was done to buildings, bridges, highways, and railroads, to an estimated total of $30,000,000. In 1928 for President, Hoover received 90.404 votes; Smith, 41,440. Governor Weeks and Senator Green were reëlected.

Legislation. The Legislature voted to submit to the people a prohibition law at the election of 1916. This law was defeated. The Legislature, in 1917, repealed the Prohibition Act of 1915. Amendments were made to the child-labor laws, and a State accounting system was created.

Women taxpayers over 21 years of age were permitted to vote in town meetings. The Legislature of 1919 legalized absentee voting and made provision for a farm census. A teachers' retiring system was established. A measure was passed forbidding the display of the red flag in public. In 1921 provision was made for planning commissions in cities, towns, and villages. A direct-primary law was amended; presidential primary laws were repealed; provision was made for the regulation of workmen's-compensation insurance, and it was provided that no person should be debarred from public service on account of sex. Administration of motor-vehicle laws was entrusted in 1925 to a bureau under the Secretary of State, and it was made possible for street railroads to operate motor vehicles. A special session in December, 1927, provided funds for restoring highways and bridges ruined in the 1927 flood.

VERMONT, UNIVERSITY OF. A coeducational State institution at Burlington, Vt., founded in 1791. The student enrollment increased rapidly, from approximately 600 in 1914 to 1310 for the year 1928–29, with 912 in the summer session of 1928; the faculty rose from 100 to 150; and the library from 90,000 to 133,000 volumes. The income showed a corresponding increase during the period, from $210,000 to $600,000, and the productive funds from $943,423 to $1,900,000. The Ira Allen Chapel, a gift from James B. Wilbur, was erected in 1926. President, Guy W. Bailey, LL.D.

VERMONT FLOODS. See FLOODS AND FLOOD PROTECTION.

VERSAILLES, TREATY OF. See LEAGUE OF NATIONS; PEACE CONFERENCE AND TREATIES.

VESSELS, NAVAL. During the years that have elapsed since the Washington Conference for the Limitation of Armaments and the signing of the Five-power Pact, the construction of naval vessels, except in the United States, has not materially decreased. It has merely changed direction, concentrating upon vessels that were not limited by the Pact all of the effort, and probably all of the money, that would have been used in naval shipbuilding—largely no doubt for capital ships—under the old conditions. The United States alone followed the spirit of the Pact, but at the end of half a dozen years, finding that Great Britain, France, and Japan were building great numbers of large cruisers, large destroyer leaders, large destroyers, and large submarines, she reluctantly began to build cruisers herself. The answer was immediate. Great Britain, having built as many 10,000-ton cruisers as she needed, desired to check the building by the United States and indicated a willingness for a new conference, presumably to consider further limitations. This was held at Geneva in 1927. As the British proposals concluded a doubling of existing British cruiser tonnage, instead of a reduction, as well as other suggestions designed to weaken the relative power of the United States fleet and to preserve and increase British superiority, and as her delegates firmly adhered to the increased cruiser tonnage to the end, the new conference adjourned without accomplishment. In October, 1929, another conference for the consideration of further limitations of naval armaments was called by the British government to be held in London early in 1930. In the following notes, the existing types of naval vessels are briefly described.

Aircraft Carriers. These vessels are designed, not only for the purpose of transporting aircraft and aircraft supplies, but to furnish a long, broad deck from which airplanes fitted with landing gear can take off, or on which they can effect a landing. Vessels of less than 10,000 tons, which are fitted to carry aircraft and aircraft supplies, are not, by the terms of the Five-power Pact, rated as aircraft carriers. Most of them are called aircraft tenders or aircraft transports; neither their numbers nor total tonnages are limited by the Pact; of existing ships, only two have full-length flying decks. The U. S. tender, *Patoka,* has a fully-equipped mooring mast for airships. No aircraft carrier commenced after the signing of the Pact may exceed a "standard" tonnage (see NAVIES OF THE WORLD) of 27,000; but the United States and Japan were each allowed to transform two battle cruisers under construction, but which were to be scrapped, into carriers of not more than 33,000 tons. All four—*Lexington, Saratoga, Akagi,* and *Kaga*—are completed. The *Kaga,* commenced as a battleship, was substituted for the battle cruiser *Amagi* which was irreparably damaged by the great earthquake of 1923. The flying decks of aircraft carriers are kept as free as possible from obstructions; smokepipes, deck houses, masts, etc. are grouped along a narrow strip at one side or otherwise placed in a way to cause no interference with airplane movement. In some carriers, the smokepipes and masts rise from the side beyond the edge of the flying deck and are hinged so that they may be turned down below the level of the deck when airplanes are landing or taking off. Aircraft carriers and tenders are fitted with repair shops adequate for all ordinary aircraft repair and have quarters for the crews of the planes they carry or attend.

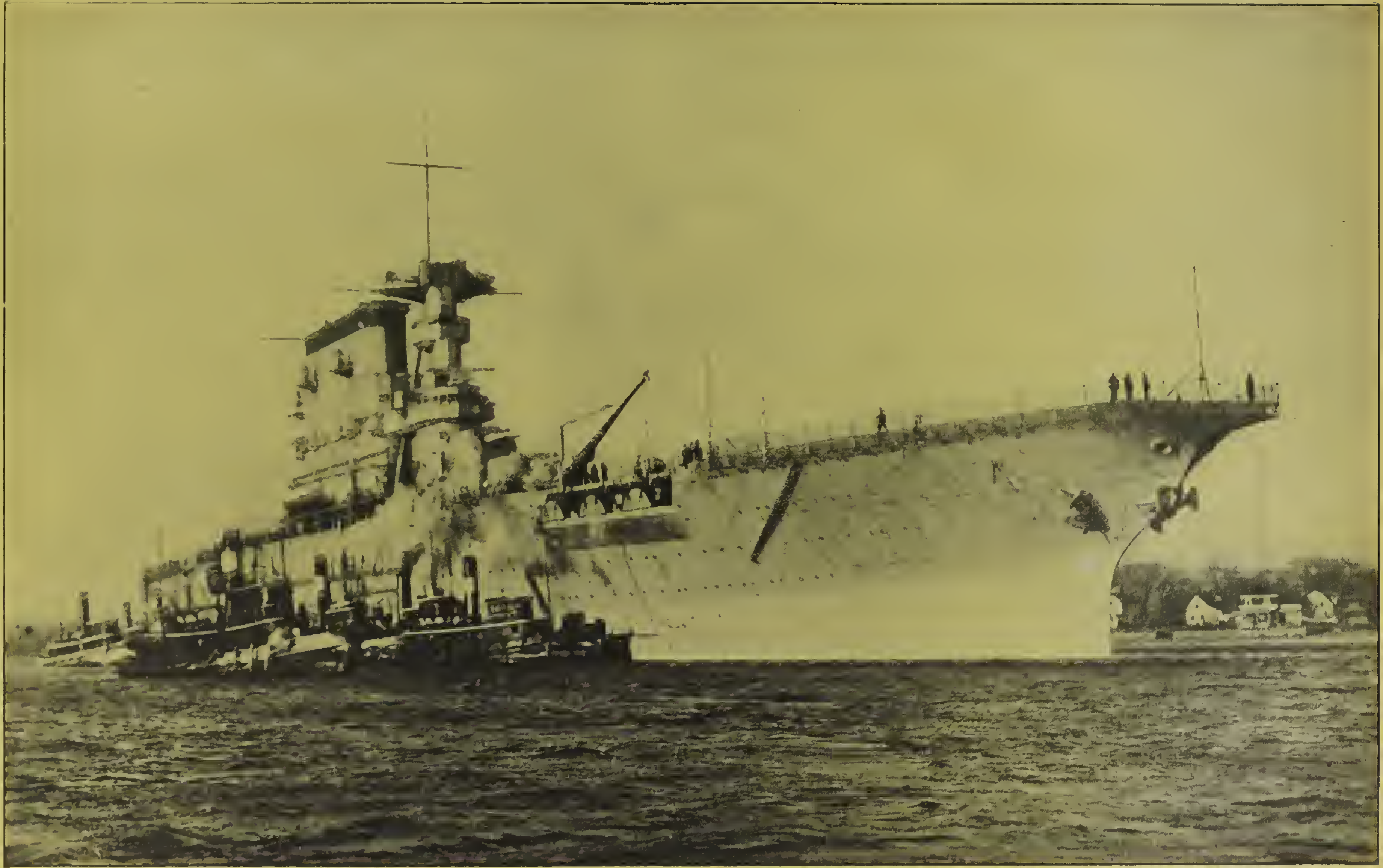
Armored Cruiser. This is a type of war vessel which is obsolete though many of them are still in use for peace purposes. It was designed to meet and destroy the protected cruisers of the enemy. In addition to light armor (3 to 8 inches), it carried heavier guns than most protected cruisers and had at least equal speed. The battle cruiser is its development in one direction and the large light cruiser in another.

Armored Ship. Any ship carrying armor, but especially one carrying heavy armor, is known as an armored ship. Many light cruisers have thin armor belts, decks, conning towers, and gun houses, but are not called armored ships because of the thinness of the armor. See *Battleship, Battle Cruiser, Armored Cruiser, Monitor,* etc.

Battle Cruiser. The battle cruiser differs from a battleship only in having a much higher speed and much thinner armor. The guns of the main battery are of the same or about the same calibre and power as those on contemporary battleships, but may be fewer in number. Great Britain and Japan are the only countries possessing battle cruisers at present. In accordance with the terms of the Five-power Pact, the United States scrapped six and Japan two that were under construction, and Germany lost all of hers by the terms of the Treaty of Versailles.

Battleship. A battleship is a war vessel possessing the greatest offensive and the greatest defensive power, especially the former, which can be given to a ship without rendering inadequate such other necessary attributes as speed, habitability, seaworthiness, etc. Existing battleships may find new enemies which are too strong for them.

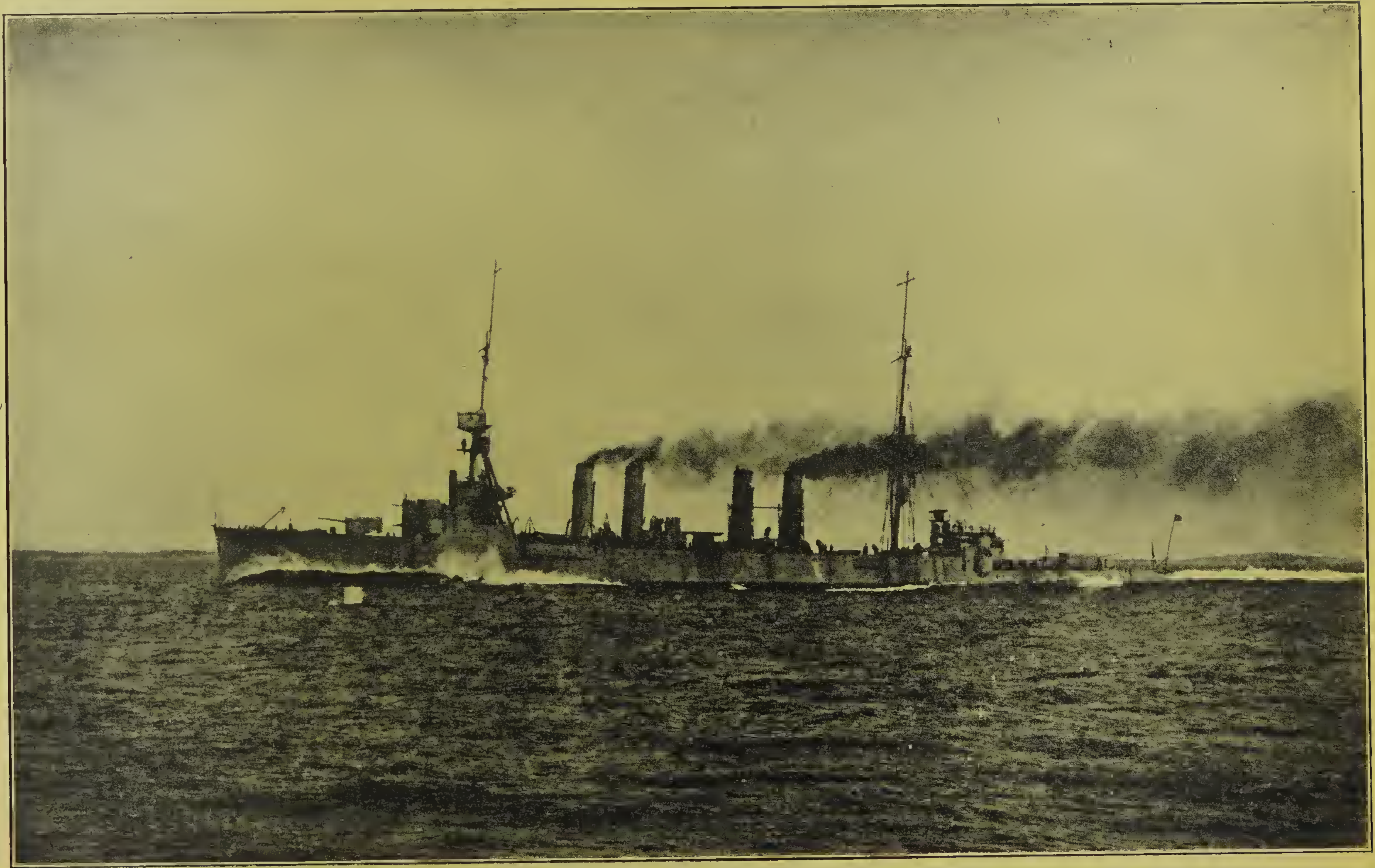
NAVAL VESSELS



Official Photograph, U. S. Navy Department

UNITED STATES NAVY AIRCRAFT CARRIER "LEXINGTON"

NAVAL VESSELS



Photograph Underwood & Underwood, N. Y.

UNITED STATES NAVY LIGHT CRUISER "RICHMOND"

Displacement, 7100 tons Speed, 34 knots Battery, twelve 6-inch guns

Their design must then be so changed as to enable them to meet and conquer each new enemy or to render its attack comparatively innocuous. The "wooden walls" of the early nineteenth century put on armor to defend themselves against the increasing power of the gun and the explosive shell. Later types were fitted with numerous water-tight compartments, underwater armor, and the "bulge" or cellular belt, in order to meet the growing menace of the torpedo and the submarine mine; and to meet the torpedo carrier, surface, air, or submarine, a numerous battery of guns of moderate calibre was mounted. Further protection was derived from accompanying vessels, the light cruiser and the destroyer. Battleships, like other surface and submarine vessels, are now called on to meet bombing attack from the air; they must have armored upper decks and strong batteries of anti-aircraft guns and must be defended in the air by accompanying aircraft as they are defended on the water by cruisers and destroyers. The only battleships designed and laid down since the danger of aircraft bombing was fully gauged were the British ships, *Nelson* and *Rodney*. They are of 35,000 tons, the greatest size permitted by the Five-power Pact, and their design, of a very new type, has been studied with interest by other powers. (See NAVIES OF THE WORLD, *Great Britain*.) A ship of premier force, capable of taking its place in the line of battle in a fleet action, is known as a capital ship. According to present classification, capital ships are either battleships or battle cruisers. The Five-power Naval Pact defined a capital ship as a vessel, not an aircraft carrier, with a displacement over 10,000 standard tons, or carrying a gun of a calibre in excess of 8 inches. No capital ship of more than 35,000 standard tons may be constructed by one of the signatory powers.

Cruiser. Cruisers are of four types: battle, armored, protected, and light. Armored (already described) and protected cruisers are obsolete. The latter derived its name from an armored deck covering the machinery and other vital parts; it was flat amidships but inclined downward at the sides at an angle about 40 degrees, the lower edge reaching the side at 5 to 8 feet below water. Light cruisers are a development of the protected-cruiser type. The distinguishing characteristic is very high speed. Some have water-line belts of thin armor, 3 to 5 inches thick, and some have part or all of the main battery guns in lightly armored turrets or gun houses. Under the terms of the Five-power Pact, light cruisers cannot have a displacement in excess of 10,000 tons or guns of a greater calibre than 8 inches. Nearly all the light cruisers designed since the Washington Conference are of 10,000 tons and carry 8-inch guns. A few smaller ones are under construction or completed and many others are likely to be built in the near future. In those of less than 7000 tons, the guns—or most of them—probably will be of calibres of less than 8 inches. See NAVIES OF THE WORLD, *France, Japan, Great Britain, United States*, etc.

Destroyer. Vessels of this type were originally designed to drive off or destroy torpedo boats, hence the name. The small torpedo boat is now obsolete, but the destroyer has succeeded to its functions and in addition has become the greatest protector of large vessels against submarine attack. The latest types of destroyers are from 1200 to 1500 tons with a maximum speed of 34 to 36 knots, 6 torpedo tubes, 4 guns of 4- to 5-inch calibre, and 1 or 2 anti-air-craft guns. See NAVIES OF THE WORLD, *France, Japan, Great Britain, Italy*, etc.

Flotilla Leader or Destroyer Leader. An enlarged destroyer designed to act as flagboat for the commanding officer of a destroyer flotilla. The displacement is from 1500 to 2800 tons. The maximum sea speed is usually slightly greater than that of the destroyers of their flotillas and the battery about 50 per cent more powerful. See NAVIES OF THE WORLD, *France, Italy, Great Britain*, etc.

Fuel Ship. Naval fuel ships were formerly colliers. They are now oil tankers. In addition to fuel oil, they usually carry lubricating oil, cotton waste, and other engineering supplies which are bulky and much used.

Hospital Ship. A vessel especially fitted for the care and transportation of the sick and wounded is known as a hospital ship. During the World War, dozens of such ships were needed, and passenger ships were refitted and adapted to the service.

Mine Layer. Mine layers are of all sizes and kinds, from small launches to vessels of 5000 tons or more. Large mine layers carry their main supply on the lower decks or in the holds. The main operating deck is fitted with fore and aft tracks or trolleys on which the mines are placed when hoisted from below and from which they are dropped after being carried to the stern. Just before launching, the safety device is removed or set for service. The mine is still inoperative and will not explode until anchored in place, when the remaining safety fittings are automatically released. A type of small fast mine layer has been developed by the transformation of destroyers. The average capacity is 50 to 100 mines. During the World War, mine-laying submarines were developed and much used. They carry the mines (ready for dropping) in inclined tubes extending from the deck through the bottom. Mines may be planted by submarine mine layers in places where the use of surface vessels would be impracticable. See MINE, SUBMARINE.

Mine Sweeper. As mines are usually anchored so as to be held 12 feet or more below the surface, it is highly desirable that mine sweepers should draw less than 12 feet of water, 3 or 4 feet less is practicable. The great German mine-laying campaign, begun at once on the declaration of war and continued to the Armistice, found the British almost without mine sweepers. Fortunately, the steam trawlers, used so extensively in the British fisheries, were very efficient sweepers when they were fitted with proper appliances and their officers and crews had received suitable training. They continued to form the greater part of the mine-sweeping fleet; at the end of the War, out of 726 sweepers in service, 412 were trawlers, 110 were destroyers or vessels built as mine sweepers, 52 were small paddle steamers, 142 were drifters, and 10 were sweepers of the "Dance" type. The danger of sweeping is shown by the fact that 214 sweepers were sunk or very seriously damaged. The boats (about 100 in number) which were specially built for sweeping were of 750 to 800 tons with a draft of 7 feet and had about 16 knots speed; one-third were paddle steamers and the others had twin screws. These vessels with the destroyers, formed the fast mine sweepers. Sweeping was effected by a wire cable 500 yards long, whose ends were carried by sweepers. This often exploded the mine or parted its mooring rope; if neither happened, bombs or depth charges were dropped on it. In 1915 the paravane (see PARAVANE) appeared, and this was followed by the later type with cable-cutting jaws. Mines rising to the surface after the cutting of their cables were destroyed by gunfire. In times of peace, only a moderate number of the best types of mine sweepers are retained in service in most navies.

Monitors. The monitors built during the World War were shallow-draft armored vessels of moderate speed, used chiefly on the Belgian coast. Most of them had a single turret and carried guns of 6- to 15-inch calibre. Although styled monitors, they all had rather high freeboard; and all were fitted with anti-torpedo "bulges" on their sides. The Italians used enormous raft-line structures for defense of their army's right flank. Each of these carried a turret mounting heavy guns.

Patrol Boats. Probably 2000 of these were used in the World War by the Allies alone. They were of every conceivable type of small craft, yachts, motor boats, old torpedo boats, small destroyers, and boats built for the service. Of the latter were the *P* boats of Great Britain and the Ford boats built in the United States. Both types were about 600 tons. None of the Ford boats was completed in time for active service abroad. The fast motor boats were commonly called submarine chasers.

Q Ships. These were decoy ships that were used in the World War for the destruction of enemy submarines. Small and old merchant steamers, sailing vessels, gunboats, etc., were transformed into inoffensive-looking craft apparently employed in coastal traffic or trade with Norway. All sorts of expedients were used to entice submarines within easy range, one of which was for part of the ship's force called the "panic party" to abandon a ship ostentatiously when the submarine opened fire. If the latter approached close enough, the guns were uncovered and fire opened. Many *U* boats were sunk by *Q* ships, and many *Q* ships were sunk by their adversaries.

Repair Ships. These are vessels fitted as floating workshops, with all kinds of tools and appliances for the repair of vessels which are far away from their bases. As the naval operations of the World War were mostly confined to the small North Sea area, few of these were necessary. Repair ships for aircraft, submarines, and destroyers are called aircraft tenders, submarine tenders, etc. They have quarters for the officers and men of their flotillas who need medical attention, rest, etc. They carry supplies of all sorts and a repair shop capable of making ordinary repairs. Aircraft tenders usually carry extra aircraft.

Submarines. Submarines are vessels designed for navigating below the surface of the sea. Naval submarines are principally designed for the attack of the enemy's vessels with torpedoes and have fixed torpedo tubes both forward and aft. The submarine's ability to quickly conceal itself beneath the water renders it very, very useful for certain classes of scouting and mine laying.

The rapid development of the submarine during the World War has led to the division of the various designs into types or classes. The present (1929) classification is as follows: Submarine Cruisers which are large enough to carry small bodies of troops, cargo, or important supplies over long distances; fleet submarines, large enough to have such sea-keeping qualities as will enable them to accompany the fleet; cruising submarines, large enough to keep the sea for a month or two and operate independently at long distances from any base; coast-defense submarines of small size designed to operate from ordinary harbors or nearby bases; mine-laying submarines, all sizes.

The only submarine specifically designed as a submarine cruiser in 1929 was under construction for the French Navy. Its surface displacement is reported to be 3250 tons. Fleet submarines are of 1700 to 3000 tons with a surface speed of 18 to 22 knots; cruising or high-sea submarines are of 900 to 1800 tons with moderate speed and long radius of action; coast-defense submarines are of 600 tons or less and small cruising radius; mine layers range from 300 to 3000 tons depending upon the character of the service for which designed. See SUBMARINES AND THEIR WAR ACTIVITIES; NAVIES OF THE WORLD; and TORPEDO BOAT, SUBMARINE (VOL. XXII, p. 353).

Supply Ships. These vessels are of the cargo type and are fitted as refrigerator ships, general supply ships, and ammunition ships, or a combination of two or more of these types.

Tenders. These are vessels designed to accompany aircraft, destroyers, submarines, etc., and to act as a movable base of supplies, repairs, etc. See *Aircraft Carrier* above.

Torpedo Boat. A small, fast boat designed to use torpedoes in the attack of large vessels. The torpedo boat and the destroyer are small craft of the same general type. In the nineties, torpedo boats were of less than 200 tons and very numerous. In 1893 the British Navy built the *Havock* and *Hornet* of 240 tons to defend vessels against torpedo boats by attacking the latter. They were therefore styled torpedo-boat destroyers. Besides having greater displacement, they carried 6-pounder and 12-pounder guns, while torpedo boats mostly carried 3-pounders. After that time, the destroyer gradually grew in size and took on other functions. A few torpedo boats for harbor and smooth-water service were built in recent years, but the type is almost obsolete. Old destroyers of less than 1000 tons are often classed as torpedo boats.

Transport. A vessel fitted for the transportation of troops, animals, or supplies. No nation possesses many of these; therefore, in times of war, merchant vessels have to be used and altered to adapt them to the service. In the World War, the American (formerly German) passenger steamer, *Leviathan*, after fitting as a transport, carried 10,000 officers and men on each trip, in addition to her own complement.

U Boat. A name applied to German submarine boats because they were officially designated by a number preceded by the letter U, as *U125*. The "U" is an abbreviation of *untersee* (under water). See *Submarines*, above.

Submarine Chaser. See *Patrol Boat*, above.

VETERANS' BUREAU. See AGRICULTURAL EDUCATION; UNITED STATES, *History*.

VETERINARY MEDICINE. A gradual rise in the educational standards of this profession resulted in the requirement of four years' high-school education or its equivalent for the class entering in the fall of 1919 and thereafter for the accrediting of a veterinary college and the eligibility of its graduates for United States government service. The requirements for admission to civil-service examination for the government service were raised so that, after the fall of 1917, a fourth year of study at a veterinary college, with an increased number of hours, was required. The conditions attending upon the World War brought a great decrease in the number of students enrolled at veterinary colleges in the United States. With the close of the War, the attendance increased somewhat, but later declined, in part because of the increased educational requirements. These conditions resulted in the discontinuance of several colleges, and by 1927 there were but 10 accredited colleges in the United States, with a total student enrollment of 606. Among those which gave way to State-supported schools were some of the oldest and best-known institutions.

Bovine Tuberculosis Eradication. In his annual report for 1916, the United States Secretary of Agriculture called attention to the wide dissemination of tuberculosis of farm animals, pointing out that it may be transmitted to man and is the source of annual losses in the United States estimated at more than $25,000,000. He outlined undertakings leading to its eradication, and asked for an appropriation of $75,000 to inaugurate the work. Congress responded with allotments for its investigation and eradication amounting to $300,000, of which $132,618 was expended. Offices were at once opened at several points in the country, and coöperative work commenced with the view to eradicating the disease from, and the establishment of, accredited pure-bred herds. In December, 1917, rules and methods were adopted, the plan followed being to test cattle with tuberculin, to eliminate any reacting animal, usually by slaughter, to repeat the test at prescribed intervals, and to list as tuberculosis-free, accredited herds all of which successfully pass two annual or three semi-annual tests, official certificates being issued to the owners of such herds. In 1918 Congress provided for the payment of one-third of the difference between the appraised and salvage value of the slaughtered animals, no payment by the Federal government to be more than $25 for a grade animal or more than $50 for any pure-bred animal. Increased appropriations for the work were made by Congress from year to year until 1927–28, when the annual appropriation had reached $5,964,000, and the combined State appropriations were more than $13,000,000, a large proportion of which was for payment of indemnities. By 1922 the coöperative eradication work had been extended to include all the 48 States and the Territories of Alaska and Hawaii.

A rapid growth took place in the area-eradication work and by the close of the fiscal year ended June 30, 1928, 1119 counties and the District of Columbia had engaged in the work, and 527 were modified accredited areas. By that time, there were 167,472 herds containing 2,164,105 head of cattle accredited as tuberculosis-free, and approximately 35 per cent of the entire cattle population of the United States was under supervision. The work of eradicating tuberculosis from swine and poultry had been undertaken and was progressing satisfactorily and work looking to the eradication of paratuberculosis, known as Johne's disease, of cattle had just commenced.

Late in October, 1927, the State of North Carolina completed the tuberculin testing of all cattle in its 100 counties and was the first State to have all of its counties classed as "modified accredited" areas, in which areas not more than 0.5 per cent of the cattle are tuberculous and from which all animals reacting to the test have been removed for slaughter. Maine was following closely with 13 of its 16 counties on the modified accredited list.

The degree of infection of cattle throughout the United States had been reduced from 4 to nearly 2 per cent, and by Jan. 1, 1929, a total of 581 counties and 21 townships in 11 States had been placed on the modified accredited list.

Texas Fever and Tick Eradication. As a result of eradication work with the cattle tick, 760 of the 985 counties originally quarantined had been released by July 1, 1928, as tick-free, and this included all of 6 of the 15 States quarantined in 1906.

Anaplasmosis of Cattle. This disease, formerly associated with piroplasmosis, or Texas fever, of cattle and supposed to be tick-transmitted, has appeared independently in the last few years in Florida, Louisiana, Texas, Kansas, Oklahoma, Nevada, and California, and has been the source of serious loss.

Dourine. The occurrence of this disease of the horse, due to *Trypanosoma equiperdum*, necessitated eradication work by the U. S. Department of Agriculture under annual appropriations by Congress, varying from $27,800 to $97,800. The work has progressed until the disease occurs only on the Navajo Indian Reservation in Arizona and in a small section of northern Montana.

Foot-and-Mouth Disease. This disease of live stock, particularly of cattle and swine, has, because of its epizoötic nature, continued to be one of those most dreaded by the live-stock interests. Three countries, Canada, Australia, and New Zealand, have been entirely free from it for many years; others, including the United States, Great Britain, and Sweden, have been visited by it from time to time and have applied the slaughter stamping-out policy, as the British dominions mentioned and Norway would if they were to be invaded. They prohibit the entry of live stock or apply drastic quarantine laws against the entry of diseased animals. Other countries where the disease is present deal with it by isolating infected stocks, regulating live-stock movement within their boundaries, and quarantining the animals they import; or they let the disease take its course without interference. Denmark and Holland have periodically freed themselves from the disease, but became reinfected from neighboring countries.

Eight outbreaks have taken place in the United States, in 1870, 1880, 1884, 1902, 1908, 1914, and 1924 (two). That of 1914 was by far the most serious, extending into 21 States and the District of Columbia, and necessitating an expenditure of over $5,500,000. The animals slaughtered at the last outbreak included 69,742 cattle, 73,574 swine, 8742 sheep, and 99 goats, with a total appraised value of $5,243,138.55. The first three outbreaks were caused by the importation of infected animals; the fourth and fifth, by the importation of contaminated cowpox vaccine virus; the sixth was caused by contamination through contact with leather or leather products imported from a foreign country in which the disease occurred; the seventh is supposed to have originated in the feeding of pigs with garbage from a steamship arriving from a foreign port; and the eighth, not definitely determined. In England, where the disease has appeared from time to time, investigations indicate that the infection may even be introduced by birds migrating from the Continent, or be air-borne.

Infectious Abortion of Live Stock. This disease of cattle, horses, sheep, and swine has continued to increase in importance and, since the advance in the eradication work with tuberculosis, has surpassed that disease in the monetary loss caused. It is responsible for the loss of the offspring, a decrease in the flow of milk, and sterility. Both the porcine forms of the organism appear to be the cause of undulant fever (Bang) in man, which has appeared with increasing frequence in the last few years.

Undulant Fever. This dual disease of man may be caused by the *Brucella melitensis* of Bruce, contracted from an affected goat and known as Malta, Mediterranean, or undulant fever (Bruce); or caused by the *Brucella abortus* of Bang, contracted from cattle or swine and known as undulant fever (Bang).

The form contracted from the goat, which occurs in, and was first described from, the Mediterranean region, was recognized in 1911 as occurring in the United States. It was discovered in that year to be endemic among goats in southwest Texas, and in 1922 an outbreak took place in Phoenix, Ariz., in which more than 30 human cases were positively diagnosed. In the last few years, undulant fever (Bang), which appears to be caused particularly by the porcine strain of the abortion organism, has been differentiated from typhoid and other fevers and been found to occur with increasing frequency.

Hog Cholera. This affection was estimated by the Federal government in 1923 to cause a mortality of 4.05 per cent, a large reduction from the preceding year, and to be responsible for about 80 per cent of all hogs lost by disease. In that year, 2,564,837 hogs, valued at $29,393,032, were destroyed by it. Control work was commenced by the U. S. Department of Agriculture in 1913 under an appropriation by Congress of $75,000, which was increased in amount from year to year until in 1919 the sum of $641,045 was made available for investigation, demonstration, education, and control work. The work has consisted in the making of surveys, production and use of serum on hogs on infected and exposed farms, sanitation and quarantine work, and organization of farmers to coöperate with the State and Federal authorities. Studies of a disease known as "hog flu," which has appeared and caused large losses in the hog-raising States, have shown that it is not related in any way to hog cholera.

Botulism and Forage Poisoning. Investigations have shown that *Bacillus botulinus* is probably the cause of much of the loss among horses and mules resulting from forage poisoning and also is a cause of limberneck in chickens. See Botulism.

Bacillary White Diarrhœa of Fowls. The cause of this, perhaps the most important disease of the fowl, was found in 1899 to be due to a bacterium now known as *Salmonella pullorum*. The investigations that followed have shown that it may cause loss through (1) a marked reduction in fertility, (2) lowered vitality or death of chicks in the shell, (3) death of the young chick, (4) stunting of chicks that survive, (5) reduction in the number of eggs laid, and (6) even death of grown fowls from acute and chronic forms of the disease. The causative organism occurs in the ovary of the carrier hen from which it may pass into the yolk and be transmitted through the egg. The organism also may be transmitted from chick to chick through contamination in the incubator and brooder, and to both chick and adult through the consumption of infected eggs. Remedial treatment has been found to be of little avail, and chicks should be reared only from flocks known to be free from the infection, including those from which it has been eliminated through application of the blood test.

Parasitoloy. Equine piroplasmosis due to *Piroplasma equi* was discovered for the first time on the American continent in 1913, it being found endemic among native horses in the interior of Panama. *Cysticercus ovis*, the intermediate stage of a dog tapeworm (*Tænia ovis*), was shown in 1913 to be the cause of tapeworm cysts, or measles, in mutton, and of common occurrence in sheep in the western United States. Tapeworm cysts in beef carcasses were found in 1914 to be destroyed by an exposure for six hours to a temperature of 12 to 15° F. Important studies of Manson's eye worm of chickens were reported from Hawaii, Florida, and Australia. The cockroach was found to act as the intermediate host. Studies of *Trichinella spiralis* have shown that the larvæ in pork die after an exposure to a temperature of 131° F. gradually attained, and this is held to be the thermal death point. Refrigeration at a temperature of 5° F. for a period of 20 days was found in 1915 to destroy it in pork. *Habronema muscœ* was discovered in 1913 to be transmitted by the house fly. It was shown in 1915 that larvæ of the ox warble enter the host by penetrating the skin. The intermediate or cysticercoid stage of the tapeworm *Choanatœnia infundibuliformis* of chickens was found in 1916 to occur in the common house fly. It was demonstrated in 1918 that *Ascaris lumbricoides* of man and swine has a direct life cycle, and that no intermediate host is required. The embryos hatch out in the alimentary tract, migrate to the lungs and other organs, and cause pneumonia of pigs, the symptoms of which are commonly known as thumps. Carbon tetrachloride was found in 1921 to be highly efficacious in the removal of hookworms from dogs and foxes, ascarids from dogs, and large strongyles from horses. The third-stage larva of a cat and dog hookworm, *Ancylostoma brasiliense*, was found in 1926 to be the cause of a creeping eruption of man.

Journals. In 1915 the *American Veterinary Review*, the oldest veterinary journal published in America, having completed its 47th Volume, became the *Journal of the American Veterinary Medical Association* and was edited by the secretary of that Association. In 1920 the name of the *American Journal of Veterinary Medicine* was changed to *Veterinary Medicine*. *The North American Veterinarian* and the *Canadian Veterinary Record*, a quarterly journal, both commenced publication in 1920.

VIBRATION. See Physics.

VICTOR EMMANUEL III. See Italy, *History*.

VICTORIA. A state of the Commonwealth of Australia in the southeastern part of the continent. Area, 87,884 square miles; population in 1911, 1,315,551; in 1928, 1,748,610; annual average increase, 1.54 per cent. Melbourne, the capital and largest city, including its suburbs, had 975,160 inhabitants in 1928 (591,830 in 1911). In 1921 about three-fifths of the total population was urban. Farming continues to occupy a leading place in the state's activities. Wheat, hay, oats, barley, and potatoes are the most important crops. Pastoral pursuits followed next in importance. The wool output in 1919–20 was 132,847,000 pounds; in 1926–27, 121,299,621, as compared with the 1913–14 output of 106,833,000 pounds. The mineral production in 1927 was valued at £1,877,000, as compared with £2,344,744 in 1913. The gold yield steadily dropped; the output was worth only £163,699 in 1927 (£1,847,475 in 1913). In 1926–27, 161,639 employees were engaged in manufacturing (118,744 in 1913). Values for production in 1926–27 were: agricultural, £15,744,992; pastoral and dairying, £22,380,367; mining, £1,880,242; forest, £1,880,799; miscellaneous, £5,542,600; total, £47,336,983; manufacturing value added, £51,005,430. Imports overseas in 1913 were valued at £24,387,073; in 1927–28, £48,108,752. Exports for the same years were £17,835,395 and £31,057,025. Leading exports are gold, wool, cereals, and meats. In 1928 there were 4749 miles of railway open (3747 in 1914). Government accounts showed: revenues for 1912–13 and for 1927–28, £10,287,285 and £26,566,864; expenditures for the same years, £10,258,081 and £26,730.217. Public works continue to account for the increased public debt. In 1912–13 the debt amounted to £62,776,724; in 1928 it had increased to £158,183,470. Unlike the other states, Victoria is the seat of Australian Conservatism, her large agricultural population making for stability.

VICTORIA. The capital of the Province of British Columbia, Canada. The population in 1928 was estimated to be 65,000. Greater Victoria, which includes Oak Bay, Esquimalt, and part of Saanich, has an area of 13½ square miles, 78 miles of paved streets, 65 miles of boulevards, and 14 public parks, with a combined area of 1600 acres. Victoria is the first and last Canadian port of call on the Pacific coast. Its harbors are capable of accommodating the largest ships afloat, and the second drydock in size in North America, 1150 feet long by 149 feet wide and 49 feet 5 inches deep, was built in the Esquimalt Harbor at a cost of more than $6,000,000. Victoria has three harbors: the outer harbor comprising Rithet's wharves, with an area of 16 acres, and the Canadian National Docks at Ogden Point, covering 30 acres; the inner harbor which is used chiefly by coastwise vessels; and the famous Esquimalt Harbor, 940 acres in extent. Victoria's annual sea-borne tonnage is more than 12,600,000; its exports are valued at $3,282,834 and its imports at $6,470,269. In 1928, 2737 persons were employed by the industrial establishments of the city and received $3,270,449 in wages; the value of products manufactured was $10,498,975.

VICTORY LOAN. See United States, under *History*.

VIEBIG, fē'bĭk, Clara (1860–). A popular German novelist (see Vol. XXIII). She is the author of *Mütter und Frauen* (1918); *Eine Handvoll Erde* (1920); *Töchter der Hekuba* (1922); *Das rote Meer* (1920); *Menschen und Strassen* (1923); *Unter dem Freiheitsbaum* (1923); *Der einsame Mann* (1924); *Passion* (1925); *Franzosenzeit* (1925); and *Die goldenen Berge* (1927).

VIENNA. The capital of the Federal Republic of Austria. The population at the census of 1923 was 1,857,400, having decreased from 2,031,498 before the World War. Since 1921 the city has formed a separate province within the Republic, and the Parliament Building, formerly the seat of the Imperial Diet, has been occupied by the two chambers of the Federal Congress of Austria—the Nationalrat and the Bundesrat. The former royal palaces have been converted into museums and government buildings. The Belvedere, the residence of the Archduke Francis Ferdinand whose assassination led to the outbreak of the World War, contains two galleries devoted to the artistic productions of the eighteenth and nineteenth centuries; in 1929 the Government Gallery of Modern Masters, comprising paintings and sculptures executed since 1890, was opened. The Folklore Museum has been transferred to the former Schönborn Palace and the Ethnographical Museum to the New Hofburg. The Technical Museum of Industry and Manufacturing was opened in 1918, the Museum of Sociology and Economics in 1928, and the Museum of Building and Housing in 1929. The Albertina, the world's most famous collection of etchings, engravings, and lithographs, named after its founder, Duke Albert of Teschen, is housed in the former Palace of the Archduke Frederick. Since 1921 the Vienna Trade Fair has been held twice annually, in March and September, in the former imperial stables, certain rooms of the New Hofburg, and the gigantic exhibition hall of the Rotunda in the Prater, Vienna's famous park. The total area covers 245,000 square meters (393,000 square yards). An average of 125,000 buyers, 30,000 of them from 70 different countries, attend this fair regularly. The Monument of the Republic, with portrait busts of leading Austrian Socialists, was erected in 1928 in the Schmerling-Platz.

Vienna has retained its position as the banking centre of central and eastern Europe. In 1923 a new bank of issue (the Austrian National Bank) was formed for the purpose of carrying through plans of stabilization of the crown and of insuring its permanence. The housing programme on which the municipality, under its socialist officials, embarked in 1923 has aroused world-wide admiration. By 1932 a total of more than 60,000 apartments in the working-class quarters of the city will have been constructed. The houses, built around garden courts, are beautiful architecturally and provide improved living conditions for the families of thousands of industrial workers. The garden groups of the Lainz poorhouse, the Steinhof lunatic asylum, the tuberculosis hospital, the trade schools, the Amalienbad (public baths), the foundling relief station, and other institutions bear witness to an interest in public welfare formerly unknown in Vienna. The city is one of the most important traffic centres of Europe and is the junction of eight international air lines. Its aërodrome at Aspern stands on the spot where Napoleon suffered his first defeat in 1809.

VIERNE, Louis-Victor-Jules (1870–). A French organist and composer, born at Poitiers. He studied the organ under Franck and Widor at the Paris Conservatoire and graduated in 1894 as winner of the first prize. In 1900 he became organist at Notre Dame in Paris and professor of organ at the Schola Cantorum. Numerous recitals in Paris and tours of France, Switzerland, the Netherlands, England, Spain, and Portugal established his reputation as one of the greatest living masters of the organ. He wrote a symphony and *Suite Bourguignonne* for orchestra; *Praxinoë, Princesse d'Égypte* for soli, female chorus, and orchestra; *Messe Solennelle* for chorus and orchestra; a string quartet, a violin sonata and a 'cello sonata; five symphonies and numerous other works for organ; sacred music; piano numbers; and songs.

VILDRAC, Charles (1882–). A French poet and dramatist. His *Le Paquebot Tenacity* (1920) was one of the more popular plays at the Vieux Colombier Théâtre, and was played in the United States in 1922. With Jules Romains and Duhamel, he was a member of the *Unanimiste* group. His poems were *Chants du désespéré, 1914–1920* (1920), and *Poèmes de l'Abbaye* (1928). As a playwright, he was objective, with an intuitive knowledge of correct proportions. Other plays include *Lion d'Amour; Michel Auclair,* played in the United States in 1925, and *Le pèlerin* (11th ed., 1923).

VILLA, vēl'yȧ, Francisco (Pancho) (1877–1923). A Mexican revolutionary leader and bandit (see Vol. XXIII). In 1914 he raised a force of some 35,000 men to assist General Carranza against Huerta. After the defeat of Huerta, Villa quarreled with Carranza and, with the help of Zapata, caused Carranza to flee from Mexico City. In March, 1916, raiding Columbus, N. M., he killed 17 and wounded 7 Americans. This was the cause of the American expedition, under General Pershing, to capture Villa "dead or alive." Although overtaken at Guerrere and seriously wounded, Villa escaped. After that, his power declined, and on his promise to settle as a peaceful citizen, the Federals gave him $2,000,000 for himself and his men, a small farm for each man, and a ranch for himself. His assassination near Parral, Mexico, on July 20, 1923, was attributed to the vengeance of a family some of whose members he had killed.

VILLAESPESA, Francisco (1877–). A Spanish poet and dramatist. He excels in that most difficult genre, the sonnet. Among his principal works are *Intimidades*; *Tristitiæ rerum*; *El jardin de las quimeras*; *La copa del rey de Thule—La musa enferma* (1898–1900); *El alto de los bohemios: Rapsodias* (1899–1900); *Canciones del camino* (1906); *Carmen-cantares* (1907); *El espejo encantado* (1911); *El alcázar de las perlas: leyenda trágica* (play, 1912); *Era él* (1913); *Andalucia* (1913); *Judith,* Bibical play (1913); *Ajimeces de ensueño* (1914); *Campanas pascuales* (1914); *Los nocturnos del Generalife* (1915); *El halconero,* play (1915); *La maja de Goya,* play (1915); *Baladas de cetreria y otros poemas* (1916); *A la sombra de los cipreses* (1917); *Doña Maria de Padilla,* historical play (1917); and *El milagro de las rosas-novela griega* (1917).

VILLAMOR, Ignacio (1863–). A Filipino jurist, born at Bangued, Abra, P. I., and educated at San Juan de Letran College and in the law department of the University of Santo Tomas, both in Manila. From 1902 to 1907, he was judge of the Sixth Judicial District of the Philippine Islands and then Attorney General until 1913, when he became Secretary of State. He was president of the University of the Philippines (1914–18), and in 1920 he was appointed associate justice of the Supreme Court of the Philippine Islands. He wrote several books on law administration in the Philippines.

VILNA DISTRICT. This region, the northern zone of that long corridor which the Poles claimed as their rightful eastern boundary, was the scene of a long dispute between Poland and Lithuania which was not settled even after the line finally drawn by the Council of Ambassadors on Mar. 15, 1923, gave the district to Poland. Lying between Grodno on the south and Dvinsk on the north, with the city of Vilna at its centre, and possessing the important Warsaw-Vilna-Dvinsk Railway section, the territory has an area of some 6000 square miles and a population put at 1,300,000. Of this, according to the Polish estimates, Poles totaled 25 per cent, although the pre-war census had put the figure at only 10 per cent. Besides Lithuanians, there were to be found here also White Russians, Jews, and Germans, and the racial and nationalistic loyalties of this diverse population made the demarcation of a just line practically impossible. At the Peace Conference, an attempt was made to cut the Gordian knot with the so-called Curzon line which kept almost rigorously to the confines of Congress Poland and left the Vilna district to Lithuania (accepted by the Supreme Council, December, 1919), but the settlement was deemed inadequate by almost all the Allies, including France and the United States, and was never observed by the Poles, who pushed into the disputed region and effectively occupied it. Not only was the hostility of the Lithuanians awakened (for they regarded the town of Vilna as the centre of their nationalistic aspirations) but the Russians were equally aroused. Here was the reason for the perplexing events of 1920.

Early in 1920, Poles massed against the Red armies, took Dvinsk, entered Vilna on April 20, and then pushed triumphantly across White Russia and captured Kiev on May 8. This was the high-water mark of Polish success and was followed by equally notable defeats. With the Poles in full retreat by July, the Supreme Council hastened to take action. The Spa Conference suggested that the Poles retire behind the Curzon line and broached the question of a general conference, but nothing came of it, and the Russian advance continued. Meanwhile Lithuanians had reëntered Vilna and on July 12, a Russo-Lithuanian treaty ceded the disputed district to the Lithuanian government. By the end of July, the Russians were threatening Warsaw; in another two months, so bewildering were the reverses, the Poles had turned about, routed the Russian armies, and passed beyond Grodno, Brest-Litovsk, Kovel, and Luck. Vilna was again theirs. The attempt of the League of Nations Council to take a hand in the dispute proved a failure, for while on October 7 a League commission fixed a neutral zone leading to the city of Vilna and along a line running about forty miles north and south (the Suwalki agreement), two days later, General Zeligowski, at the head of a Polish irregular force, entered the city and claimed it for Poland. On Oct. 12, 1920, by the Treaty of Riga, Russia recognized Polish claims to the whole disputed zone on the east of Poland, including Vilna and stretching so far south as to take in the whole of eastern Galicia. The Poles took possession of Vilna at once and held a plebiscite in the city in January, 1922; this, proving favorable to Poland, was followed by the seating of the Vilna delegates in the Polish Parliament. On Mar. 15, 1923, the Polish occupation was legalized when the eastern boundary fixed by the Council of Ambassadors was made to follow the Treaty of Riga line on the east and to include the whole Vilna district on the northeast. See Lithuania, under *History*; Poland, under *History.*

Kresy. By this name, the Poles designate the portion of the eastern corridor lying between Vilna and eastern Galicia and east of the Curzon line. Claimed by both Poland and Russia, it, too, was finally ceded to Poland in March, 1923. Made up of part of White Russia and the Ukraine, with an area of some 43,000 square miles, this border region contained a population of some 3,700,000, of whom, according to the Poles, 32 per cent were Polish, while the pre-war Russian census showed a Polish population of only 6 per cent. This region was affected by all the happenings that influenced the fortunes of Vilna. It lay beyond the Curzon line; it was won, lost, and won again by the Poles in their operations against the Red Armies in 1920; it was yielded up to Poland by Russia as the result of the Riga Treaty; and finally in March, 1923, it was included in the Polish state by the decision of the Council of Ambassadors. With their customary despatch and with a complete disregard of the desires of the large racial minority living there, Polish officials proceeded to nationalize the annexed territory. The Polish language was substituted for the Russian; Polish peasants were colonized; the administration centres, in order to break the alien influence, were moved from such large cities as Grodno to cities of secondary importance such as Bialystok and Novogrodek, the latter without even a railway connection; but the Kresy looked to Moscow as Vilna did to Kovno, and in spite or the fact that Soviet Russia, after October, 1920, made no attempt to regain these lost provinces, there was every reason for believing that the settlement had too many artificial elements in it to be lasting. The danger zones in the Polish system included almost half its 1929 area, i.e., Vilna, "Kresy," East Galicia, and Upper Silesia, where there were large irredentist groups in which Germany and Russia could not help being interested.

VINCENT, EDGAR. FIRST BARON D'ABERNON. See ABERNON, EDGAR VINCENT D'.

VINCENT, HENRI JEAN (1862–). A French physician and professor of medicine, born at Bordeaux. A professor at the Collège de France, he conducted researches in medical and surgical tetanus and antitypho-paratyphoid vaccines which won him membership in the Academy of Medicine and the Academy of Science. He also served as inspector of hygiene and epidemiology in the French Army. He was made a Grand Officer of the Legion of Honor. ' His works which have had English translations include *Vincent's Angina*; *Infectious Diseases*; and *Anti-colibacillary Serotherapy*.

VINOGRADOFF, vē'nō-grä'dôf, SIR PAUL (1854–1925). An English jurist and educator (see VOL. XXIII), Corpus professor of jurisprudence at Oxford (1903–1925). In 1917 he was knighted for his work as a liaison officer between England and Russia. He lectured at the University of Leyden (1921), and at various American universities (1923). He received numerous honorary degrees, was a member of many European academics, and was director of the British Academy publications on social and economic history. He edited *Oxford Studies in Social and Legal History* (1909–21) and the Russian section of the Carnegie Endowment Fund *Social and Economic History of the War* (1914–17). He wrote *Self-Government in Russia* (1916); *Historical Types of International Law* (1923); and *Custom and Right* (1925). Consult *Paul Vinogradoff: a Memoir,* by the Rt. Hon. H. A. L. Fisher (1927).

VÍQUEZ, CLETO GONZÁLEZ (1858–). A President of Costa Rica, who was born in Barba, Province of Heredia, and educated in the College of Law there. In addition to a successful legal career, he served as a member of Congress and at various periods held the portfolios of Finance, Foreign Affairs, Promotion, and Interior. He was President of the Republic in 1906–10 and was reëlected in 1928 for the term ending in 1932. During his public life, he secured the enactment of a numbér of important legislative and administrative reforms. He is the author of several works on history and finance and of *Temblores, terremotos, inundaciones y erupciones volcánicas en Costa Rica 1608–1910* (1910).

VIRGINIA. The thirty-third State in size (42,627 square miles) and the twentieth in population; capital, Richmond. The population increased from 2,061,612 in 1910 to 2,309,187 in 1920, a gain of 12 per cent; estimated population, 1928, 2,575,000. White population increased from 1,389,809 (1910) to 1,617,909 (1920); Negro, from 671,096 to 690,017; native white, from 1,363,181 to 1,587,124; and foreign-born white, from 26,628 to 30,785. Both urban and rural populations rose, the former from 476,529 to 673,984 and the latter from 1,585,083 to 1,635,203. The growth of the principal cities was as follows: Richmond (q.v.), 1910, 127,628; 1920, 171,667; Norfolk (q.v.), 67,452 to 115,777; Portsmouth, 33,190 to 54,387; Roanoke, 34,874 to 50,842.

Agriculture. Although Virginia is one of the cotton-producing States, only a small part of the farm area is devoted to cotton cultivation and, consequently, the State has not suffered much from the ravages of the boll weevil and other destructive insects as have the States farther south. The weevil did not reach the State until 1922 and on account of the cold winters was not a serious menace. The production of cotton was, with the exception of one or two years, comparatively stable. In 1913 the acreage was 47,000 and the production 23,000 bales; 1920, 42,000 and 22,000; 1922, 55,000 and 27,000; 1928 (estimated), 79,000 and 44,000. The number of farms increased only 1.2 per cent, or from 184,018, in 1910 to 186,242 in 1920, but rose thereafter to 193,723 in 1925. The total acreage in farms decreased from 19,495,636 (1910) to 18,561,112 (1920) and 17,210,174 (1925). The improved land in farms totaled 9,460,492 acres in 1920. The total value of farm property rose by 91.4 per cent, or from $625,065,383 in 1910 to $1,196,555,772 in 1920, but declined moderately to $999,465,839 in 1925; the average value per farm was $3397 in 1910, $6425 in 1920, and $5159 in 1925. In interpreting these values, the inflation of the currency incident to the World War is to be taken into consideration. The percentage of the total area in farms was 75.7 in 1910, 72 in 1920, and 66.8 in 1925. Of the total number of farms in 1925, 143,587 were operated by owners; 1238, by managers; and 48,898, by tenants. The comparative figures for 1910 were 133,664; 1625; and 48,729, respectively. There were 138,456 white and 47,786 colored farmers in 1920; 143,576 white and 50,147 colored in 1925. Farms reported as under mortgage, 24,331 in 1920, numbered 27,075 in 1925. The total number of cattle was 909,795 in 1920; 806,524 in 1925; there were 509,304 dairy cows in 1920; 291,651 in 1925. Sheep numbered 342,367 in 1920; 350,850 in 1925; swine, 941,308 in 1920; 582,193 in 1925. The estimated production of the principal farm products in 1928 was as follows: Corn, 45,155,000 bushels; wheat, 9,758,000; oats; 4,641,000; barley, 9,758,000; potatoes, 21,593,000; sweet potatoes, 6,336,000; tobacco, 111,600,000 pounds, and hay, 1,479,000 tons, For cotton, see above.

Comparative figures for 1913 are corn, 51,480,000 bushels; wheat, 10,608,000; oats, 4,192,000; barley, 286,000; potatoes, 9,870,000; hay, 952,000 tons; and tobacco, 154,000,000 pounds.

Mining. The chief mineral products of the State are coal, clay, stone, and cement. Of these, coal is by far the most important. The progress of coal mining in the period starting with 1914 is indicated by the following production figures: 1914, 7,959,535 net tons; 1916, 9,707,474; 1917, 10,087,091; 1918, 10,289,808; 1920, 11,378,606; 1921, 7,492,378; and 1922, 10,491,174; 1926, 14,133,386. The value of the clay products ran between $2,000,000 and $4,000,000 annually. The State also produces iron ore, sand and gravel, and gypsum. The total value of mineral products in 1926 was $46,136,458, compared with $60,161,247 in 1920; $36,799,407 in 1919; $37,639,368 in 1918; and $16,400,347 in 1914.

Manufactures. Virginia showed considerable increase in manufacturing after 1909. In 1920 there were 11 cities having more than 10,000 inhabitants. These formed 23.8 per cent of the total population and in 1919 produced 52.2 per cent of the value of the State's manufactured products. In 1909 there were in the State 5685 manufacturing establishments; in 1919, 5603; and in 1925, 2553. Persons engaged in manufactories numbered 120,797, 119,352, and 112,136, respectively; the capital invested amounted to $216,392,388 in 1909 and $463,644,498 in 1919. The value of the manufactured product amounted to $219,793,858 in 1909; $643,511,621 in 1919; $589,511,000 in 1925; and $730,461,810 in 1927. The increase in value of products in and about 1919 was largely due to the change in industrial conditions brought about by the World War and cannot properly be used to measure the growth of manufactures during the period. The first industry in point of value of products is the manufacture of tobacco. In 1909 this amounted to $25,385,000; in 1919, to $78,350,000; in 1925 were produced 460,000,000 cigars, 10,229,406,903 cigarettes, and 21,639,123 pounds of other tobacco. In 1927 the value of the output was $182,071,911. Lumber and timber products attained $35,855,000 in 1909; $56,394,000 in 1919; $23,895,561 in 1925. In 1927 Virginia had 41 industries with an output in excess of $3,000,000 each, tobacco, as stated, having first place. Others in order were, iron and machinery, $32,071,124; shipbuilding, $31,745,895; mining, $31,379,206; cotton-mill products, $30,380.99; silk-mill products, $29,640,382; railroad shops, etc., $28,578,074; paper and pulp mills, $27,571,434; automobiles, $24,668,520; furniture, $23,199,968; and flour- and grist-mill products, $20,419,833. The chief manufacturing city was Richmond (q.v.). In 1909 its manufactured products were valued at $47,358,000; in 1919, at $156,724,000; and in 1925, at $157,450,000.

Education. The progress of education in Virginia has been marked by important steps in recent years. The Legislature, in a succession of its sessions, has passed several important laws which greatly assisted the administration of the school system. The Assembly of 1922 enacted three important educational bills, covering compulsory education, the county-unit system of school administration, and the adoption and distribution of textbooks. The compulsory-education law was greatly superior to that previously in force. The county-unit law became effective in September, 1922. Negro education is a problem in Virginia, as in other Southern States, but in this phase of education also there was progress. Twenty-three county training schools were devoted to the needs of Negroes, and from the Julius Rosenwald Fund, nearly 160 public schools were built for colored people. Vocational work under the Smith-Hughes Law was established in 1917–18, including vocational agriculture, vocational home economics, and trade and industrial education. In 1922–23, 53 of the 100 counties of the State were provided with training in vocational agriculture. The work in trade and industrial education, which was meeting with considerable success, was intended to serve pupils enrolled in public schools, those already engaged in industry, who could give a part of their time to industrial class work, and others. Notable progress also was made in the programme of health and physical education. Approximately 75 per cent of the pupils in the schools received physical inspection under the general direction of the State Board of Health and the State Board of Education in 1922–23. The public-school enrollment in the State increased from 474,210 in 1915 to 551,475 in 1925–26; of this total, 481,799 were enrolled in kindergarten and elementary grades and 69,676 in high schools. Colored enrollment contributed to the total 147,245 in elementary and 5729 in secondary grades. Expenditure for public day schools was: current, $17,628,569; outlays, $4,126,869. The percentage of illiteracy in the State decreased from 17.9 in 1910 to 13.5 in 1920: in the native white population, from 9.4 to 7.1 per cent; in the foreign-born white, from 9.3 to 7.5; and in the Negro, from 37.1 to 29.3.

Finance. State expenditure in the year ended June 30, 1927, as reported by the U. S. Department of Commerce, was: for maintenance and operation of State departments, $23,762,635 (of which $5,710,371 was aid to local education); for interest on debt, $763,839; for permanent improvements, $12,758,777; total, $37,285,251 (of which $15,711,805 was for highways, $5,176,483 being for maintenance and $10,535,322 for construction). Revenue was $38,995,736. Of this, property and special taxes formed 35.1 per cent; departmental earnings and charges for officials' services, 9.6 per cent; sales of licenses and taxation of gasoline, 39.8 per cent. Property valuation was $765,373,554; State taxation thereon, $5,877,960, intangible property alone being taxed. Net funded State debt on June 30, 1927, was $26,637,392.

Political and Other Events. In 1914 a measure providing for State-wide prohibition was adopted by the people. In 1916, 1922, and 1928, Senator Claude A. Swanson was reëlected. For President, in 1916 Wilson received 102,824 votes; Hughes, 49,256. On Mar. 1, 1916, the prohibition law went into effect. In 1917 the Democratic candidate for governor, Westmoreland Davis, was elected. Senator Martin was reelected in 1918. He died in 1920, and Carter Glass, Secretary of the Treasury, was appointed to fill his unexpired term. For President, in 1920 Cox received 141,670 votes; Harding, 87,458. The Democratic candidate for governor, E. Lee Trinkle, was elected in 1921. For President, the vote in 1924 was: Davis, 139,797; Coolidge, 73,359; La Follette, 10,379. Harry F. Byrd, Democrat, was elected governor in 1925. He carried out a programme of fiscal reform, in coöperation with the General Assembly. A movement progressed in 1927 and 1928 to acquire a part of the Blue Ridge to form a Shenandoah

National Park. In 1928 the vote of the State for President was: Hoover, 164,609; Smith, 140,146.

Legislation. The Legislature of 1918 passed measures regulating the practice of women at law. A general prohibition law was passed and a commission was appointed to study the educational system of the State. Laws regulating the labor of women and children were amended, and an elaborate measure was enacted relating to safety in industry. A new workmen's-compensation law also was passed. In 1918 the Legislature passed a law providing for a budget. In 1922 the Legislature amended the laws relating to labor and the workmen's-compensation law and passed a motion-picture censorship bill. In 1923 a special session of the Legislature was held, when it passed a series of acts relating to highways and motor vehicles and enacted a measure designed to prevent the operation of "rings" among bidders for State work. During the regular session of 1924, the Legislature passed an act regulating more rigidly the operations of the Virginia Pilot Association, which, up to that time, had been a powerful political factor in the State. In 1926 measures sought by Governor Byrd to transfer the taxation of land values to the counties solely and reserve taxation of intangibles to the State were enacted. An amendment to the State constitution, restricting elective State officers to three, was passed in the sessions of 1926 and 1928.

VIRGINIA, UNIVERSITY OF. A nonsectarian institution of higher learning at Charlottesville, Va., founded in 1819. The student enrollment, including the summer quarter, for the academic year 1913–14 was 2138, as compared with 4890 in 1928–29. The faculty in 1914 comprised 103 teachers; in 1928, 290. During this period, the institution received from Paul Goodloe McIntire $200,000 to found a school of commerce and business administration; $150,000 to found a school of art, now known as the McIntire School of Fine Arts; $70,000 for an amphitheatre and outdoor organ; $50,000, to which other donors added $115,000, for two wings to the hospital; and $118,000 from John B. Cobb for the Cobb Chemical Building and Laboratory, besides $300,000 for a new gymnasium from students, alumni, and others. The library contained approximately 140,000 volumes in 1928. President, Edwin Anderson Alderman, Ph.D., D.C.L., LL.D.

VIRGIN ISLANDS. An American dependency in the West Indies, consisting chiefly of the islands of St. Thomas, St. Croix, and St. John's. Total area, 132 square miles. The United States took possession of these islands, following their purchase from Denmark for the sum of $25,000,000, on Mar. 31, 1917. In that year, the population was placed at 26,051. Subsequent partial population surveys indicate a decrease, ascribed to emigration. Of the total population, 80 per cent is Negro, 13 per cent, of mixed race, and 7 per cent, white.

Production. Agriculture was formerly the chief industry of the islands, but, after the abolition of slavery, the laboring classes showed a tendency to concentrate about the ports. Some 70,000 acres were devoted to agriculture in 1917. In 1920 there were 430 farms, 102 worked by white farmers and 270, by Negroes. Sugar cane is the chief product. In 1917 about 9000 acres were devoted to it, the production being valued at about $440,000. Sugar exports in 1928–29 were valued at $669,398. The total value of farm products in 1917 amounted to $3,706,911. Other products were vegetables, cotton, bay rum, fruits, and nuts. The value of all crops in 1917 was $522,606. The production of bay rum in 1928–29 was 91,116 gallons. Shipments of cattle to Porto Rico were increasing.

Commerce. The value of the Virgin Islands to the United States principally lies in their geographic location and their exceptional harbor facilities rather than in their commercial and agricultural interests. The chief exports are sugar, hides, skins, and cabinet woods. Prior to the enactment of the United States Prohibition Amendment, there was a large export of rum, and the cutting off of this source of revenue had a very serious effect on the economic condition of the islands. Exports to the United States in 1917 were valued at $1,259,607. In 1927 they were but $968,463. Imports from the United States in 1917 amounted to $1,416,342 and, subsequently rising, reached $2,053,340 for 1927.

Education. Education is compulsory. The total enrollment in the public schools of the islands was 2950 in the year 1928–29. The appropriation for education in the latter year was $95,269. Junior high schools and a summer school for teachers have been established and night schools opened in several of the larger towns. Manual-training schools also have been established.

Transportation and Communication. Regular transportation has been maintained between the islands and New York City. Each municipality had a post office, cable office, and telephone system. The naval station at St. Thomas has a powerful radio station. There is also a naval station on the island of St. Croix. A weekly airmail service from San Juan, Porto Rico, was inaugurated in 1929. In 1928–29, 655 ships of a total gross tonnage of 2,651,397 entered the Harbor of Saint Thomas.

History. The islands are administered by the U. S. Navy Department. The governors have been Rear Adm. James H. Oliver (1917–19), Rear Adm. Joseph W. Oman (1919–21), Capt. Sumner E. W. Kittelle (1921–23), Capt. H. H. Hough (1923), Capt. Philip Williams (1923), Capt. Waldo Evans (from 1927). By the Organic Act of Mar. 3, 1917, the United States Congress vested all military, civil, and judicial powers in a governor appointed by the President and continued in force the Danish code under which the islands had been governed. Citizenship was held by males over 25 possessing an annual income of 1500 francs. Criticism was frequent in the United States on the despotic character of the American administration. It was charged that Americans, unlike their Danish predecessors, refused to fraternize with the Negroes, that free speech was being suppressed, and local leaders proceeded against summarily. On another ground, there were complaints in many quarters that the American officials were doing nothing to aid the economic development of the islands. The exceptionally severe hurricane of September, 1928, did great damage to the islands.

VISION. In the field of vision, Prof. L. T. Troland brought together, in a monograph published by the National Research Council (*Bull.*, vol. v, no. 27, December. 1922), the available experimental data on the "Present Status of Visual Science." Passing lightly over the theories of color vision, he concentrated his attention on the psychophysics of vision. He reduced the introspective attributes of color to brilliance, saturation, and hue, the last two being included in the term "chroma." Each of these attributes can be correlated with the wave length, intensity, and purity of the light stimulus. Troland also made a similar analysis of the perception of forms and of things in motion, first separating the introspective conditions from the physical and then proceeding to work out psychophysical relationships between them.

These relationships or functions he sought to divide among the several stages of visual response. For instance, he assigned such effects as scotopic and photopic adaptation to the receptors, while other effects, such as Carpentier's bands, he attributed to the afferent conduction, with still others, like motion perception, belonging to the cortex. These relationships hold between the stimulus and the visual consciousness, but in some instances, according to Troland, "we are actually able to establish empirically the relationships between visual consciousness and stages in the response other than the stimulus." He went on to say that "this is particularly true with respect to the central process itself. The disturbances of vision which accompany lesions in the occipital lobe of the cerebrum demonstrate clearly the fact that the totality of the visual consciousness depends psychophysically upon the brain process; so that relations such as those studied in the majority of laboratory experiments, between consciousness and the stimulus, must be explained in terms of the physiological mechanism of the response, leading up to the focal region in the cortex, as well as by the direct psychophysical relation which exists between consciousness and the cortical activity in question."

Professor Troland's monograph contains a detailed bibliography of 268 titles, to which we refer the interested reader.

In the field of color vision, Hecht has been able to produce binocular fusion of colors, red and green giving yellow, and blue and yellow giving white. Hecht overcame the difficulties met by Helmholtz and others in obtaining binocular fusion through the use of special filters. Successful fusion was obtained in all persons who had normal color vision. These findings offer serious difficulty for those color theories that assume special receptors for yellow and white and lend new support to the old Young-Helmholtz theory of color vision. *Proceedings of the National Academy of Sciences*, 1928, p. 237.

The immense number of brain lesions suffered during the War has given rise to an extensive series of investigations and reports on the relation between brain structure and visual function. A recent review of this literature (H. Klüver, "Visual Disturbances after Cerebral Lesions," in *Psychological Bulletin*, 1927) contains 271 titles, and this is by no means a complete survey.

One of the outstanding events of the present decade is the publication of an English translation of Helmholtz, *Physiologische Optik*, 3 vols., under the editorial direction of J. P. Southall. After nearly three-score years, this famous work has at last become directly accessible to English readers. A review of the recent literature on visual sensations will be found in the *Psychological Bulletin*, 1928, p. 20. See PSYCHOLOGY, EXPERIMENTAL.

VITAL STATISTICS. The movement of population after 1914 was temporarily perturbed by the years of war and pestilence, 1914–19. After this period, the birth and death rates became stabilized, but further confusion resulted from the formation of new States, so that figures available for Russia, the Balkans, Greece, and some of the new national states of Europe are not always on a basis comparable with the years before the war. A recent compilation of death rates of the leading nations of the world is given herewith and is of interest.

DEATH RATES OF VARIOUS COUNTRIES IN RECENT YEARS

Countries	Years	Death rate
New Zealand	1926	8.7
South Australia	1926	8.7
Western Australia	1926	8.9
Queensland	1925	8.9
Tasmania	1926	9.1
New South Wales	1925	9.2
Australia	1926	9.4
Victoria	1925	9.5
Union of South Africa (Whites)	1926	9.6
Netherlands	1926	9.8
Uruguay	1926	10.5
Norway	1926	10.6
Denmark	1925	10.8
Panama	1923	11.0
Canada	1927	11.1
Germany	1926	11.5
England and Wales	1926	11.6
Switzerland	1926	11.7
Sweden	1926	11.8
Prussia	1925	11.9
United States (Reg. Area)	1928	12.1
Belgium	1926	12.8
Iceland	1923	12.8
Scotland	1926	13.0
Finland	1926	13.4
Greece	1921	13.8
Quebec	1927	13.9
Irish Free State	1926	14.1
Newfoundland	1923	14.2
Latvia	1924	14.8
Argentina	1921	14.8
Austria	1926	14.9
North Ireland	1926	15.0
Estonia	1924	15.2
Czechoslovakia	1925	15.2
Hungary	1926	16.6
Italy	1925	16.8
France	1926	17.5
Spain	1926	19.0
Japan	1926	19.2
Bulgaria	1924	20.7
Rumania	1925	21.0
Jamaica	1925	21.4
Ceylon	1926	24.7
British India	1925	24.7
Egypt	1925	26.2
Chile	1925	27.6

Deaths. While the gross death rate is available for the regions enumerated, the figures often possess very limited value; for infant mortality, as well as deaths by ages and sex, they are not separately given, and there are no means for determining the reasons for the great disparities of mortality in different countries. Under a similar civilization, the death rate of Chile is nearly double that of Argentina; the mortality of Scotland is sensibly higher than that of England and Wales. The death rate is notably higher in France than in Germany and Great Britain and much higher in Spain than in Italy. In most of the statistics, the population on which the death rate per 1000 is computed is only an estimate. Hence, the percentages are only approximations. The lowest figures are supplied by New Zealand, with a death rate between 8 and 9 per 1000 inhabitants, and Australia with 9.4; at the other extreme stands Chile, with more than 27. Other very low figures are furnished by the Netherlands and Denmark, with 9.8 and 10.8, respectively. England and Wales show slightly below 12, while Switzerland has between 11 and 12, and the death rate for the whole of Canada was 13.74 for the year 1921 but fell to 11.1 in

1927. Germany shows a mortality of 11.5, which is slightly below that of England and Switzerland. The figure for Italy is 16.8; that for France, 17.8. Austria and Argentina have about 14.8.

Death rates above 18 are shown by Spain with 19 and Japan with 19.2. Figures available for tropical countries are not numerous. Further figures could be supplied, but as already stated, the lessons of these crude statistics are not obvious. They may be contrasted, however, with death rates in the United States for 1928.

Statistics for 1928 show a death rate of 12.1, as compared with 11.4 for 1927 and increases were reported in 36 of the 38 States. The highest 1928 death rate (14.5 each per 1000 population) is shown for California and Mississippi and the lowest rate (7.4) is for Idaho. The figures by States are given in the accompanying table.

On Dec. 30, 1927, the figures of mortality for the registration area of the United States for 1925 and 1926 were released and showed a slight increase over 1924; the rate for 1926, 12.2, being a trifle more than for 1925. The figures for 1925 and 1926 show an increase for heart disease, cancer, influenza and pneumonia, nephritis, and whooping cough over previous years, while there were fewer deaths from intestinal ailments, including typhoid fever. In 1926 the list was headed by about 233,000 deaths from diseases of the heart and arteries; pneumonia, influenza, bronchitis, whooping cough, measles (broncho-pneumonia), and other acute respiratory diseases claimed over 175,000 victims; nephritis totaled 103,332 deaths; and cancer, 99,833. Tuberculosis, believed to be receding, caused 91,568 deaths, as against 89,268 in 1925. Apoplexy shows a gain, with 90,382. Diabetes, despite radical innovations in treatment, with 18,881 deaths in 1926, shows an increase over 1925. Appendicitis, despite much life-saving from operation, shows no decrease in mortality.

In a subsequent bulletin dealing with the principal causes of death in 1928, the Bureau of the Census announced that 1,378,675 deaths occurred in 1928 in the registration area in continental United States, corresponding to a death rate of 12.0 per 1000 population, as compared with 11.4 in 1927. This area in 1928 comprised 44 States, the District of Columbia, and 10 cities in nonregistration States, with an estimated population on July 1 of 114,495,000, or 95.4 per cent of the population of the United States. In 1927 the registration area included only 91.3 per cent of the total population.

Increases in rates (per 100,000 population) from those of the preceding year, were from the following principal causes: diseases of the heart (195.7 to 207.7), cerebral hemorrhage and soft-

UNITED STATES VITAL STATISTICS—1928

Births and deaths (exclusive of stillbirths), with rates per 1000 estimated population, and infant mortality, in the birth-registration area in continental United States, 1928

Area	Number—1928			Rate per 1000 estimated population				Infant mortality (deaths under 1 year per 1000 births)	
	Births	Deaths		Births		Deaths			
		All ages	Under 1 year	1928	1927	1928	1927	1928	1927
Birth registration area [a]	2,062,760	1,265,487	139,567	19.7	20.6	12.1	11.4	67.7	64.6
Alabama	63,555	31,854	4,765	24.7	26.5	12.4	10.6	75.0	64.4
Arizona	8,903	6,453	1,266	18.8	18.6	13.6	12.8	142.2	130.1
Arkansas	38,183	20,012	2,557	19.6	21.0	10.3	9.5	67.0	60.9
California	83,387	65,947	5,178	18.3	19.0	14.5	13.9	62.1	62.3
Colorado	19,022	14,063	1,708	17.5	([b])	12.9	12.2	89.8	([b])
Connecticut	28,017	17,929	1,653	16.8	17.7	10.8	10.2	59.0	58.8
Delaware	4,311	3,196	338	17.7	17.5	13.1	12.4	78.4	70.6
Florida	29,828	18,953	2,002	21.1	25.0	13.4	13.3	67.1	67.4
Georgia	59,143	36,011	4,322	18.5	([b])	11.2	([b])	81.5	([b])
Idaho	9,081	4,040	504	16.6	17.2	7.4	7.1	55.5	50.0
Illinois	129,668	90,192	8,321	17.5	18.3	12.2	11.4	64.2	64.4
Indiana	60,289	40,494	3,767	19.0	19.8	12.8	12.0	62.5	58.8
Iowa	42,774	25,313	2,302	17.6	18.4	10.4	10.1	53.8	55.5
Kansas	33,691	20,922	1,993	18.4	19.0	11.4	10.2	59.2	55.3
Kentucky	57,954	30,226	4,109	22.7	24.6	11.8	10.7	70.9	61.0
Louisiana	41,400	24,984	3,292	21.2	23.9	12.8	12.3	79.5	77.4
Maine	16,404	11,005	1,194	20.6	20.6	13.8	13.8	72.8	80.0
Maryland	31,724	21,653	2,533	19.6	20.3	13.4	13.2	79.8	81.5
Massachusetts	79,026	51,034	5,084	18.4	19.4	11.9	11.6	64.3	64.5
Michigan	97,500	54,751	6,789	21.2	22.3	11.9	11.3	69.6	67.7
Minnesota	49,413	25,979	2,658	18.2	19.0	9.5	9.2	53.8	51.9
Mississippi	48,034	25,900	3,569	26.8	27.5	14.5	13.0	74.3	66.8
Missouri	63,239	45,280	4,164	18.0	18.9	12.9	11.6	65.8	59.7
Montana	9,936	5,781	613	18.1	13.7	10.5	7.5	61.7	66.4
Nebraska	28,029	13,489	1,448	19.9	20.0	9.6	8.9	51.7	51.2
New Hampshire	8,665	6,442	602	19.0	19.3	14.1	13.9	69.5	69.2
New Jersey	70,080	44,960	4,568	18.3	19.4	11.8	11.2	65.2	61.3
New York	223,084	151,637	14,394	19.3	19.9	13.1	12.3	64.5	59.4
North Carolina	80,893	36,165	6,903	27.5	28.8	12.3	11.4	85.3	79.1
North Dakota	14,176	5,264	839	22.1	22.9	8.2	8.1	59.2	63.4
Ohio	119,845	80,209	7,956	17.6	18.4	11.8	11.0	66.4	61.8
Oklahoma	42,991	21,075	2,964	17.7	([b])	8.7	([b])	68.9	([b])
Oregon	14,035	10,488	658	15.6	16.4	11.6	11.5	46.9	47.5
Pennsylvania	200,769	119,616	14,507	20.4	21.6	12.1	11.4	72.3	69.0
Rhode Island	13,021	8,398	878	18.2	19.5	11.7	11.2	67.4	66.5
South Carolina	43,285	24,427	4,178	23.2	([b])	13.1	11.8	96.5	([b])
Tennessee	50,363	31,391	4,070	20.1	22.0	12.5	11.7	80.8	71.1
Utah	12,962	5,038	764	24.4	24.7	9.5	9.1	58.9	54.3
Vermont	7,042	4,886	457	20.0	19.9	13.9	13.9	64.9	69.8
Virginia	56,518	30,203	4,298	21.9	22.9	11.7	11.3	76.0	75.5
Washington	22,863	16,714	1,113	14.4	14.9	10.5	10.2	48.7	49.8
West Virginia	43,387	17,511	3,045	25.2	26.4	10.2	10.0	70.2	71.9
Wisconsin	57,398	31,788	3,526	19.4	19.7	10.8	10.1	61.4	59.1
Wyoming	4,496	2,151	307	18.2	18.6	8.7	8.2	68.3	68.9

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[a] Exclusive of Colorado, Georgia, Oklahoma, South Carolina, Massachusetts, and Utah for both years. The first four of these States were not in the registration area in 1927. The 1928 data for Massachusetts and Utah are incomplete.

[b] Not in the registration area in 1927.

DEATHS AND DEATH RATES IN THE UNITED STATES

PRINCIPAL CAUSES OF DEATHS IN THE REGISTRATION AREA OF THE UNITED STATES, 1927–28

From *United States Bureau of the Census*

Cause of Death	Deaths in the registration area in continental United States			
	Number		Rate per 100,000 estimated population	
	1928	1927	1928	1927
All causes [a]	1,378,675	1,236,949	1,204.1	1,141.9
Typhoid and paratyphoid fever	5,620	5,905	4.9	5.5
Malaria	4,167	2,875	3.6	2.7
Smallpox	131	145	0.1	0.1
Measles	6,146	4,433	5.4	4.1
Scarlet fever	2,229	2,440	1.9	2.3
Whooping cough	6,234	7,445	5.4	6.9
Diphtheria	8,263	8,426	7.2	7.8
Influenza	51,741	24,471	45.2	22.6
Dysentery	3,215	2,605	2.8	2.4
Erysipelas	2,724	2,567	2.4	2.4
Acute anterior poliomyelitis	1,381	2,013	1.2	1.9
Lethargic encephalitis	1,373	1,326	1.2	1.2
Meningococcus meningitis	2,923	1,705	2.6	1.6
Tuberculosis (all forms)	90,659	87,567	79.2	80.8
Of the respiratory system	80,285	77,195	70.1	71.3
Of the meninges, central nervous system	3,446	3,533	3.0	3.3
Other forms	6,928	6,839	6.1	6.3
Syphilis [b]	16,826	15,976	14.7	14.7
Cancer and other malignant tumors	109,770	103,578	95.9	95.6
Rheumatism	4,324	4,177	3.8	3.9
Pellagra	6,969	5,418	6.1	5.0
Diabetes mellitus	21,747	18,937	19.0	17.5
Meningitis (nonepidemic)	3,287	3,084	2.9	2.8
Cerebral hemorrhage and softening	99,624	91,001	87.0	84.0
Paralysis without specified cause	5,627	5,006	5.1	4.6
Diseases of the heart	237,849	211,976	207.7	195.7
Diseases of the arteries, atheroma, aneurysm, etc.	23,112	23,615	21.9	21.8
Bronchitis	5,975	5,651	5.2	5.4
Pneumonia (all forms)	112,195	87,230	98.0	80.5
Respiratory diseases other than bronchitis and pneumonia (all forms)	9,969	9,111	8.7	8.4
Diarrhea and enteritis	30,730	29,899	26.8	27.6
Diarrhea and enteritis (under 2 years)	23,663	23,382	20.7	21.6
Diarrhea and enteritis (2 years and over)	7,067	6,517	6.2	6.0
Appendicitis and typhlitis	17,433	16,205	15.2	15.0
Hernia, intestinal obstruction	11,954	11,309	10.4	10.4
Cirrhosis of the liver	8,630	8,098	7.5	7.5
Nephritis	108,813	100,183	95.0	92.5
Puerperal septicemia	5,692	5,715	5.0	5.3
Puerperal causes other than puerperal septicemia	9,299	9,145	8.7	8.4
Congenital malformations and diseases of early infancy	75,159	73,365	65.6	67.7
Suicide	15,566	14,356	13.6	13.3
Homicide	10,050	9,470	8.8	8.7
Accidental and unspecified external causes	90,712	84,980	79.2	78.4
Burns (conflagration excepted)	6,323	6,089	5.5	5.6
Accidental drowning	8,084	7,296	7.1	6.7
Accidental shooting	2,839	2,741	2.5	2.5
Accidental falls	16,116	15,152	14.1	14.0
Mine accidents	2,639	2,690	2.3	2.5
Machinery accidents	2,120	2,124	1.9	2.0
Railroad accidents	6,796	6,892	5.9	6.4
Collision with automobile	2,041	1,676	1.8	1.5
Other railroad accidents	4,755	5,216	4.2	4.8
Street-car accidents	1,581	1,452	1.4	1.3
Collision with automobile	542	476	0.5	0.4
Other street-car accidents	1,039	976	0.9	0.9
Automobile accidents (excluding collision with railroad trains and street cars)	23,765	21,160	20.8	19.5
Injuries by vehicles other than railroad trains, street cars, and automobiles [c]	1,819	1,593	1.6	1.5
Excessive heat (burns excepted)	654	530	0.6	0.5
Other external causes	17,916	17,261	15.6	15.9
All other defined causes	124,097	116,301	108.4	107.4
Unknown or ill-defined causes	23,560	19,060	20.6	17.6

[a] Exclusive of stillbirths.
[b] Includes tabes dorsalis (locomotor ataxia) and general paralysis of the insane.
[c] Includes airplane, balloon, and motor-cycle accidents.

ening (84.0 to 37.0), nephritis (92.5 to 95.0), diabetes mellitus (17.5 to 19.0), cancer (95.6 to 95.9), influenza (22.6 to 45.2), and pneumonia, all forms (80.5 to 98.0). The deaths from these causes numbered 741,739, which is considerably more than half the total number of deaths from all causes. Increases in rates were for measles (4.1 to 5.4); pellagra (5.0 to 6.1).

The death rate from all accidental causes increased from 78.4 to 79.2, the individual types of accidents showing the greatest increases being accidental drowning (6.7 to 7.1), and automobile accidents, excluding collisions with railroad trains and street cars (19.5 to 20.8); if deaths from these collisions were included, the total number from automobile accidents in 1928 would be 26,348 as compared with 23,312 in 1927. The corresponding rates (per 100,000 population) for 1928 and for 1927 are 23 and 21.4.

Significant among the decreases in rates from 1927 to 1928 were those from tuberculosis, all forms (80.8 to 79.2), congenital malformations and diseases of early infancy (67.7 to 65.6), whooping cough (6.9 to 5.4), diarrhea and enteritis, under 2 years (21.6 to 20.7), acute anterior poliomyelitis (1.9 to 1.2), typhoid and paratyphoid fever (5.5 to 4.9), and scarlet fever (3.3 to 1.9). The death rate from railroad accidents decreased from 6.4 to 5.9 and from mine accidents, from 2.5 to 2.3.

The study of mortality figures in the United States seems to indicate that notwithstanding the remarkable progress in public health practices and in medicine during the last century, the span of human life cannot be considered lengthened. Dr. Louis I. Dublin of the Metropolitan Life Insurance Company, in a paper presented to the American Public Health Association in 1929, submitted a study of the mortality figures since 1920 among the general population of the United States and among the insured of the Metropolitan Life Insurance Company. Dr. Dublin's conclusions were that a decreased ability for people to live much longer than 65 years was apparent. In this paper he stated:

> The expectation of life has increased, but the span of life has remained stationary. A fundamental distinction must be made between the two. The former, which is the average length of life of people in a stationary population, has shown appreciable gains and will continue to increase as public health improves and more and more diseases are brought under control. The latter has remained stationary for a long time and it is altogether unlikely that man will be able to do anything to change it. The span of life seems to be fixed by the nature of man himself. His internal structure wears out after so many years of work and use and he appears unable to master its weakness or give it stamina to last longer.
>
> That twenty years have been added to the average length of human life since public health work began to be actively practiced in the early eighties of the last century is true. But this gain can be traced to the reduced mortality of infants and to the cutting down of the unnecessary and preventable deaths of young people from typhoid fever, diphtheria, scarlet fever, smallpox, and a host of other diseases which for the most part affect persons under forty years of age. Improvement, after age forty, has been slight and almost altogether limited to women. This lack of improvement is all the more striking in view of the great effort that has been made to interest those in middle life in the conditions of their health. Such campaigns as center around the physical examinations are very desirable, but their value, so far as they go to extending the life span, is questionable. Their greatest worth is in making old age freer of discomfort.

Dr. Dublin was of the opinion that more babies would survive the perils of infancy and childhood and grow to be men and women, but the grown men and women today would die at the same age as they did a century ago.

Age and Sex. The United States Census Bureau issues two sets of mortality figures, one termed "crude" and the other "adjusted" by reason of its corrections for age and sex groups. Separate figures for sex and age, aside from infant mortality, are not supplied. In other countries, only crude figures appear to be given, with the occasional exception of infant mortality.

Infant Mortality. Figures under this head are difficult to obtain. In Great Britain, the infant mortality had dropped from the 1903 figure of 133 per 1000 to 70 per 1000 in 1926. In the United States, the death rate during the first year of life in 1924 was about 76 for the entire registration area; while in 1928 it had declined to 67.7. Even this low figure has been surpassed in Western Australia, where a minimum of 37.16 deaths per 1000 was attained in 1927. These figures of infant mortality vary, some reports including, and others excluding, stillbirths, but, in general, the figures apply only to live births. The superior figures in certain countries are due in part to natural conditions but very largely to intensive child-welfare campaigns.

For the registration area of the United States for 1926, the death rate in early infancy was 71.5, as against 73.9 in 1925. The infant-mortality rate for 1928 represents an increase as compared with 1927, the rates being 67.7 for 1928 and 64.6 for 1927. The highest infant-mortality rate (142.2) is for Arizona and the lowest (46.9) for Oregon. Infant-mortality rates were compiled for both years for 54 cities of 100,000 population or more in 1920. For 39 of these cities, the 1928 infant-mortality rates were higher than those of the previous year, the highest 1928 rate (99.3) being for Nashville, Tenn., and the lowest (42.7) for Seattle, Washington.

Marriages. This subject is of some special interest in connection with the decimation of the peoples of the warring countries and the discussion of a declining birth rate. In France, the anticipated increase in the marriage rate reached its high mark in 1920, with 623,869, and fell in the next year to 456,221, declining to 337,864 in 1927. The number of German marriages in 1927 was 538,525. In England and Wales, the number of marriages for 1926 was 279,860; in 1920 it was 379,982, and in 1919, declined to 369,411. The figures of the Department of Commerce of the United States do not appear to take cognizance of the number or rate of marriages per annum, but bulletins which cover the married state are occasionally released and one of these issued in 1922 gave the status of the married and single for 1920. Of 36,900,663 males over 15 years of age, 21,849,266 were married, and 1,758,308 were widowers, while 235,285 were divorced. Of 35,177,515 females over the age of 15, 21,318,933 were married at the time; 3,917,625 were widows, and 273,304 were divorced. The number of single males over 15 was 12,967,565; single females, 9,616,902. The number on

CRUDE BIRTH RATES VARIOUS COUNTRIES[a]

Country	Year	Rate
Egypt	1927	50.6
Soviet Republics	1925	44.9
Chile	1927	44.8
Ceylon	1927	39.5
Jamaica	1924	36.8
Rumania	1926	35.8
Japan	1927	33.6
Quebec	1927	31.9
Argentina	1926	31.1
Spain	1927	28.6
Italy	1927	26.4
Union of South Africa (whites)	1926	26.2
Uruguay	1926	25.4
Hungary	1927	25.2
Bulgaria	1927	24.6
Canada (including Quebec)	1927	24.6
Czechoslovakia	1927	23.3
Netherlands	1927	23.1
Tasmania	1927	23.0
New South Wales	1927	22.7
Queensland	1927	22.2
Western Australia	1927	22.0
Australia	1927	21.7
Finland	1926	21.7
Northern Ireland	1927	21.3
Ontario	1927	21.2
United States[b]	1927	20.4
New Zealand	1927	20.3
Victoria	1927	20.3
Irish Free State	1927	20.3
South Australia	1927	20.1
New York State	1927	19.9
Scotland	1927	19.8
Prussia	1926	19.6
Denmark	1927	19.6
Great Britain and Northern Ireland	1927	18.3
Germany	1927	18.3
Norway	1927	18.2
Belgium	1927	18.2
France	1927	18.1
Austria	1927	17.8
Switzerland	1927	17.4
England and Wales	1927	16.7
Sweden	1927	16.1

[a] Number of births per 1000 of the mean population.

[b] Figures for "provisional birth registration area," which includes about 76 per cent of the population.

whom information could not be obtained concerning the married state was 110,240 males and 50,751 females. The largest proportion of married men was found in Mississippi and Arkansas and the smallest in Nevada, percentages varying between 62.8 and 45.9. In 1926 the total number of marriages in the United States was 1,202,574. See DIVORCE.

Births. Figures on births and excess of births over deaths are found in the same frequency as death reports. A few of these follow. Argentina in 1927 had 308,689 births, an excess of nearly 173,000 over the deaths; the rate was about 31.1 per 1000. In Australia, the surplus of births over deaths in 1927 was 75,416; the birth rate, about 21.7. The surplus in Austria was 21,000; the birth rate, about 17.8. In the whole of Canada, the surplus for 1921 was about 135,000; the rate, between 29 and 30. In France in the same year, the excess of births was 117,000, and the birth rate was 18.10. By contrast, the surplus of births in Germany for the same year was nearly 700,000 and the rate was over 18.3.

In Great Britain, the surplus in England and Wales for 1922 was 294,000; in Scotland, 43,000; and in Ireland (1921), 27,000. The birth rate for England and Wales was over 25; that of Scotland, 23; and that of Ireland, over 24. In Italy, the surplus was over 461,000; the birth rate, about 28. The surplus and birth rate signify little in the absence of data covering infant mortality, which commonly varies directly with the birth rate.

The general birth rate of the United States for 1922 was 22.7, which represented quite a falling off from the preceding year, when it was 24.3. The surplus of births over deaths was 720,000. The highest birth rate was in Wyoming cities with 34.4; lowest, in rural Washington (17.3). Japan has a high birth rate, about 35, but its surplus was not correspondingly large in comparison with Germany; the latter had almost as large an excess, with a much lower birth rate. The U. S. Bureau of the Census announced in 1929 that for the birth-registration area, the birth rate for 1928 was 19.7, as compared with 20.7 for 1927. In 35 of the 40 States for which figures for the two years are shown in the accompanying table, the birth rates, were lower in 1928, as compared with 1927. The highest birth rate in 1928 (27.5 per 1000 population) is shown for North Carolina and the lowest (14.4) is for Washington.

Birth Control. Does birth control tend to lower the number of births and the birth rate? The only evidence thus far is supplied by Holland and gives a negative answer. In 1927 the excess of births over deaths was 97,484 and the birth rate 23.1, which is high for a state with high civilization; in some years, this rate was even higher. In 1916 it was 31. See BIRTH CONTROL.

VITAMIN, or VITAMINS (also VITAMINE). Since their discovery in 1909, the vitamins have never been isolated. Because of their occurrence in yeast, a substance long reputed to have medicinal properties, vitamin, or rather yeast, was urged vigorously by yeast manufacturers as a universal panacea. The subject of vitamins remains of absorbing interest and many monographs on it have appeared. Originally, as discussed under FOOD AND NUTRITION, there were three of these bodies, absence of any one of which from the diet was known to entail the development of a so-called deficiency disease. If the water-soluble, or B, vitamin is lacking, the disease beriberi develops; and if the fat-soluble, or A, vitamin is deficient, a peculiar affection of the eyes results. Both these affections are little known in America and Europe. If, on the other hand, the C vitamin is missing, scurvy develops; in civilized, temperate-zone countries, it is prone to attack young children. It is, however, easily prevented and cured by the use of fresh fruits, fruit juices, and tomatoes.

It was learned during the World War that famine conditions do not necessarily lead to the development of these deficiency diseases, because the cheapest and commonest foods usually contain sufficient vitamins; the only real danger lies in the use of a monotonous diet, such as peeled rice or preserved foods. Deprivation of vitamins in the growing child would in theory mean death or stunting, but as a matter of fact the only deficiency disease actually and constantly encountered is infantile scurvy. The original number of known vitamins has recently been increased by others, the absence of which from the diet may, perhaps, in conjunction with other factors, be a cause of rickets. (See RICKETS.) In May, 1924, Prof. Walter H. Eddy of Columbia University announced the isolation in pure state of Vitamin D, a study of which reveals its identity with a substance known as Wildier's Bios, a sort of forerunner of the vitamins, which dropped out of sight after their discovery.

Professor C. Funk, now of Warsaw, the discoverer of vitamins, has recently summed up our present knowledge of these substances in an abstract published in the *Revue de médecine* for 1928, No. 5. Vitamins are essential to the proper growth and development of the skeleton, as shown in the disease, rickets. The word "vitamin" was evidently formed by Funk because of the resemblance of the action of this class of substances to certain amines; and, for the same reason, he prefers to term the anti-rachitic vitamin a vitasterin because of the similarity of action between this substance and ergosterin. Vitamin D, or, as he prefers to call it, vitasterin E, presides over the calcification and harmonious growth of the bones and, as he also believes, of the teeth as well. Funk believes that some of the epidemic and endemic maladies, in the last analysis, may depend on some defect in the diet and cites the influenza epidemic of 1918–19, which developed when the world was on rations. Tuberculosis and leprosy also stand in some relationship to defective diet, while cancer, diabetes, and gout result from overfeeding. Naturally, the problem is a complicated one, for there are other organic growth agents besides vitamins—certain amino-acids, for example; there must be mineral matter for skeletal and other growth and, finally, the internal secretions, or hormones, also stand in close association with growth and development.

The subject is in a transitional stage and some of the statements of past years may require a radical modification. The present count comprises the vitamins A, B, C, of the textbooks, with the addition of D, which is associated in some way with the disease rickets, and E, which is concerned only in reproduction among certain small laboratory animals. To these may be added a so-called vitamin X, which is believed to play a rôle, through its absence, in the genesis of pellagra. Naturally, this sort of innovation will end in a *reductio ad absurdum* or else all of our knowledge will have to be revised.

The dictum that vitamins are formed only in the plant world and that the animal, including man, must get his vitamins either from the plants themselves or from animals who directly or indirectly subsist on plants, seems likely to be overthrown, for some evidence is forthcoming that animals on a vitamin-free diet can manufacture these bodies in their intestines from the sterile food. There is some reason for the belief that pregnant women, if fed on a vitamin-rich diet, are less likely to abort and more likely to bear well-developed and healthy children. Under favorable conditions, the new-born babe has a store of vitamins, but this is soon lost if the nourishment is deficient in this respect. See DIET; FOOD AND NUTRITION; PELLAGRA; RICKETS.

VITTADINI, FRANCO (1884–). An Italian composer, born at Pavia. Having received his first musical instruction in his native city and in Lodi, he entered the Conservatorio Giuseppe Verdi in Milan, where his teachers were Andreoli (piano), Balli (harmony), and Ferroni (composition). He became more widely known through his opera, *Anima Allegra* (Rome, 1921; New York, 1923), the text of which Illica had originally written for Puccini. *Nazareth* was brought out at Monte Carlo (1926) and *Segerto* at Milan (1929). Two other operas, *Mare di Tiberiade* and *Sirenetta,* have not been produced (1929). He also wrote a considerable amount of church music.

VITTORIA, DUCA DELLA. See DIAZ, ARMANDO.

VIVIANI, vē′vyȧ′nē′, RENÉ (1863–1925). A French statesman (see VOL. XXIII), who was Prime Minister at the outbreak of the World War. He resigned in October, 1915, afterward becoming Minister of Justice in Briand's cabinet and later holding the same office under Ribot. He visited the United States twice, first in 1917 as the head of the French Commission sent for the purpose of influencing the American people to help in the War, and the second time in 1921, when he was a delegate to the Disarmament Conference in Washington. In 1920 he was appointed French delegate to the first meeting of the League of Nations. He spent the last years of his life, from June, 1923, until his death in an asylum.

VLAMINCK, MAURICE DE (1876–). A French lithographer, illustrator, and painter in water colors. His works, exhibited at the Salon des Indépendants and the Salon d'Automne, are considered outstanding examples of modern abstract art. He popularized the Negro art revealed in the fetishes of African savages, which exerted a powerful influence upon the development of cubism. See PAINTING, under *France.*

VOCATIONAL EDUCATION. See EDUCATION IN THE UNITED STATES.

VOCATIONAL REHABILITATION. See AGRICULTURAL EDUCATION.

VÖGLER, ALBERT (1877–). A German industrialist, chairman of the Ruhr Steel Trust. He was born at Borbeck and after a technical education entered business life, achieving such success that he was placed at the head of the Ruhr Steel Trust, one of Germany's greatest industries. He was one of the two German delegates to the conference of reparation experts held in Paris in May, 1929, under the chairmanship of Owen D. Young. He resigned from the committee May 23, 1929, on the ground that the compromise reparations figures submitted by Mr. Young were beyond Germany's capacity to pay.

VOLK, DOUGLAS (1858–). An American painter (see VOL. XXIII). He resigned as an instructor in the National Academy of Design in 1917. He painted several important war portraits, including those of General Pershing, King Albert, and Lloyd George, in the National Gallery, Washington (1921). In 1915–16 he received the Beck Gold Medal of the Pennsylvania Academy and a gold medal from the National Arts Club, New York City. His powerful portrait of Lincoln (1923) was acquired by the Albright Art Gallery, Buffalo, N. Y.

VOLKELT, fōl′kĕlt, JOHANNES IMMANUEL (1848–). A German philosophical writer (see VOL. XXIII). He published, after 1914, *Gewissheit und Wahrheit* (1918); *Religion und Schule* (1918); *Das Ästhetische Bewusstsein* (1920); *Gefühlsgewissheit* (1922); and *Phänomenologie und Metaphysik der Zeit* (1925).

VOLPI DI MISURATA, GIUSEPPE, COUNT (1877–). An Italian statesman and financier. After the Tripoli War between Italy and Turkey, he negotiated the peace treaty, he was Governor of Tripolitania for four years (July, 1921–July, 1925), was made a senator in 1924, and from July 9, 1925, to 1928, he was Finance Minister of Italy. His policy caused a successful period of financial reconstruction, with a return to the gold standard on Dec. 21, 1927 (see ITALY, *Finance*). He edited *La rinascita della Tripolitania* (1926); and wrote *Italy's Financial Policy* (1927) and, in collabóration with Professor Bonaldo Stringher, *The Financial Reconstruction of Italy* (1927).

VOLSTEAD, ANDREW J. (1860–). An American public official, born in Goodhue County, Minn., and educated at St. Olaf's College and Decorah Institute. In 1884 he was admitted to the bar and practiced law at Granite Falls, Minn. He was for 14 years county attorney of Yellow Medicine County. In 1903 he was elected to Congress and was successively reëlected until 1922. He was the author of the Volstead Act for the enforcement of the Federal Prohibition Amendment (see PROHIBITION) and also of the Farmers' Coöperative Marketing Act. Since 1925 he has been legal adviser to the chief of the Northwestern Dry Enforcement District.

VOLUNTEERS OF AMERICA. A Christian philanthropic organization, founded in 1896 by General and Mrs Ballington Booth. The society maintains 14 summer camps, and over 60 institutions for social work of various sorts. While coöperating with evangelical missions in many branches of relief work, the organization makes an especial effort to aid needy women under the financial care of their families. Much of this work is carried on in cities, 127 of the society's 133 philanthropic stations being in urban communities. The activities of the Volunteers of America have increased in the past few years, as indicated by the following statistics: There were 26 Sunday schools, with an enrollment of 1600, in 1923, and 80, with an enrollment of 9942, in 1928; during the same period, the number of lodgings given free, or for work or nominal fees, increased from 440,057 to 454,267; and the number of meals provided increased from 1,250,178 to 1,392,214. Employment was found for 32,244 persons in 1923, and for 45,824 in 1928. Every year, the society distributes food, clothes, and toys to the poor at Thanksgiving and Christmas time; during 1928, 80,840 families were visited, and garments given to 14,068 persons, shoes to 202,523, and holiday dinners to 137,791. The national headquarters of the society are at 34 West 28th Street, New York City. General Ballington Booth is president.

VORONOFF, Serge (1866–). A French surgeon who divides with Steinach and Lydston such credit as lies in the introduction of grafting the sexual glands with the aim of rejuvenating the senile and presenile invalid. He is a graduate of the University of Paris and visiting surgeon to the Russian Hospital in that city. He also is director of experimental surgery in the physiological station of the Collège de France and of the biological laboratory of the École des Hautes Études. He has published four works on gland grafting: *Vivre*; *Études des Moyens de Relever l'énergie Vitale* (1920), translated into English by Mme. Voronoff; *La Glande Génitale Male*, in collaboration with Retterer (1921); *Greffes Testiculaires* (1923); *Quarante-trois Greffes du Singe à l'Homme* (1924); *Étude sur la vieillesse et le rajeunissement par la greffe* (1920); translated into English as *Study of Old Age* (1925), and as a more popular work, *The Conquest of Life* (1928). See Secretions, Internal.

VOROSHILOV, Klimentiy (1881–). A Russian Communist soldier, commander-in-chief of the Red Army. Born of a poor peasant family and a metal worker by trade, he joined the revolutionary movement when he was seventeen years old. He served in the Czarist armies during the World War and after the Bolshevik revolution was chief of staff of the Budeny cavalry in the campaigns against the counter-revolutionary forces of Denikin and Baron Wrangel. In 1921 he suppressed the Kronstadt revolt. A supporter of Stalin in the latter's struggle with Trotsky, he was appointed chief of the Red Army in 1925 upon the death of General Frunze, successor to Trotsky. He was also a member of the Communist Political Bureau and president of the Revolutionary Military Council of the United Soviet Socialist Republics.

VORSE, Mary Heaton (Mrs. Robert Minor) (?–). An American author born in New York City and educated in Europe. Her most successful book was *The Prestons* (1918), picturing American family life. Her other works include: *The Breaking In of a Yachtsman's Wife* (1908); *The Very Little Person* (1911); *The Autobiography of an Elderly Woman* (1911); *The Heart's Country* (1913); *I've Come to Stay* (1919); *Growing Up* (1920); *Man and Steel* (1921); *Fraycar's Fist* (1923); *Passaic* (1926); *Second Cabin* (1928).

VREULS, Victor (1876–). A Belgian composer, born at Verviers. He received his first education at the music school of his native town, then entered the Conservatory at Liége, and after graduation continued his studies in composition as a private pupil of d'Indy in Paris. During 1906–26 he was director of the Conservatory at Luxemburg. As a composer, he continues the tradition of César Franck. His principal works are two operas, *Olivier le Simple* (Brussels, 1922) and *Un Songe de nuit d'été* (Brussels, 1925); the symphonic poems *Werther*, *Jour de Fête* and *Cortège héroique*; a symphony; two overtures; three preludes; two suites; two *Poèmes*, for 'cello and orchestra; two *Romances*, for violin and orchestra; *Élégie*, for flute and orchestra; *Pastorale*, for clarinet and orchestra; *Fantaisie*, for horn and orchestra; *Morceau de Concert*, for trumpet and orchestra; chamber music; piano pieces; songs (several with orchestra).

W

WABASH COLLEGE. A college for men at Crawfordsville, Ind., founded in 1832. The student enrollment increased from 329 in 1914 to 400 in 1927–28; the faculty from 16 to 29 members in 1928–29. The volumes in the library increased from 61,000 to 66,000, endowment from $725,000 to $1,782,749, and income to $154,693 in 1927–28. A new curriculum, based on the plan of widest possible distribution of subjects for first and second years and concentration of interest for the third and fourth years, was put into effect in the autumn of 1928; and a chapel, costing $150,000, was dedicated in December of the same year. President, Louis Bertram Hopkins, A.M.

WADSWORTH, James Wolcott, Jr. (1877–). An American legislator (see Vol. XXIII). He was elected to the United States Senate from New York State in 1914 and was reelected in 1920 for the term ending 1927. In the Senate, he was chairman of the military affairs committee and a member of the committees on foreign relations, library, and elections. He was defeated for reëlection in 1926.

WAGES. Nominal wages have increased markedly in all countries since 1914, whether comparison is based on wage rates or actual earnings. So far as can be determined from available statistical data, the relative increase has been especially great in the case of wages of unskilled workers and has made their remuneration in most countries more nearly like that of skilled workers than before the World War. Among skilled workers, there has been considerable variation in the rate and amount of increase in wages; the increase was at first most noticeable in the wage of war workers, and not until later in the wages of those in the building and other trades where production was not actively stimulated until the post-war period.

In the post-war decade, the principle of high wages became one of the keystones of the American economic system. Foreign observers were amazed at the high standards of living of the American working class and reported that American working populations were earning anywhere from twice to four times as much, in buying power, as were European workers. Undoubtedly, one of the stabilizing effects in the system of installment selling was the ability of the American consuming public to absorb the extraordinary amount of luxury and semi-luxury commodities being placed on the market. The earnest efforts, following the stock-market collapse of October, 1929, of industrialists to assure a high level of wages, was one of the most salutary expressions of faith in our modern economic order. President Hoover made the maintenance of wage levels almost his first concern in the series of industrial conferences he called following the stock break; the response he received from all industry proved the acceptance of the principle. Henry Ford was the first to take action in December, 1929, when he announced a general leveling of wages upward, the minimum wage in his American and Canadian plants being raised from $6 to $7 a day. Mr. Edsel Ford estimated that on the basis of the October pay roll of 144,990 employees, the increase would amount to $19,500,000 a year. That American industrialists were preaching a new form of imperialism was apparent from the concern of such men as Edward A. Filene and Henry Ford with consuming power. Heretofore, backward peoples were exploited on the basis of what they could produce; the new canon concerned itself with their being taught to consume more. Hence, the announcement of Henry Ford, in the spring of 1929, that he planned to establish the same level of real wages for all the employees in his factories, regardless of the countries in which they worked; and when the League of Nations reported its inability to supply Mr. Ford the basic wage information he desired, Mr. Filene stepped forward with an offer of $25,000 to finance such studies as were necessary. The figures following below show what extraordinary advances will have to be made in the case of the workmen of most of the European countries before their commodity or real dollars can be compared with American real dollars.

The International Labor Office, in order to satisfy the prevailing curiosity concerning the size of real wages in various countries, made such a comparative study for January, 1928, taking the city of Philadelphia as representative of the United States. The index numbers are for real wages. The examination was limited to a few trades, i.e., building, metal, furniture, printing, and publishing, and the price data were limited to a few articles of food. The figures are necessarily rough, but they are of value for comparative purposes.

In the summer of 1929, the International Labor Office sought to extend the scope of its inquiry to include the cost of commodities other than food and to include more than one town in each country. The result was the preparation of a series of indexes that showed the relationship of real or commodity wages a little more accurately than the figures cited for 1928. These index figures are subject, of course, to important reservations. The commodities considered, in addition to food, include soap, fuel, and light.

There have not been included the following basic necessities: clothing, housing, house furnishings. Also, the calculations include only the wages of a few categories of workers confined to large cities and for the most part disregard unskilled labor and casual labor. There follow these indexes for real wages in large towns in June–July, 1929, the base of 100 being Great Britain. The figures in parentheses indicate the number of towns in each country covered. Australia (2) 143; Austria (3) 45; Denmark (1) 104; Spain (4) 45; Estonia (2) 41; United States (10) 191; France (4) 53; Great Britain (7) 100; Irish Free State (3) 98; Netherlands (4) 95; Portugal (1) 32; Sweden (3) 101. In Germany, the post-war period has seen rises in the wages of skilled and unskilled workers, the gains of the latter being proportionately greater than those of the former. The following indexes show the hourly wages for German skilled workers for the post-war years: pre-war, 100; 1924, 106; 1925, 129; 1926, 138; 1927, 146; 1928, 157; first quarter of 1929, 160. The following are the indexes for the unskilled workers in Germany: pre-war, 100; 1924, 124; 1925, 150; 1926, 161; 1927, 178; 1928, 193; first quarter 1929, 199. In Germany, since 1926, there has been also a rise in real wages. The following indexes show the increase in the purchasing power of the German worker's mark: December, 1926, 100; June, 1927, 102.3; December, 1927, 103.6; June, 1928, 109.3; December, 1928, 110.8. In other words, since 1926, there has been a gain of 11 per cent.

The U. S. Bureau of Labor Statistics compiled a series of index numbers of general wage rates (other than agricultural) beginning with the year 1840. It will be noticed that, with 1913 as a basis, wages mounted fairly rapidly during the war period, reaching their peak in 1920. After that year, there was a recession, but by 1926, wages had become stabilized again.

Taking into account increased wage rates in dollars and the cost of living, organized labor between 1913 and 1928 improved its position from 40 to 50 per cent. In 1927, for example, with the index for union wages at 259.9 and the index for the cost of living at 172.7, the relative purchasing power of wages measured in living costs was 150.3 or 50 per cent greater than 1913. See Table II. Table III presents the same data for the entire field of labor, both organized and unorganized.

These, however, are hourly wages. What about annual wages? What about incomes? The American Federation of Labor, in 1925, indicated

TABLE I

INDEX NUMBERS OF WAGES PER HOUR, 1840 TO 1926 (EXCLUSIVE OF AGRICULTURE)

[*Currency basis during Civil War period, 1913 = 100*]

Year	Index	Year	Index
1840	33	1884	64
1841	34	1885	64
1842	33	1886	64
1843	33	1887	67
1844	32	1888	67
1845	33	1889	68
1846	34	1890	69
1847	34	1891	69
1848	35	1892	69
1849	36	1893	69
1850	35	1894	67
1851	34	1895	68
1852	35	1896	69
1853	35	1897	69
1854	37	1898	69
1855	38	1899	70
1856	39	1900	73
1857	40	1901	74
1858	39	1902	77
1859	39	1903	80
1860	39	1904	80
1861	40	1905	82
1862	41	1906	85
1863	44	1907	89
1864	50	1908	89
1865	58	1909	90
1866	61	1910	93
1867	63	1911	95
1868	65	1912	97
1869	66	1913	100
1870	67	1914	102
1871	68	1915	103
1872	69	1916	111
1873	69	1917	128
1874	67	1918	162
1875	67	1919	184
1876	64	1920	234
1877	61	1921	218
1878	60	1922	208
1879	59	1923	217
1880	60	1924	223
1881	62	1925	226
1882	63	1926	229
1883	64		

INDEX NUMBERS OF COMPARATIVE REAL WAGES IN VARIOUS CITIES, JANUARY, 1928

[London, January, 1928 = 100]

City	General average index numbers	
	Based on food only	With allowance for rent
Philadelphia	192	192
Ottawa	162	160
Copenhagen	109	109
Dublin	101	110
London	100	100
Stockholm	90	89
Amsterdam	82	82
Berlin	66	61
Paris	59	...
Madrid	55	...
Vienna	47	53
Lodz	47	48
Brussels	46	49
Rome	45	47
Warsaw	44	46
Tallinn	40	...
Lisbon	30	...

TABLE II

COMPARISON OF CHANGES IN UNION RATES OF WAGES PER HOUR AND IN COST OF LIVING, 1907 to 1927

1913 = 100

	Index Numbers of Union Rates of Wages Per Hour	Index Numbers of Cost of Living	Relative Purchasing Power of Wages as Measured in Living Costs	Changes in Purchasing Power of Wages as Compared With 1913. Per cent
1907	89.7	82.0 [a]	109.4	+ 9.4
1908	91.0	84.3 [a]	107.9	+ 7.9
1909	91.9	88.7 [a]	103.6	+ 3.6
1910	94.4	93.0 [a]	101.5	+ 1.5
1911	96.0	92.0 [a]	104.3	+ 4.3
1912	97.6	97.6 [a]	100.0	0.0
1913	100.0	100.0	100.0	0.0
1914	101.9	105.0	98.9	— 1.1
1915	102.8	105.1	97.8	— 2.2
1916	107.2	118.3	90.6	— 9.4
1917	114.2	142.4	80.2	—19.8
1918	132.7	174.4	76.1	—23.9
1919	154.5	188.3	82.0	—18.0
1920	199.0	208.5	95.4	— 4.6
1921	205.3	177.3	115.8	+15.8
1922	193.1	167.3	115.4	+15.4
1923	210.6	171.0	123.2	+23.2
1924	228.1	170.7	133.6	+33.6
1925	237.9	175.7	135.4	+35.4
1926	250.3	175.2	142.9	+42.9
1927	259.5	172.7	150.3	+50.3

[a] Food only.

that its interests were not to lie in advancing real wages; it was to concern itself with "higher social wages, for wages which increase as measured by prices and productivity." By social wages was meant an opportunity to provide for those comforts and luxuries which the middle class already possessed. To indicate that progress in this direction had been but slight, the American Federation of Labor prepared Table IV based on statistics furnished by the U. S. Census Bureau.

TABLE III

1913 = 100

	General Index of Wages Per Hour	Index Numbers of Cost of Living	Relative Purchasing Power of Wages as Measured in Living Costs	Changes in Purchasing Power as Compared With 1913. Per cent
1907	89	82.0 [a]	108.5	+ 8.5
1908	89	84.3 [a]	105.6	+ 5.6
1909	90	88.7 [a]	101.5	+ 1.5
1910	93	93.0 [a]	100.0	0.0
1911	95	92.0 [a]	103.3	+ 3.3
1912	97	97.6 [a]	99.4	— 0.6
1913	100	100.0	100.0	0.0
1914	102	103.0	99.0	— 1.0
1915	103	105.1	98.0	— 2.0
1916	111	118.3	93.8	— 6.2
1917	128	142.4	89.9	—10.1
1918	162	174.4	92.9	— 7.1
1919	184	188.3	97.7	— 2.3
1920	234	208.5	112.2	+12.2
1921	218	177.3	123.0	+23.0
1922	208	167.3	124.3	+24.3
1923	217	171.0	126.9	+26.9
1924	223	170.7	130.6	+30.6
1925	226	175.7	128.6	+28.6
1926	229	175.2	130.7	+30.7

[a] Food only.

TABLE IV

YEARLY WAGES IN MANUFACTURING INDUSTRIES

Industries	Year	Money Wages	Real Wages	Social Wages
Mfg. industry as a whole	1914	$ 580	100	100
	1927	1,301	135	114
Automobiles	1914	802	100	100
	1927	1,603	120	101
Food products	1914	566	100	100
	1927	1,226	130	109
Lumber	1914	516	100	100
	1927	1,107	129	108
Paper and printing	1914	655	100	100
	1927	1,572	144	121
Textiles	1914	449	100	100
	1927	1,027	138	115
Tobacco	1914	435	100	100
	1927	857	118	100

Reverting again to the question of the hourly wage *versus* the annual wage, it is possible to find interesting differences. In New York City, where the hourly wage workers in the building trades would indicate an annual income of $3080, the actual income averaged about $1940 per year because the workers were being employed on the average 63 per cent of the time. The following data were prepared by the National Industrial Conference Board (an employers' organization): The average annual wage in the printing and publishing business, in 9 States, runs from $1873 in New York State down to $1115 in Ohio; in food products, the wage runs from $1700 in New York State to $933 in Michigan; in the metal industries, the range of wages was from $1615 in Ohio to $1357 in New Jersey; in the paper and pulp industries the range of annual wages was from $1639 in New Jersey to $1272 in Pennsylvania: in leather products. the range was from $1326 in New Jersey to $963 in Pennsylvania; in textiles, the range was from $1722 in New Jersey to $856 in Michigan. These figures were for the year 1928 and prevailed despite the Bureau of Labor Statistics' minimum budget of $2000 per year for an average family of five. Against this situation was to be placed a state of affairs (figures by the Federal Trade Commission) in which 90 per cent of the wealth of the country was owned by 13 per cent of the people; in which 77 per cent of the people owned no capital at all; in which 50 per cent of the national income went to capital (unearned); in which the average wage for the country as a whole was $1280. It was apparent to many people in the spring of 1929 that there were two sides to the shield of the much-heralded prosperity; and even so conservative an economist as Prof. Irving Fisher was authority for the statement that the great majority of the American people were living on the brink of poverty.

New light was thrown on the complicated question of the earning power of the American factory worker during the twentieth century as a result of the scholarly researches of Paul F. Brissenden, whose study *Earnings of Factory Workers, 1899 to 1927* was published as a Census Monograph late in 1929. The work rested upon the official returns of the quinquennial and biennial censuses of manufactures made by the Bureau of the Census and sought to give answer to the following questions: What have been the relative fluctuations in per-capita earnings of manufacturing wage earners during the twentieth century? What have been their per-capita amounts of earnings? What has been the degree of change that has taken place since 1899 in the variability of earnings?

The size of this wage-earning group may be gathered from the following figures: in 1899 there were 4,712,763 wage earners on the pay rolls of the factories of the country; in 1904 the number was 5,362,017; in 1914 the number was 6,896,190; in 1921 it was 6,946,570; in 1923 it was 8,778,156; in 1925 it was 8,384,261; in 1927 it was 8,351,257. Since 1899 the average number of wage-earners very nearly doubled. Mr. Brissenden's analyses concern themselves with the reported earnings of from 75 to 68 per cent of these workers for the different census years studied.

The following figures give the final results for all industries. The figures are the estimates of actual money earnings derived from the average wages as recorded in the various censuses; 1899—$446; 1900—$449; 1901—$471; 1902—$497; 1903—$498; 1904—$483; 1905—$536; 1906—$568; 1907—$579; 1908—$496; 1909—$557; 1910—$559; 1911—$534; 1912—$592; 1913—$617; 1914—$576; 1915—$608; 1916—$768; 1917—$860; 1918—$1104; 1919—$1212; 1920—$1488; 1921—$1047; 1922—$1171; 1923—$1317; 1924—$1310; 1925—$1402; 1926—$1436; 1927—$1373. The following figures give the purchasing power of the money earnings in terms of 1914 dollars. 1899—$603; 1900—$591; 1901—$604; 1902—$621; 1903—$593; 1904—$582; 1905—$646; 1906—$660; 1907—$636; 1908—$570; 1909—$640; 1910—$608; 1911—$562; 1912—$617; 1913—$623; 1914—$576; 1915—$620; 1916—$718; 1917—$667; 1918—$703; 1919—$677; 1920—$726; 1921—$595; 1922—$705; 1923—$830; 1924—$776; 1925—$825; 1926—$830; 1927—$805.

It is apparent from these figures that, for the 15 years preceding 1914, the American wage earner made no gains in real wages. What advances there were in single years apparently were soon canceled out by the declines of others, so that for the first half of the period under study, there was no progress. The years of the War and the post-war period tell different stories. Except for the year 1921, real wages were higher in every year than those of 1899. The gains between 1914 and 1927 were at the rate of nearly 4 per cent a year. Mr. Brissenden's conclusion at this point is: "It seems quite certain that the manufacturing wage earner has achieved permanently higher levels of real wages. History probably will record the last decade as the one to witness quite unprecedented gains in the purchasing power of the wage earners."

Individual industries show somewhat different stories. For the following 12 industries, the records were available for the whole period: automobiles; iron and steel; steam railway cars; paper and wood pulp; tobacco, cigars, and cigarettes; tanned leather; wool; cotton; silk; knit goods; men's clothing; boots and shoes. All of these with the single exception of the silk industry showed gains in purchasing power from 1922 to 1923, following the slump of 1921. Most of them reached new levels in 1923. The tobacco industry, however, is the only one in which the real wages for the whole 29 years never got higher than those in 1899. All of the 12 industries except automobiles suffered losses in real earnings from 1923 to 1924. In the woolen industry, real wages never once declined below the figure for 1899. However, this was a low-wage industry; in 1899, for example, its average wage was a good deal below that of any of the other 12 industries discussed.

The figures that follow give the purchasing power (at 1914 dollars) of manufacturing labor incomes (for males only), per capita, in the United States for all industries combined and for each of the above 12 selected industries for the years 1899, 1914, and 1927; all industries, $603, $576, $805; woolen goods, $414, $477, $660; cotton manufactures, $495, $497, $613; silk goods, $528, $663, $924; knit goods, $528, $532, $723; men's clothing, $750, $743, $930; boots and shoes, $742. $695, $795; automobiles, $688, $737, $936; iron and steel, $770, $673, $1016; steam railroad cars, $493, $535, $761; paper and wood pulp, $604, $615, $835; tobacco, cigars, and cigarettes, $596, $529, $578; tanned leather, $577, $532, $645.

Finally, we present the following figures to show changes in the purchasing power of manufacturing labor incomes, per capita, by States, for the years 1899 and 1923: North Carolina, $247, $436; Michigan, $577, $991; Oklahoma, $504, $814; South Carolina, $249, $401; West Virginia, $531, $834; Alabama, $409, $591; Virginia, $432, $620; Ohio, $632, $904; District of Columbia, $607, $862; Kentucky, $489, $689; United States, $603, $839; Maryland, $493, $679; Indiana, $622, $844; New Jersey, $622, $843; Maine, $507, $685; Iowa, $570, $763; Wyoming, $947, $1259; Illinois, $678, $904; New York, $615, $818; North Dakota, $670, $882; Wisconsin, $589, $780; Georgia, $316, $414; Pennsylvania, $627, $824; Oregon, $677, $877; Connecticut, $631, $821; Delaware, $550, $711; California, $750, $971; Tennessee, $427, $539; Vermont, $522, $655; Rhode Island, $543, $678; New Hampshire, $522, $646; Idaho, $818, $1017; Arkansas, $388, $480; Florida, $474, $580; Kansas, $636, $767; Nebraska, $641, $773; Minnesota, $647, $782; Massachusetts, $584, $704; Washington, $793, $960; Missouri, $611, $731; Texas, $561, $648; Mississippi, $401, $467; Louisiana, $485, $555; New Mexico, $673, $772; Utah, $676, $764; Nevada, $1018, $1133; South Dakota, $704, $753; Colorado, $870, $878; Montana, $1005, $955; Arizona, $1007, $902.

It is apparent that the largest increases in real earnings have occurred in States which in 1899 had levels of average earnings that were very low. Note North Carolina and South Carolina and compare their 1899 real wages with the average for the whole country. It will be seen, too, that Michigan and Ohio among the industrial States were the only ones to show increases of real earnings of more than 40 per cent over the 25-year period. During the period 1899–1914 (figures not shown here), 23 of the States showed declines in per capita earnings. By contrast, it is interesting to observe that all of the States showed gains in per capita earnings for the period 1914–1923, the increases ranging from 4 per cent in Arizona to 47 per cent in North Carolina. The following increases for the same post-war period were to be found in the leading industrial States; New Jersey, 50 per cent; Illinois, 32 per cent; New York, 43 per cent; Connecticut, 50 per cent; California, 26 per cent; Ohio, 41 per cent; Massachusetts, 33 per cent; Pennsylvania, 44 per cent.

These studies in real wages show that the American manufacturing wage earner was receiving more for his labor in the post-war period than at any time before in American history. The size of his earned income also demonstrates how pitifully small these earnings are. Even if an additional 10 per cent should be added to his wage to include the earnings of members of his family and income from rent, still the total would be a long way from the hypothetical $2000 needed by the average American family to provide the ordinary comforts of life. One of the ironies of the situation is to be found in the fact that this $2000 standard budget is employed by welfare societies in their ministrations of dependent families; economically independent families, not dependent upon charity, are expected to live on much less. The industrialists, who support the family welfare societies and therefore give tacit consent at least to the use of the standard budgets for dependents, are the very ones who expect their workers to subsist on smaller budgets. Other economists, whose work has helped to clarify the real wage situation, are I. M. Rubinow, Paul H. Douglas, Willford I. King, and Leo Wolman. The reader is referred to *Middletown* (by the Lynds), that remarkable sociological record of the life of a typical post-war American community, where actual inquiries have elicited a wage situation not unlike the facts presented above.

WAGNER, Robert Ferdinand (1877–). A United States Senator. He was born at Nastatten, Province of Hessen, Germany, and removed to the United States in childhood. He was graduated from the College of the City of New York (1898), received the degree of LL.B. from the New York Law School in 1900, and began the practice of law in New York City. A member of the New York Assembly in 1905–08 and of the State Senate in 1909–18, with an interval as lieutenant governor in 1914, he became a Justice of the Supreme Court of New York in 1919. He resigned from the bench to take the United States Senate seat to which he was elected as a Democrat in 1926 for the term ending in 1933. He was a member of the Senate committees on banking and currency, foreign relations, interstate commerce, and public lands.

WAGNER, väg'nẽr, Siegfried (1869–). A distinguished German composer and conductor (see Vol. XXIII). In 1923 he made a tour of Europe to collect funds for the renovation of the Bayreuth theatre, and for the same purpose he visited the United States in 1924, when he was heard at his American début as guest-conductor of the Detroit Symphony Orchestra (Jan. 31) and later in New York, Cleveland, and Baltimore. These tours were so successful, that the famous festivals were resumed in the summer of 1924, after an interruption of 10 years. In the meantime, advanced age and the precarious state of her health had compelled Cosima Wagner, the master's widow, to relinquish the general direction of the festival, which then passed into the hands of the son. His list of compositions is completed by an orchestral scherzo, *Und wenn die Welt voll Teufel wär;* and the operas, *An allem ist Hütchen schuld* (Stuttgart, 1917), *Schwarzschwanenreich* (Karlsruhe, 1918), *Sonnenflammen* (Darmstadt, 1918), *Der Schmied von Marienburg* (Rostock, 1923), *Der Friedensengel* (Karlsruhe, 1926). The following operas are completed, but have not yet been performed: *Der Haidekönig; Rainulf und Adelasia; Die heilige Linde,* and *Wahnopfer.* In 1922 he published his memoirs under the title *Erinnerungen.* Consult *Wahnfried,* by R. du Moulin-Eckart (Leipzig, 1925) and *Siegfried Wagner,* by O. Daube (Munich, 1925).

WAGNER VON JAUREGG, Julius (1857–). An Austrian psychiatrist whose malarial inoculation treatment of paresis, introduced in 1917, has been the means of curing about 30 per cent of all patients treated. The disease was previously rapidly fatal. For this triumph, he was awarded the Nobel Prize in medicine for 1926–27. He received the degree of M.D. from the University of Vienna in 1881 and after teaching psychiatry there was made full professor of psychiatry and neurology in 1902. For many years, he was director of the insane asylum at Troppau. His valuable work has been published by his assistants. He also acquired some renown for his campaign against endemic goitre in Styria, obtaining good results from thyroid medication.

WAGSTAFF, Blanche Shoemaker (1888–). An American author, born in New York City, and educated at the Brearley School and Miss Spence's School in New York. During the World War, she acted as chairman of the National Women's Service League. Her writings include: *Songs of Youth,* poems (1906); *Woven of Dreams,* poems (1907); *Atys* (1909); *Alcestis,* a Greek drama staged at the Hudson Theatre in New York City (1911); *Eris,* a drama (1913); *Narcissus* (1917); *Book of Love* (1917); *Quiet Waters* (1921); *A Stranger's Sojourn* (1926); *Bob the Spaniel* (1927).

WAHABITES. See Arabia; Pan-Islamism.

WAHL, väl, Adalbert Emil August (1871–). A German historian (see Vol. XXIII). He published *Beiträge zur Geschichte der Konfliktszeit* (1914); *Von Bismarck der Siebziger Jahre* (1920); *Zwischen den Kriegen* (1923); *Der völkische Gedanke* (1924); and *Deutsche Geschichte von der Reichsgründung bis zum Weltkrieg* (1926).

WAILING WALL. See Palestine, under *History.*

WALDSTEIN, Sir Charles. See Walston (Waldstein), Sir Charles.

WALES. See Great Britain.

WALES, Archbishop of. See Edwards, Most Rev. Alfred George.

WALES, Prince of. See Edward (Albert Christian George Andrew Patrick David).

WALKER, Stuart (?–). An American playwright, born at Augusta, Ky., and educated at the University of Cincinnati. He was play reader, actor, and stage manager for David Belasco (1909–14) and in 1914 became stage director for Jessie Bonstelle. He became an independent producer in 1915 and directed the Repertory Company in Indianapolis from 1917 to 1923 and the Repertory Theatre in Cincinnati, 1922–23. He was the originator of the Portmanteau Theatre and wrote: *Portmanteau Plays* (*The Trimplet, Nevertheless, The Medicine Show, Six Who Pass While the Lentils Boil,* 1917), and *More Portmanteau Plays* (*The Lady of the Weeping Willow Tree, The Very Naked Boy, Jonathan Makes a Wish,* 1919); *Five Flights Up* (1922); *The King's Great Aunt Sits on the Floor* (1923).

WALKER, William Hultz (1869–1923). An American chemist (see Vol. XXIII). He was lieutenant colonel in the National Army during the World War, chief of the Chemical Service Section, and later a colonel in the U. S. Army in charge of the Gas Offense Division. In 1919 he was awarded the Distinguished Service Medal.

WALLACE, Henry Cantwell (1866–1924). An American public official, born at Rock Island, Ill., and educated at the Iowa State College of Agriculture. He engaged in farming in Iowa from 1887 to 1891, taught for a while in the Iowa State College of Agriculture, and was associated editorially with *The Creamery Gazette, Farm and Dairy* (1893–95), and *Wallace's Farmer* (1895–1924). In 1921 President Harding appointed him Secretary of Agriculture. His work in the department was considered highly satisfactory.

WALLACHIA. See Rumania.

WALLIN, J(ohn) E(dward) Wallace (1876–). An American psychologist, born in Page County, Iowa, and educated at Yale University. He began teaching psychology at Clark University in 1901, went to the University of Michigan in 1902, and from 1903 to 1906 was demonstrator in experimental psychology at Princeton University. He had professorships in several normal schools and in 1921 he was made director of the bureau of special education at Miami University. His writings include: *Researchs on the Rhythm of Speech* (1902); *Optical Illusions of Reversible Perspective* (1905); *Experimental Studies of Mental Defectives* (1912); *The Mental Health of the School Child* (1914); *Measurement of Mental Traits in Normal and Epileptic School Children* (1923); *The Education of Handicapped Children* (1924); *Studies of Mental Defects and Handicaps* (1925); *Clinical and Abnormal Psychology* (1927).

WALPOLE, Hugh (Seymour) (1884–). An English novelist (see Vol. XXIII). He served with the Russian Red Cross during 1914–16, and became a commander of the Order of the British Empire (1918), and holder of the Georgian Medal. His later publications include: *The Golden Scarecrow* (1915); *The Dark Forest* (1916); *Joseph Conrad* (1916); *The Green Mir-*

ror (1918); *The Secret City,* which won the Tait Black Prize (1919); *Jeremy* (1919); *The Captives* (1920); *The Thirteen Travellers* (1921); *The Young Enchanted* (1922); *The Cathedral* (1922); *Jeremy and Hamlet* (1923); *The Old Ladies* (1924); *Portrait of a Man With Red Hair* (1925); *The English Novel* (Rede Lecture, 1926); *Harmer John* (1926); *These Diversions: Reading* (1926); *Jeremy at Crale* (1927); *Wintersmoon* (1928); *The Silver Thorn,* short stories (1928); *Book of Stories* (1928); *Anthony Trollope* (*English Men of Letters,* New Series, 1928); and *Hans Frost* (1929). Consult *Tradition and Hugh Walpole,* by Clemence Dane (1929).

WALSH, David Ignatius (1872–). A United States Senator, who was born at Leominster, Mass., and graduated at Holy Cross College, Worcester, Mass. (1893), receiving the degree of LL.B. from the Boston University Law School in 1897. He was twice elected as a Democrat to the Massachusetts House, where he was the author of laws regulating the State's employment of labor. In 1913 he became lieutenant governor and in 1914 governor, serving two years. He was delegate-at-large to the Democratic National Conventions from 1912 to 1928, inclusive, and was delegate-at-large to the Massachusetts Constitutional Convention of 1917–18. He was elected to the United States Senate in 1918 for the term ending in 1925, but was defeated for reëlection. He was again elected, to fill an unexpired term, in 1926, and in 1928 was reëlected for the term ending in 1935. He is a member of the Senate committees on education and labor, finance, naval affairs, printing, and public buildings and grounds.

WALSH, James Joseph (1865–). An American physician and author (see Vol. XXIII). Dr. Walsh has written a number of books since the World War on his favorite subjects of medical history and biography, psychotherapy, and the accomplishments of the Roman Catholic scientists. These comprise *Health through Will Power* (1919); *History of Medicine in New York* (1919); *Mediæval Medicine* (1920); *Religion and Health* (1920); *Cures: the Story of Cures that Fail* (1923); *Eating and Health* (1925); *Spiritualism a Fake* (1925); *Laughter and Health* (1927).

WALSH, Thomas James (1859–). A United States Senator (see Vol. XXIII). He was reëlected from Montana for the terms 1919–31 and was chairman of the Democratic National Convention in 1924. As chairman of a subcommittee of the Senate committee on public lands, Senator Walsh conducted a searching investigation of government oil-land leases in 1924. He also had been active as a member of the foreign relations committee.

WALSH, Thomas Joseph (1873–). An American Roman Catholic bishop, born at Parker's Landing, Butler Co., Pa. He studied at the College and Seminary of St. Bonaventure and in Rome, and was ordained to the Roman Catholic priesthood in 1900. He served as assistant director at St. Joseph's Cathedral in Buffalo until 1900, and from that year until 1915 he was private secretary to Bishops Quigley and Colton. He also acted as chancellor of the diocese. From 1915 to 1918, he was director of St. Joseph's old Cathedral in Buffalo. He was consecrated Bishop of the Diocese of Trenton, N. J., in 1918 and transferred from Trenton to the Newark Diocese in 1928.

WALSTON (Waldstein), Sir Charles (1856–1927). A British archæologist. He was born in New York City and studied at Columbia and Heidelberg. At Cambridge University, he was director of the Fitzwilliam Museum (1883–89) and reader in classical archæology (1883–1907). From 1895 to 1901, and again from 1904 to 1911, he was Slade professor of fine arts in King's College, Cambridge. He acted as director of the American Archæological School at Athens from 1889 to 1893 and conducted several important excavations, including the site of ancient Platæa (1889–93), Eretria (the tomb of Aristotle), in 1891, and the Heraion of Argos (1892–95). His publications include, *The Study of Art in Universities* (1895); *Expansion of Western Ideals and the World's Peace* (1899); *The Jewish Question* (1899); *Herculaneum* (1908); *Greek Sculpture and Modern Art* (1914); *Aristodemocracy* (1916); *What Germany is Fighting For* (1917); *Patriotism, National and International* (1917); *The Next War* (1918); *The English-Speaking Brotherhood and the League of Nations* (1919); *Alcamenes and the Establishment of the Classical Type in Greek Art* (1926).

WALTER, Bruno (1876–). A German conductor, born in Berlin. He was trained at Stern's Conservatory, where his teachers were Ehrlich, Bussler, and Radecke. After short periods as conductor in Cologne, Hamburg, Breslau, Presburg, Riga, and Berlin, he rose rapidly to a position of preëminence through his brilliant work at the Hofoper in Vienna (1901–13). In 1914–22 he was Hofkapellmeister and Generalmusikdirektor in Munich, succeeding Felix Mottl. He made extensive tours as a guest-conductor and in 1923 visited the United States, where his appearances with the New York Symphony Society and the Boston, Minneapolis, and Detroit Symphony orchestras made a profound impression. During 1925–29 he was general musical director of the Deutsches Opernhaus in Charlottenburg (Berlin). Since 1924 he has been the regular conductor of the German operas at Covent Garden. His compositions include two symphonies; *Das Siegesfest,* for soli, chorus, and orchestra; a piano quintet; a piano trio; a string quartet; and a violin sonata.

WANAMAKER, (Lewis) Rodman (1863–1928). An American merchant, son of John Wanamaker, born in Philadelphia. He was graduated from Princeton in 1886, and became associated in business with his father as vice president of the John Wanamaker stores in New York and Philadelphia. He was resident manager in Paris for 10 years. For several years, he was consul general at Philadelphia for Paraguay and other South American countries. He financed three expeditions to the West to study Indian life and presented their collections to the Government at Washington. He also gave an art collection to Princeton University. During the World War, he served as chairman of the mayor's committee in New York to welcome homecoming troops. Following the death of his father in 1922, he became head of the Wanamaker business. Mr. Wanamaker was a leader in numerous civic and philanthropic movements. He presented to New York the perpetually burning light and altar of liberty, in Madison Square, as a memorial to the American dead in the World War. In his later years, he devoted much time and money to the advancement of aviation. He received decorations from Great Britain, France, Italy, Belgium, Serbia, and Venezuela.

WAR BANKING AND FINANCE. See Finance and Banking, *War Banking and Finance.*

WAR CASUALTIES. See World War Casualties.

WARD, Henry Baldwin (1865–). An American zoölogist, born at Troy, N. Y., and educated at Williams College and Harvard University and at Göttingen, Freiburg, and Leipzig. After teaching science in Troy (1885–88), he was instructor in zoölogy at the University of Michigan (1893); associate professor and professor of zoölogy (1892–1909) at the University of Nebraska and dean of the college of medicine there (1902–09); and professor (since 1909) at the University of Illinois. His research work was in connection with the Michigan Fish Commission, the biological survey of the Great Lakes, the Alaska salmon investigations, and studies on parasites of man and the lower animals. He published *Fresh Water Biology,* with Whipple (1917), and founded and was editor of the *Journal of Parisitology.*

WARD, James (1843–1925). A British philosopher and psychologist (see Vol. XXIII). His *Psychological Principles* was published in 1918. It contains a systematic exposition of mental life from the point of view of the Act school. The mind is defined as a "continuum of presentations." In 1920 an honorary LL.D. from Cambridge was added to his long list of degrees. In 1922 Professor Ward published his exhaustive *Study of Kant.*

WARD, Rt. Hon. Sir Joseph (George), First Baronet (1856–). A Premier of New Zealand, born at Melbourne, and educated privately. At 30 he was elected to Parliament as a Liberal, and in 1891 became Postmaster General, an office which he held continuously until 1912. He held many cabinet posts and was Premier of New Zealand from 1906 to 1912. He was made a baronet in 1911. At the outbreak of the World War, he was leader of the Liberal Party, and in 1915 entered the National Ministry, a coalition of the Liberal and Reform parties brought about by the War, as Finance Minister and Postmaster General. Sir Joseph represented New Zealand with Premier Massey at the War Conferences in London (1916–18), and at the Peace Conference in Paris (1919). On his return, he resigned from the cabinet and was defeated in the election which followed, Massey's Reform Party remaining in power. He was reëlected to Parliament in 1925, and as leader of the United Party again became Premier, and Minister of Finance and of External Affairs on Dec. 10, 1928.

WARD, Robert De Courcy (1867–). An American climatologist. He was born in Boston and graduated from Harvard, where he has taught since 1890, holding a professorship in climatology since 1910. In 1927 he served as Harvard exchange professor with Western colleges. He was editor of the *Meteorological Journal* from 1892 to 1896. In 1908 he was a member of the Shaler Memorial Expedition to Brazil. He has been president of the Association of American Geographers and of the American Meteorological Society. In 1894 he was one of the founders of the Immigration Restriction League. He is the author of *Practical Exercises in Elementary Meteorology* (1899); *Climate Considered Especially in Relation to Man* (1908, 1918); and *The Climates of the United States* (1925).

WAR FINANCE CORPORATION. See Agricultural Credit.

WAR IN EUROPE. See World War.

WARNE, Frank Julian (1874–). An American economist, born in Parkersburg, W. Va., and educated at the University of Pennsylvania (Ph.D., 1902). From 1896 to 1902, he was connected with the Philadelphia *Public Ledger,* and during 1903–06 he was editor of *The Railway World.* In 1908 he became secretary of the New York State Immigration Commission, and in 1910 was special expert with the U. S. Census Bureau. He was associated with several railroad labor organizations, and during the World War was chief statistician of the Emergency Fleet Corporation. In addition to many pamphlets and special articles, he is the author of *The Slav Invasion and the Mine Workers* (1904); *The Coal Mine Workers* (1905); *The Immigrant Invasion* (1913); *Railway Operation and Finance* (1914); *Intercorporate Ownership and Interlocking Directorates of the Railroads of the United States* (1914); *The Tide of Immigration* (1916); *Warne's Book of Charts* (1917); *Industrial Relations* (1919); *The Workers at War* (1920); and *Train Employees' Reply to the Railroads* (1921).

WARNER, Edward Pearson (1894–). An American aëronautical engineer, born in Pittsburgh, Pa., and educated at Harvard University and the Massachusetts Institute of Technology. He was engaged in aëronautical work continuously after 1916. He taught at the special army and navy schools in aëronautical engineering, was aëro engineer with the U. S. Army, and did wind-tunnel work and made miscellaneous researches in stability and stress analysis (1917–18). In 1918–20 he was chief physicist with the National Advisory Committee for Aëronautics. He was in charge of aëronautical research at Langley Field and after 1919 was secretary of the committee on aërodynamics of the National Advisory Committee for Aëronautics. In 1920 he became associate professor of aëronautics, and in 1924, professor, at the Massachusetts Institute of Technology. He was Assistant Secretary of the Navy for Aëronautics from 1926 to 1929, when he became editor of *Aviation.* He has written many books, reports, and technical notes, dealing chiefly with stability, stress analysis, and free-flight testing. Among his recent publications are *Aërostatics* (1926) and *Airplane Design—Aërodynamics* (1927).

WARREN, Charles (1868–). An American lawyer, born at Boston, Mass., and educated at Harvard University and its law school. Admitted to the bar, he practiced in Boston, and after acting as private secretary to Gov. William E. Russell, he was associated with him in law practice until the latter's death in 1896. From 1914 to 1918, he was Assistant Attorney General of the United States. He wrote *The Girl and the Governor*; *History of the Harvard Law School and Early Legal Conditions of America* (1909); *The Supreme Court in United States History* (3 vols., 1922), awarded the Pulitzer Prize for the best book on American history published in 1922; *The Supreme Court and Sovereign States* (1924); *Congress, the Constitution and the Supreme Court* (1925); and *The Making of the Constitution* (2 vols., 1928).

WARREN, Charles Beecher (1870–). An American lawyer and diplomat, born at Bay City, Mich., and educated at the University of Michigan. He began the practice of law in Detroit in 1893. He was associate counsel for the United States before the Joint High Commission on the Behring Sea claims in 1896, and also represented the United States in the North Atlantic coast fisheries arbitration with Great Britain before The Hague tribunal in 1910. During the World War, he served on the staff of the Judge Advocate General. In 1921 he became United States Ambassador to Japan, and the negotiations which he carried on with the Japanese government resulted, in March, 1923, in the cancellation of the Ishii-Lansing Agreement. He resigned from this post in December, 1923, and was appointed United States Ambassador to Mexico in January, 1924, but he resigned in the following August. He was chairman of the committee on platform and resolutions at the Republican National Convention in 1924. In 1925 he was named by President Coolidge for the office of Attorney General, but his nomination was twice rejected by the Senate.

WARREN, Francis Emroy (1844–1929). An American legislator (see Vol. XXIII). He served as United States Senator from Wyoming from 1890 to 1893 and continuously from 1894. He was reëlected in 1924 for the term ending in 1931. He was chairman of the committee on appropriations in the Seventieth Congress and was also a member of the committees on military affairs and public buildings and grounds. He was the oldest Senator in point of service.

WARREN, Lloyd (Eliot) (1868–1922). American architect. He was born in Paris in 1868 and was educated in the United States at Columbia University, graduating from its College (1888) and from its School of Architecture (1891), he returned to Paris to become a student in the École des Beaux Arts, and remained in that city for seven years. In 1899 he again came to the United States, where he was for a time with his brother Whitney Warren in the architectural firm, Warren & Wetmore. Later, he became identified with the Society of Beaux Arts Architects, which from little more than a social architectural organization soon grew to be an educational system, with schools in many cities of the United States and Canada, and with its associated Institute of Design offering criticism to architectural students of more than 20 universities. During the World War, Mr. Warren was director of education and dean of the faculty in the Education Corps of the American Expeditionary Force, at Belleville, France. He was also a member of the Fraternité des Artistes, which came to the assistance of the families of French painters and architects. The French government awarded him the Legion of Honor.

WARREN, Whitney (185?–). An American architect (see Vol. XXIII). Following the bombardment of Reims Cathedral by the Germans during the World War, he made an examination of the damage done and prepared a report on restoration. He also prepared plans for and supervised the reconstruction of the University of Louvain in Belgium, destroyed by the Germans in 1914. The Library, designed by him and built by American contributors, was dedicated on July 4, 1928. He protested against the change in the inscription attributing the destruction of the building to "Teutonic fury," but was overruled and it was duly modified before being carved on the building. He then brought suit to enforce the use of the original inscription, which he said had been furnished by Cardinal Mercier, in October, 1929, and a Belgian court decided in his favor. See Louvain Library. He is a member of many architectural societies in the United States and foreign countries. He wrote *Montenegro: the Crime of the Peace Conference* (1922). Several of his lectures during the War period were published.

WARREN, William Fairfield (1833–1929). An American theologian and educator, born in Williamsburg, Mass. (See Vol. XXIII.) He was graduated from Wesleyan University (1853), studying later at the Andover Theological Seminary (1854–56) and at the universities of Berlin and Halle (1856-58). In 1855 he was ordained in the Methodist Episcopal ministry. From 1860 to 1866, he was professor of systematic theology in the Mission Institute of Bremen, Germany (becoming later the Martin Institute of Frankfort). On his return to the United States, he was acting president of the Boston Theological Seminary (1866–73), which was the nucleus for Boston University. Dr. Warren was one of the organizers of that university and served as its president from 1873 to 1903. In 1873 he became also professor of comparative theology and philosophy of religion at the theological school of Boston University, and he was its dean in 1903–11. In 1923 he was made president emeritus of Boston University.

WAR-RISK INSURANCE. See Insurance.

WARSHIP. See Vessel, Naval; Navies of the World.

WAR TAXES. See Taxation in the United States.

WASHBURN Albert Henry (1866–). An American diplomat, born at Middleborough, Mass., and educated at Cornell University and at the law school of the University of Virginia. From 1890 to 1893, he was United States Consul at Magdeburg, Germany, and later held various public offices. He became professor of international law at Dartmouth in 1919. In 1922 he was appointed Minister to Austria. He was president of the mixed commission to adjust differences arising out of provisional trade agreements between Austria and Jugoslavia, 1923–24.

WASHBURN, Edward Wight (1881–). An American chemist, born at Beatrice, Nebr., and educated at the Massachusetts Institute of Technology. In 1908 he became an associate at the University of Illinois, where during 1913–16 he was professor of physical chemistry and from 1916 to 1922, professor of ceramic chemistry and head of the department of ceramic engineering. Since 1926 he has been chief chemist of the U. S. Bureau of Standards. Dr. Washburn has made studies in physical chemistry on ionic hydration, the theory of solutions, high-temperature chemistry, and the physics of ceramic materials. In addition to many papers on chemical, physical, and ceramic matters, he is the author of *Introduction to the Principles of Physical Chemistry* (1915; 2d ed., 1921).

WASHBURN COLLEGE. A coeducational institution founded at Topeka, Kansas, in 1865. The student enrollment increased from 831 in 1915 to 1235 in 1927–28, exclusive of the summer-session registration which amounted to 259. The endowment rose from $950,893 to $1,295,710, and the value of the buildings from $274,708 to $709,624. There were 67 members on the faculty in 1928. The library increased from 35,000 volumes in 1923 to 37,051 in 1928. Benton Hall, a dormitory for women, Mulvane Art Museum, and the Larrick Memorial Fountain were constructed prior to 1928; Holbrook Hall, formerly a dormitory for women, was remodeled and con-

VIEW ACROSS THE LAGOON

STATUE IN MAIN HALL
THE LINCOLN MEMORIAL AT WASHINGTON, D. C.

verted into a classroom building from the school of law; and in 1928 an athletic field, seating 7500, and a field house, costing $185,000, were constructed. President, Parley P. Womer, Sc.D.

WASHINGTON. The capital of the United States. Since the close of the World War, Washington has increased in population, which in 1920 was 437,571, and an official estimate in July, 1928, showed 552,000. With this growth of population has come increased business, making necessary the widening of thoroughfares, such as Connecticut Avenue and Thirteenth and Fifteenth streets, and the extension of business zones. This prosperity has been marked by a larger and better class of business houses, notably on F Street and on Connecticut Avenue. For the housing of this growing population, many large apartment houses have been built, such as the Cathedral Mansions, La Salle Apartments, Meridian Mansions, and Tilden Gardens; also new hotels, such as the Carlton, Hays-Adams, Mayflower, and Wardman Park, all of attractive design, have been completed. Between 1914 and 1929, many public buildings and monuments were constructed. During the War, concrete office buildings were erected for the Navy and War departments, a stone office building for the Department of the Interior, and 12 temporary hotels of gray stucco for women war workers, who found it extremely difficult to find quarters. The latter were removed in 1929 to make possible the elaborate improvements planned for the approaches to the Capitol, especially between it and Union Station.

The Lincoln Memorial, finished in 1921 at a cost of $2,584,000, is a finely proportioned building in the form of a Greek Temple, containing a colossal seated figure of Lincoln, in marble, by Daniel Chester French, and mural paintings representing emancipation and reunion. The Grant Memorial, the work of Henry Merwin Shrady, was dedicated in 1922, and adjacent to this is the recent sculpture by Charles Grafly of Gen. George G. Meade and his associates, who gained the victory at Gettysburg. The National Academy of Sciences, on a gift of $5,000,000 from the Carnegie Corporation in 1919, erected a new building to contain its library and exhibition rooms. The Freer Gallery of Art was erected under the direction of the Smithsonian Institution, through a gift from Charles L. Freer, to house the American and Oriental art collections of the capital; and more recently, the home of the Chamber of Commerce of the United States of America has been completed. The National Shrine of the Immaculate Conception was begun by the Roman Catholic Church, and work on the National Cathedral was continued by the Protestant Episcopal Church which in 1929 was completed, except the transepts; and the Bishop's Garden and an approach to the cathedral are nearly finished. A National church edifice has been proposed for the Presbyterian denomination in Washington, and land has been purchased for that purpose.

On upper Sixteenth Street is Meridian Park, which is slowly approaching completion and is already adorned with statues of Joan of Arc, Dante, and President James Buchanan. On this thoroughfare are several new and beautiful churches, notably the First Baptist, All Souls (Unitarian), and St. Stephen's (Protestant Episcopal). Here also are the recently erected embassy buildings of Cuba and Italy, while the stately British Embassy on upper Massachusetts Avenue was completed in 1929.

The most important of all the great improvements in Washington culminated in 1929, when public announcement confirmed the adhesion of Congress to the L'Enfant plan by the purchase of the greater portion of the triangle between the White House on the west, Pennsylvania Avenue on the north, the Smithsonian grounds on the south, and the Capitol grounds on the east. Definite plans were made for the erection of a series of public buildings which were published, and work was begun on an office building for the Department of Commerce (to be the largest building of its kind in the United States) and the Internal Revenue Building on B and Tenth streets to face the National Museum, together with the erection of the central portion of the building for the Department of Agriculture. This occupation of the triangle by government buildings has compelled the removal of the present Centre Market to the northeast section of the city in the vicinity of Fifth Street and Florida Avenue, formerly occupied as Camp Meigs. The Memorial Bridge, crossing the Potomac near the Lincoln Memorial, will connect Washington with Arlington, where the National Cemetery and Lee's old home are located and at the Virginia end of which will start the Memorial Highway to Mount Vernon, authorized by Congress. These two memorials are to be completed for the bicentennial celebration of the birth of George Washington in 1932. Methods of transportation have been improved, notably the addition of bus lines, some urban and some suburban. Also a traffic system operating colored lights has been installed on the leading thoroughfares.

In 1927, 9519 persons were employed in 503 industrial establishments and received $15,668,655 in wages; the value of products manufactured was $90,389,537. Bank clearings in 1928 amounted to $1,435,725,000. The assessed valuation of property in 1927 was $1,523,588,000.

WASHINGTON. The nineteenth State in size (69,127 square miles), and the thirtieth in population; capital, Olympia. The population increased from 1,140,990 in 1910 to 1,356,621 in 1920, or by 18.8 per cent; estimated population, 1928, 1,587,000. The white population increased from 1,109,111 (1910) to 1,319,777 (1920). The number of Indians fell from 10,997 to 9061, that of Chinese from 2709 to 2363. Japanese increased in number from 12,929 to 17,387, and Negroes, from 6058 to 6883. The native white population rose from 867,914 to 1,069,722; the foreign-born white, from 241,197 to 250,055. Both urban and rural populations mounted, the former from 605,530 to 748,735, the latter from 536,460 to 607,886. The growth of the principal cities was as follows: Seattle, 1910, 237,194; 1920, 315,312; Spokane, 104,402, 104,437; Tacoma, 83,743, 96,965. See articles on these cities.

Agriculture. A considerable increase in agriculture occurred in Washington from 1910 to 1920, which was fairly maintained in the difficult years thereafter. The increase in the number of farms, 18 per cent from 1910 to 1920, was continued; farms numbered 66,288 in 1920; 73,267 in 1925. The acreage of land in farms increased from 11,712,235 in 1910 to 13,244,720 in 1920, and was 12,610,310 in 1925. The improved land in farms totaled 7,129,343 acres in 1920. The percentage of the total land area used for agricultural purposes was 27.4 in 1910, and 29.5 in 1925. The total value of farm property rose from $637,543,411 in 1910 to $1,057,429,848 in 1920, or 65.9 per cent, and declined thereafter to

$823,437,940 in 1925; the average value per farm was $11,346 in 1910, $15,952 in 1920, and $11,239 in 1925. In interpreting these values, the inflation of the currency incident to the World War is to be taken into consideration. Of the total number of farms in 1925, 60,389 were operated by owners; 935, by managers; and 11,943, by tenants. The corresponding figures for 1910 were 47,505; 961; and 7726. White farmers numbered 65,022 in 1920, of whom 45,265 were native and 19,757, foreign born. There were 1266 colored, 460 Indian and 699 Japanese, farmers. White farmers numbered 55,067 in 1910 (37,770 native and 17,297, foreign-born) and in that year there were 673 Indian, and 316 Japanese, farmers. Farms reported as under mortgage numbered 24,004 in 1920; 27,604 in 1925. The area under irrigation increased from 334,378 acres in 1909 to 529,899 in 1919. The number of dairy cows was 289,635 in 1920; 266,216 in 1925; "beef" cows numbered 88,969 in 1920; 71,577 in 1925; sheep, 623,779 in 1920; 515,789 in 1925. The estimated production of the principal farm crops in 1928 was as follows: Corn, 1,794,000 bushels; wheat, 48,644,000; oats, 9,447,000; barley, 1,952,000; potatoes, 9,045,000; hay, 2,186,000 tons. Comparative figures for 1913 are corn, 952,000 bushels; wheat, 53,300,000; oats, 14,250,000; barley, 7,290,000; potatoes, 7,380,000; and hay, 1,794,000 tons.

Mining. The mineral resources of Washington are as yet largely undeveloped. The chief mineral is coal, although cement, clay, sand, and gravel also are produced in valuable quantities. The coal output during the period starting with 1914 was as follows: 1914, 3,064,820 net tons; 1916, 3,038,588; 1917, 4,009,902; 1918, 4,082,212; 1920, 3,575,093; 1921, 2,428,722; 1922, 2,581,165; 1926, 2,586,568. The value of the cement produced annually was between $2,000,000 and $6,000,000 during this period. The State also produced small amounts of copper, gold, and iron ore. The total value of the mineral production in 1926 was $21,256,952, compared with $26,677,191 in 1920; $18,267,938 in 1919; $20,999,691 in 1918; and $13,830,739 in 1914.

Manufactures. Washington developed greatly in industrial importance during the World War. There were 10 cities having more than 10,000 inhabitants in the State in 1920. There were 3674 manufacturing establishments in the State in 1909; 4918 in 1919; 3216 in 1925; and 3344 in 1927. Wage earners in manufactories numbered 132,928 in 1919; 105,893 in 1925; and 104,468 in 1927; capital invested amounted to $222,261,229 in 1909 and $574,235,183 in 1919. The value of the manufactured product amounted to $220,746,421 in 1909; $809,622.984 in 1919; $659,339,836 in 1925; and $677,913,579 in 1927. The increase in the value of products evidenced in 1919 was due in great measure to changes in industrial conditions brought about by the World War and cannot be properly used as an index of the industrial expansion during the war period. The lumber and timber industry of the State is chief in point of value of product, with an output valued at $89,155,000 in 1909; $234,881,000 in 1919; and $273,545,537 in 1925. Shipbuilding and boatbuilding attained importance during the War, amounting to $1,550,000 in 1909 and $166,520,000 in 1919. The chief manufacturing cities are Seattle and Tacoma. In 1909 there were in Seattle, 753 manufacturing establishments with a product valued at $50,814,000; in 1919, 1229 with $274,431,000; in 1925, 1005 with products valued at $159,566,000; in 1927, 1154 with $168,032,381. In 1909 Tacoma had 277 establishments, with products valued at $24,462,000; in 1914, 399 with $27,708,000; in 1919, 248 with $103,172,000; in 1925, 289 with $71,001,327; in 1927, 322 with $79,381,871.

Finance. State expenditures in the year ended Sept. 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of governmental departments, $22,921,765 (of which $9,683,539 was aid to local education); for interest on debt, $716,615; for permanent improvements, $11,116,449; total, $34,754,829 (of which $9,556,931 was for highways, $2,585,305 being for maintenance and $6,971,626 for construction). Revenue was $35,622,467. Of this, property and special taxes formed 48.3 per cent; departmental earnings and charges for officials' services, 6.6 per cent; sales of licenses and taxation of gasoline, 34.5 per cent. Property valuation was $1,216,089,557; State taxation thereon, $13,792,277. Net State funded debt on Sept. 30, 1927, was $12,911,977.

Education. Educational progress in Washington has been steady. The Legislature in the course of successive sessions has passed important school measures. Progress was especially notable in connection with the rural-school work. The following objects have been accomplished: The establishment of a State-wide retirement fund; a constructive programme in State-wide consolidation; increased aid for high schools; increased direct supervision of rural schools through the eighth grade; exemption laws and higher professional standards for teachers. Strong efforts were being made for the grouping of related school districts in neighboring units sufficiently large to support community high schools. Vocational education has been carried on since 1919, and the Legislature passed an act providing for its further development in accordance with the Smith-Hughes Act. The enrollment in public schools increased from 239,663 in 1914 to 329,288 in 1925–26. To the latter total, the high-school enrollment furnished 70,474; the kindergarten and elementary grades, 258,814. Total expenditure for public day schools in 1925–26 was: current, $26,075,815; outlays, $4,652,165. The percentage of illiteracy in the State decreased from 3.2 in 1910 to 2.1 in 1920. In the native white population, it remained at 0.3 per cent; in the foreign-born white, it increased from 4.7 to 5 per cent; in the Negro, it decreased from 4.8 to 4.6.

Political and Other Events. Senator Wesley L. Jones was reëlected in 1914 (also in 1920 and 1926). In Seattle, Hiram C. Gill, who was once recalled as mayor, was again chosen mayor on a Nonpartisan ticket. A measure providing for State-wide prohibition was carried. In 1916 a Democratic governor, Ernest Lister, was reëlected and the vote for President went to Wilson by a narrow margin. Senator Poindexter, Republican, was elected to the Senate by a record majority, and the entire Republican State ticket except the governor was elected. A strike in the shipyards, involving 25,000 workmen, occurred in Seattle in 1919. In 1920 the Republican vote elected Louis F. Hart governor. For President, Harding received 223,137 votes; Cox, 84,298. In 1922 C. C. Dill, Democrat, was elected to the Senate. On Nov. 12, 1923, the United States Supreme Court sustained the State laws prohibiting the ownership of agricultural lands by Japanese and other aliens ineligible to citizenship. For President, Coolidge received in 1924, 220,224 votes; La Follette, 150,727; Davis, 42,842. Ronald H. Hartley, Republican, was elected governor. In a conflict over the direction of the State University, Hartley caused the removal of its president, Dr. Henry Suzzalo, in 1926. For President, in 1928, Hoover received 335,844 votes; Smith, 156,772. Governor Hartley was reëlected. A 7.79-mile tunnel of the Great Northern Railroad system through the Cascade Mountains was bored through in 1928.

Legislation. The Legislature passed a minimum wage act which went into effect on Feb. 20, 1915. In 1917 the Legislature adopted a "bone dry" prohibition amendment. It also passed measures substituting life imprisonment for the death penalty, unless the jury in addition to the verdict of guilty found that the death penalty should be inflicted. The Legislature created a State Safety Board with legal aid boards to investigate industrial accidents. It also enacted measures against criminal syndicalism and sabotage. In 1923 the sale of narcotics was made a felony. An executive-budget law was enacted in 1925. A constitutional amendment to subject different classes of property to different rates of taxation was submitted in 1927, but rejected by popular vote in 1928.

WASHINGTON, State College of. A coeducational State institution at Pullman, Wash., founded in 1890 under the National Land Grant Act. The student enrollment increased from 1184 in 1914 to 3344 in 1927–28, and the summer-session enrollment in 1928 was 390. The members of the faculty for 1927–28 numbered 292, as compared with 264 in 1923–24. During the period 1914 to 1927–28, the yearly income increased from $458,000 to $1,849,667, while the Land Grant Endowment Funds amounted to $2,690,778 in 1928. The library was increased from 90,000 bound volumes in 1914 to 145,000 in 1928. During the period under review, David S. Troy Hall for the dairy department, three dormitories for women, one for men, several farm buildings, a gymnasium, a hospital, and a home economics building, were constructed. President, Ernest O. Holland, Ph.D.

WASHINGTON, University of. A coeducational State institution of higher learning at Seattle, Wash., founded in 1861. In 1914 student enrollment was 1888; the faculty numbered 194, and the library contained 64,000 volumes. In 1928 the total enrollment reached 7282; the faculty had increased to 350 members; and the library contained 249,208 volumes. During this period, the schools of business administration, library, economy, and fisheries were opened. Education Hall, Home Economics Hall, Commerce Hall, Philosophy Hall, the forest products laboratory, the mines laboratory, and a stadium seating 30,000 were built. In 1925 Alfred H. Anderson Hall for the college of forestry was opened, and a library was completed in 1926. The following year, the Henry Memorial Art Gallery was opened and a gymnasium for women was erected. An athletic pavilion for men was completed in 1928. The university received a gift of the Boeing Aërodynamical Laboratory in 1919, and a gift of $250,000 for a building for the college of forestry in 1923. Requirements for entrance and scholarship standards were raised in 1921. President, M. Lyle Spencer.

WASHINGTON AND JEFFERSON COLLEGE. A nonsectarian institution of higher education at Washington, Pa., founded in 1802. The student enrollment in 1915 was 326, as compared with 499 in 1928. The faculty numbered 21 members in 1915 and 40 in 1928, and the library, in the same period, was increased from 26,000 to 40,763 volumes. The endowment was approximately $1,500,000 in 1928. In 1926 and 1927, the main building and other facilities were completely overhauled and modernized, including equipment. President, S. S. Baker, LL.D.

WASHINGTON AND LEE UNIVERSITY. A nonsecretarian institution of higher education for men at Lexington, Va., founded in 1749, maintaining departments of liberal arts, commerce, engineering, and law. The student enrollment increased from 492 in 1914 to 910 in 1928. During the same period, the faculty increased from 26 to 56 members. The permanent endowment of the university in 1928 was $1,390,047, and there were 65,000 volumes in the library. A dormitory was built in 1920, and a chemical laboratory, costing $150,000, was opened in 1924. Within the period 1914–1928, two years of college work were made requisite for admission to the law school; departments of education, electrical engineering, and public speaking were opened; a campaign was carried on in the South to raise $500,000 to reëstablish the school of journalism of the university, which was founded in 1869 while Gen. Robert E. Lee was president; and the United Daughters of the Confederacy raised $150,000 for a Lee Memorial Chapel. President, Henry Louis Smith, Ph.D.

WASHINGTON CONFERENCE. The possibility of the nations' disarming has been a favorite theme of prophets and poets. The Hebrew prophets told of a time when nations would "beat their swords into ploughshares and their spears into pruning-hooks." Tennyson sang of the day when "the war drum throbs no longer and the battle flags are furled." After the Paris Conference, however, the reduction of expenditures for armaments was the concern of statesmen, and some real progress was made. The great naval Powers actually put a limit on capital ships, and European states even discussed a treaty to limit land armaments.

Senator William E Borah of Idaho was more than any other individual responsible for the calling of the Washington Conference, and his activities were at first viewed with some suspicion by President Harding and Secretary Hughes. On Dec. 14, 1920, Senator Borah introduced in the Senate a resolution which became part of the Naval Appropriation Bill of 1921. The President was authorized and requested "to invite the governments of Great Britain and Japan to send representatives to a conference, which shall be charged with the duty of promptly entering into an understanding or agreement by which the naval expenditures and building programmes of each of said governments . . . shall be substantially reduced annually during the next five years to such an extent and upon such terms as may be agreed upon." Executive opposition could not keep this provision out of the Naval Bill, but how far the agitation in Congress and the country forced the executive to reluctant action and how far it was simply pressure on a door which had begun to swing open, it is difficult to say. On July 10, 1921, the State Department issued a proclamation announcing that a conference was to be called. Great Britain, Japan, and the United States were the principal naval Powers, but before they could agree on limitation, there had to be a full discussion and agreement on the political situation in the Pacific. Policy and armament go hand in hand. Preparedness is only half-preparedness if not measured according to the demands of a nation's foreign policy. President Harding appointed as the American representatives Secretary Hughes, Elihu Root, Senator Lodge, leader of the Republican majority in the Senate, and Senator Underwood, leader of the Democratic minority. Apparently, President Harding, unlike Wilson in the case of the Treaty of Versailles, was ready to placate the Senate in advance. The Conference began on Nov. 12, 1921, and lasted until February, 1922. Seven treaties were adopted:

(1) A treaty between the United States, the British Empire, France, Italy, and Japan with respect to the limitation of naval armament.

(2) A treaty between the same powers in relation to the use of submarines and noxious gases in warfare.

(3) A treaty between the United States, the British Empire, France, and Japan relating to their insular possessions and dominions in the Pacific Ocean.

(4) A declaration accompanying this treaty.

(5) A treaty between the same four powers supplementary to the above.

(6) A treaty between the United States, Belgium, the British Empire, China, France, Italy, Japan, the Netherlands, and Portugal relating to policies in matters concerning China.

(7) A treaty between the same nine powers relating to the Chinese customs tariff.

In addition, 12 resolutions were adopted relating to such matters as proposals for the amendment of the laws of war; extraterritoriality in China; reduction of Chinese military forces; the Chinese Eastern Railway; and radio stations and foreign postal agencies in China. The most spectacular result of the conference was the Five-power Naval Treaty which established a 5-5-3 ratio for the capital ships of the United States, Great Britain, and Japan, and maintained the *status quo* in respect to American and Japanese fortifications in the Pacific. This treaty was in large part due to the important speech which Secretary Hughes made at the opening of the conference. He not only urged disarmament with an eloquence which recalled President Wilson's utterances, but he had a definite scheme which the United States approved and which, at the same time, was not unfair to Great Britain and Japan. He suggested the following four principles:

1. All capital shipbuilding programmes, either actual or projected, should be abandoned.
2. Further reduction should be made through the scrapping of the older ships.
3. In general, regard should be had to the existing naval strength of the powers concerned.
4. The capital-ship tonnage should be used as the measurement of strength for navies, and a proportionate allowance of auxiliary combatant craft should be prescribed.

This scheme entailed the scrapping of 1,878,073 tons, or 60 capital ships—30 for the United States, 23 for Great Britain, and 17 for Japan. Some modifications of detail were made, largely because of Japanese reluctance to agree to the ratio. Japan was finally permitted to retain the *Mutsu*, one of the most powerful ships afloat; but it was a Pyrrhic victory, for in compensation Great Britain was allowed to build two superdreadnoughts, and the United States got the right to complete two battleships of the *West Virginia* class. This bargain, however, was rather costly in money to Great Britain and the United States.

Some naval strategists maintained that the capital ship was obsolete; if that were so, its limitation was little more than a magnificent gesture. The limitation of capital ships, furthermore, it was contended, would really cause an increased construction of smaller vessels, and these the conference failed to limit. Indeed, the naval programmes of the Powers, following 1922, already began to compete in ships which the treaty did not cover. Archibald Hurd, one of the most distinguished naval experts of England, declared that one of the results of the conference would be to "set up a higher standard for submarines, placing on each nation what amounts practically to an obligation to continue building submarines." Here, probably, was the most conspicuous failure of the conference. The submarine, "the criminal of the seas," which was directly responsible for the entrance of the United States into the War, was turned loose with a certificate of good conduct.

Article I of the treaty on the subject authorized the use of the submarine under certain specified conditions as a commerce destroyer. Article IV, however, declared that the signatory Powers recognized the practical impossibility of using the submarine as a commerce destroyer. There were ambiguities in the treaty which seemed likely to cause difficulty in the event of war, and meanwhile there was no limitation. Great Britain was anxious to act drastically, but France, on account of her strategic position, wished to retain the submarine as a weapon. France was excluded from the meetings in which England, the United States, and Japan deliberated on the naval holiday; and she was not notified of the decisions until they were accomplished facts. The American delegation might have been more diplomatic in this respect, since France's cooperation was necessary if submarines were to be successfully dealt with, to say nothing of the interests of the United States in having France agree to the rehabilitation of Germany. Aircraft, also, was too big a problem for the conference, although in this case their commercial possibilities would make any form of limitation extremely difficult. Another lacuna of the conference was its failure to define a merchant ship in the treaties relating to this subject.

Of the other treaties, one deserves special mention. The United States, Great Britain, France, and Japan agreed "as between themselves to respect their rights in relation to their insular possessions and insular dominions in the region of the Pacific Ocean." Article II provided that "if the said rights are threatened by the aggressive action of any other power, the high contracting parties shall communicate with one another fully and frankly in order to arrive at an understanding as to the most efficient measures to be taken, jointly or separately, to meet the exigencies of the particular situation." This was the so-called Four-power Treaty. It gave rise to a lively controversy in the United States Senate. In particular, critics did not fail to point out the similarity of this language to that of Article X of the League of Nations Covenant. One serious question raised by the treaty was whether the phrase "insular dominions" included the Japanese mainland. If it did—and this was the interpretation first given the treaty—the United States would be bound to confer on the measures necessary to protect Japan. The United States might be forced into indirect support of possible Japanese imperialism. There was a difference of opinion between President Harding and Secretary Hughes as to whether Japan proper was included, and as a result of the ensuing public discussion, a supplementary treaty was drawn up, excluding the mainland from the term "insular possessions and insular dominions." The treaty probably left Japan in a better position in the Pacific than she was before, for American diplomatic freedom of action was limited. The most beneficial result was that the Anglo-Japanese Alliance was canceled. This was one of the principal objectives of the American delegation to the conference; but if, from the point of view of the United States, the Four-power Treaty was considered a winding-sheet for the Anglo-Japanese Alliance, Japan apparently thought that the alliance was extended. Premier Takahashi declared that the "Quadruple Entente, which for Japan replaces the Anglo-Japanese Alliance, is much wider in its bearing and removes all chances of war." Some pledge, however, such as the Four-power Treaty, was necessary to provide moral disarmament before actual disarmament could be achieved. The Four-power Treaty was bound up with the naval pact.

At the conference, China met with both successes and reverses. One achievement of the conference, the Shantung agreement, was a real advance. Direct negotiations had failed. China had little hope of securing assistance from the League of Nations, but in the Washington Conference, she was able to debate the matter with Japan and to receive satisfaction. Two important treaties relating to foreign rights and interests in China and the Chinese tariff failed to give China what she wanted. The United States stood back of China on occasion, but the matters involved were quite technical. The country was much more interested in the naval aspects of the conference, and there was no strong public opinion in the United States in favor of going to her aid and letting China get out of the straitjacket in which imperialistic policies had succeeded in placing her. See CHINA; SHANTUNG; YAP ISLAND; NAVIES OF THE WORLD; ANGLO-JAPANESE ALLIANCE.

WASHINGTON UNIVERSITY. A nonsectarian coeducational institution at St. Louis, Mo., founded in 1853. The student enrollment increased from 1390 in 1914 to 6669 in 1928, the faculty from 208 to 541 members, the library from 142,589 bound volumes and 60,000 pamphlets to 285,654 bound volumes and 78,386 pamphlets. Productive funds increased from $6,156,223 to $13,802,548.01 in the same period; the Wilson swimming pool and funds for Wilson Memorial Hall for the department of geology, the latter in memory of her husband, were given by Mrs. Newton R. Wilson; and the Grace Valle January Law School Building and funds for the erection of a building for the school of fine arts were received; by donation of private individuals and of the General Education Board, a school of Medicine was endowed with $1,600,000; $100,000 was given by Robert S. Brookings for a residence foundation in Washington, D. C., in connection with the graduate school of economics and government; a chair of history was endowed through anonymous gift; an athletic field house and the W. K. Bixby Hall of Fine Arts were completed; new courses were established in industrial engineering; the Charles Rebstock Hall of Biology and the St. Louis Maternity Hospital were opened; $1,000,000 was received for Mallincrodt Radiological Institute; a like amount for an eye, ear, nose, and throat hospital; a women's building and a school of dentistry building were completed; and $600,000 was received for the George Warren Brown Department of Social Work. Acting Chancellor, George R. Throop, Ph.D.

WASSERMANN, väs'ĕr-män, JACOB (1873–). A German novelist, born at Furth, who has lived much in Austria. He is the author of many works, including: *Die Juden von Zirndorf* (1897); *Geschichte der Jungen Renate Fuchs* (1901); *Der Niegeküsste Mund* (1902); *Der Moloch* (1903); *Alexander in Babylon* (1905); *Die Schwestern* (1906); *Caspar Hauser, oder die Trägheit des Herzens* (1908); *Die Masken Erwin Reiners* (1910); *Der Goldene Spiegel* (1911); *Der Mann von Vierzig Jahren* (1913); *Das Gänsemännchen* (1915); *Christian Wahnschaffe* (1917); *Der Wendekries* (1920); and several prose essays, *Die Kunst der Erzählung, Faustina, oder ein Gespräch über die Liebe* (1912), and *Mein Weg als Deutscher und Jude* (1920). His later works are *Fabian oder die verlorenen Jahre* (1924); *Landin und die Seinen* (1925); *Der Fall Maurizius* (1926); and *Aufruhr um den Junker Ernst* (1927). Among English translations of his works are *The Triumph of Youth*; *World's End*; *Wedlock*; *Gold* (1924); *Oberlins Three Stages* (1926); *Caspar Hauser* (1928); and *The Maurizius Case* (1929). He has written also five one-act plays under the title *Die ungleichen Schalen*.

WATER METERS. See WATERWORKS AND WATER PURIFICATION.

WATER POWER. In the years following 1914, there was no more important movement for the development of natural resources than that concerned with making water power available for the use of industry in an economical, convenient, and efficient manner. This was particularly evident with the increased cost of fuel, involved especially in the raising and transportation of coal, and due to the growing demand of industry along with the improved standards of living. This condition held good the world over, and the development of water power in such countries as Switzerland, Italy, and Scandinavia, not to mention North America, was indeed most important. Obviously, it was a subject which required deep interest and supervision even when private capital was employed; for the construction of dams, power plants, and transmission lines, considerable outlay was involved, although the maintenance costs were comparatively low. Naturally, in the years immediately succeeding the World War, it was not always easy to secure such capital in view of government indebtedness, high rates for loans, and often lack of private capital. Nevertheless, in many parts of the world there were important developments, as, for example, in connection with railway electrification in France and in Switzerland, for industrial purposes in Italy, and for general power development in America.

North America contains less than 15 per cent of the water-power resources of the globe, but by the end of 1928 it had developed more water power than all the rest of the world. European countries, particularly Germany, the territory comprised in the former Austria-Hungary, Norway, Sweden, France, Italy, and Switzerland, have developed a relatively larger percentage of their water power, but have not in any way approached the possible. Many of these countries have little or no natural fuel, and consequently with their ever-increasing industrial demands for power, they have been forced to develop their water-power resources. This is especially true of Italy, which has no native coal but which has expanded industrially.

Japan in 1929 was developing a project of 102,000 horse power in northern Korea in which a 16-mile tunnel has been built to carry the water through the mountains to the water wheels. Russia has recently ordered in the United States four 80,000-horse-power units for a development on the Dnieper River. These are the largest capacity units to date and the plant will eventually contain 10. While Asia, Africa, South America, and Central America all possess water power in varying degrees, much of the territory of these countries has been comparatively unexplored or is not conveniently near markets for power; hence, in their present economic condition, the development of water power is a subject of little interest.

It may be said that North Africa and South Africa, where the rainfall is low, have but limited water-power resources, but tropical Africa, particularly the Congo Basin, with a heavy rainfall, has vast possibilities for the production of water power. Asia, with its vast area and the high altitude of its central part, is inferior in water-power resources to Africa, on account of the low precipitation through northern, western, and central Asia. This subject is comprehensively summarized in "Water Power of the World," Part II, of the *World Atlas of Commercial Geography*, published by the United States Geological Survey (Washington, 1921).

Water Power in the United States. For many years, there had been considerable discussion and controversy as to the Federal water powers on streams within its jurisdiction. The matter, however, had not attained important dimensions until the twentieth century, and even then laws passed in 1901 and 1910 on the administration of water power hardly took into consideration the part which electrical power was destined to play in transportation and industry, or the safeguards which the State in the disposition of its important natural resources would be required to make in the interest of the investor as well as of the public. In fact, the rights granted at first were so insecure and the liabilities imposed were so uncertain that it was difficult to finance water-power developments requiring Federal authority, and the result was that American industry was unable to utilize the large water-power resources available to it. The Congress of the United States in 1924 had control over the disposition of some 85 per cent of the potential water power of the nation. This authority depends on three fundamental bases: first, that the United States is owner of the public lands, which may be used only in such manner and for such purposes as Congress may direct; secondly, that jurisdiction over all navigable waters of the United States is given to Congress through its power to regulate commerce, and it also has authority to determine what structures may be erected in or over them and under what conditions; thirdly, the manner in which international waters can be diverted and used, which of course must be the subject of treaty between the nations concerned, and the only power of making and enforcing treaties in the United States belongs to the Government.

In the beginning, Congress left the regulation of navigable rivers, and in a large measure their improvement, to the several States and acquiesced in the construction on such streams of whatever structures the State laws might authorize. The use of public lands for power purposes also fell under a condition of similar policy, but later, this policy was modified through legislation seeking to preserve the public interest in the power resources under public control. Such legislation, however, did not appreciate the conditions which were necessary if these resources were to be developed for public use. Under the Act of 1901, grants on public lands and reservations were made by the Executive Department; on navigable streams, power grants demanded a special act of Congress. The Act of June 23, 1910, superseding a similar act approved on June 21, 1906, merely fixed the general conditions under which the special grants were made. These acts were considered practical failures, and in order to meet the conditions which had arisen and to provide for the proper requirements of industry, as well as to protect the nation at large, the Federal Water-power Act was passed by Congress and approved June 10, 1920. This Act created the Federal Power Commission, made up of the Secretary of War, the Secretary of the Interior, and the Secretary of Agriculture, together with an engineering, technical, legal, and administrative staff which was authorized to make investigations and to collect and report data concerning water resources and the water-power industry.

The commission was also empowered to issue permits and licenses for the construction, operation, and maintenance of dams, water conduits, reservoirs, power plants, transmission lines, and like projects, such licenses being issued for a period not exceeding 50 years, and prescribing special conditions under which the licensee should operate, including, of course, those that were set forth in some detail in the Federal Water-power Act itself. At the close of the fiscal year ending June 30, 1928, the Federal Power Commission reported that it had received 910 applications since the enactment of the Water-power Act. The accompanying small table gives a summary of several years:

Date	Horse Power	Increase Horse Power	Increase Per cent
1921 (Nov.)	7,926,958	....	...
1924 (Mar.)	9,080,958	1,160,000 [a]	14.6
1925 (Mar.)	10,037,655	950,697	10.5
1926 (Jan. 1)	11,176,596	1,138,941 [b]	11.3
1927 (Jan. 1)	11,720,983	544,387	4.9
1928 (Jan. 1)	12,296,000	575,017	4.9
1929 (Jan. 1)	13,571,530	1,275,530	10.4

[a] About 2.3 years. [b] About 0.8 year.

From this summary, it will be apparent that the legislation of 1920 not only was needed but was the forerunner of improved and substantial developments. This does not mean that the Federal Power Commission was not involved in controversy or that there was a uniform acceptance by the various States of attempts to exert Federal authority over streams more or less navigable.

Toward the end of 1928, Congress passed a bill authorizing the expenditure of $165,000,000 for the construction of a dam on the Colorado River at Black Canyon, which the commission of engineers had found more suitable than Boulder Canyon. This authorized the Secretary of the Interior to construct, operate, and maintain a dam for power and irrigation canals, and to construct of cause to be constructed a power plant, which would have a maximum of 1,000,000 horse power or 550,000 continuous horse power. The operation of the power plant and the distribution of electricity were left to further determination.

At Muscle Shoals on the Tennessee River in Alabama, the Government constructed and has in operation a power plant with units having a total capacity of 260,000 horse power. More units are to be added. The maximum available energy at Muscle Shoals is 610,000 horse power, but this is available only for part of the year. The continuous all-year power is less than 100,000 horse power, which makes necessary the tying into a system containing steam and other hydro plants. This is actually done by the Government selling the output to the system of the Alabama Power Company which distributes the energy.

On the St. Lawrence, it is estimated that approximately 5,000,000 horse power will be available. This project is still in abeyance (1929), pending international agreement between the United States and Canada, also agreement with New York State which claims certain rights in the determination of the development.

A treaty was negotiated in 1928 between the United States and Canada for the preservation of the scenic beauty of Niagara Falls, the provisions of which will make possible additional

POTENTIAL WATER-POWER RESOURCES OF THE UNITED STATES

State and Division	Available 90 per cent of the time		Available 50 per cent of the time	
	Horse power	Per cent	Horse power	Per cent
United States	34,818,000	100.00	55,030,000	100.00
New England	998,000	2.87	1,978,000	3.60
Middle Atlantic	4,317,000	12.40	5,688,000	10.35
East North Central	737,000	2.12	1,391,000	2.53
West North Central	871,000	2.50	1,844,000	3.35
South Atlantic	2,476,000	7.11	4,464,000	8.11
East South Central	1,011,000	2.90	2,004,000	3.64
West South Central	434,000	1.25	888,000	1.61
Mountain	10,736,000	30.83	15,513,000	28.19
Pacific	13,238,000	38.02	21,260,000	38.63
New England				
Maine	536,000	1.54	1,074,000	1.95
New Hampshire	186,000	.53	350,000	.64
Vermont	80,000	.23	169,000	.31
Massachusetts	106,000	.31	235,000	.43
Rhode Island	25,000	.07	40,000	.07
Connecticut	65,000	.19	110,000	.20
Middle Atlantic				
New York	4,010,000	11.52	4,960,000	9.03
New Jersey	50,000	.14	90,000	.16
Pennsylvania	257,000	.74	638,000	1.16
East North Central				
Ohio	55,000	.16	166,000	.30
Indiana	40,000	.12	110,000	.20
Illinois	189,000	.54	361,000	.66
Michigan	168,000	.48	274,000	.50
Wisconsin	285,000	.82	480,000	.87
West North Central				
Minnesota	203,000	.58	401,000	.73
Iowa	169,000	.49	395,000	.72
Missouri	67,000	.19	152,000	.27
North Dakota	82,000	.23	193,000	.35
South Dakota	63,000	.18	110,000	.20
Nebraska	183,000	.53	342,000	.62
Kansas	104,000	.30	251,000	.46
South Atlantic				
Delaware	5,000	.01	10,000	.02
Maryland and District of Columbia	106,000	.30	238,000	.43
Virginia	459,000	1.32	812,000	1.48
West Virginia	355,000	1.02	980,000	1.78
North Carolina	540,000	1.55	816,000	1.48
South Carolina	429,000	1.23	632,000	1.15
Georgia	572,000	1.65	958,000	1.74
Florida	10,000	.03	18,000	.03
East South Central				
Kentucky	77,000	.22	184,000	.33
Tennessee	432,000	1.24	710,000	1.29
Alabama	472,000	1.35	1,050,000	1.91
Mississippi	30,000	.09	60,000	.11
West South Central				
Arkansas	125,000	.36	178,000	.32
Louisiana	1,000	.00	2,000	.00
Oklahoma	70,000	.20	194,000	.35
Texas	238,000	.69	514,000	.94
Mountain				
Montana	2,550,000	7.32	3,700,000	6.72
Idaho	2,122,000	6.10	4,032,000	7.33
Wyoming	704,000	2.02	1,182,000	2.15
Colorado	765,000	2.20	1,570,000	2.85
New Mexico	116,000	.33	186,000	.34
Arizona	2,759,000	7.92	2,887,000	5.25
Utah	1,420,000	4.08	1.586,000	2.88
Nevada	300,000	.86	370,000	.67
Pacific				
Washington	4,970,000	14.27	7,871,000	14.30
Oregon	3,665,000	10.53	6,715,000	12.20
California	4,603,000	13.22	6,674,000	12.13
Outlying Possessions				
Alaska	1,000.000		2,500,000	
Porto Rico	19,000		28,000	
Hawaii	100,000		200,000	

diversion of water on both the Canadian and the United States sides. The present installed capacity of the Niagara Falls Power Company in its active plants on the American side is about 450,000 horse power. In addition to this, two old plants, now held in reserve, have 110,000 horse power. On the Canadian side, nearly 1,000,000 horse power is developed in four plants, three of which are operated by the Ontario Hydroelectric Power Commission.

Another outstanding hydroelectric development completed early in 1928 is that on the Susquehanna River at Conowingo, Md. This has seven 54,000-horse-power units and four more are to be added later. Although not the largest in capacity, these units are the largest in physical dimensions constructed to date.

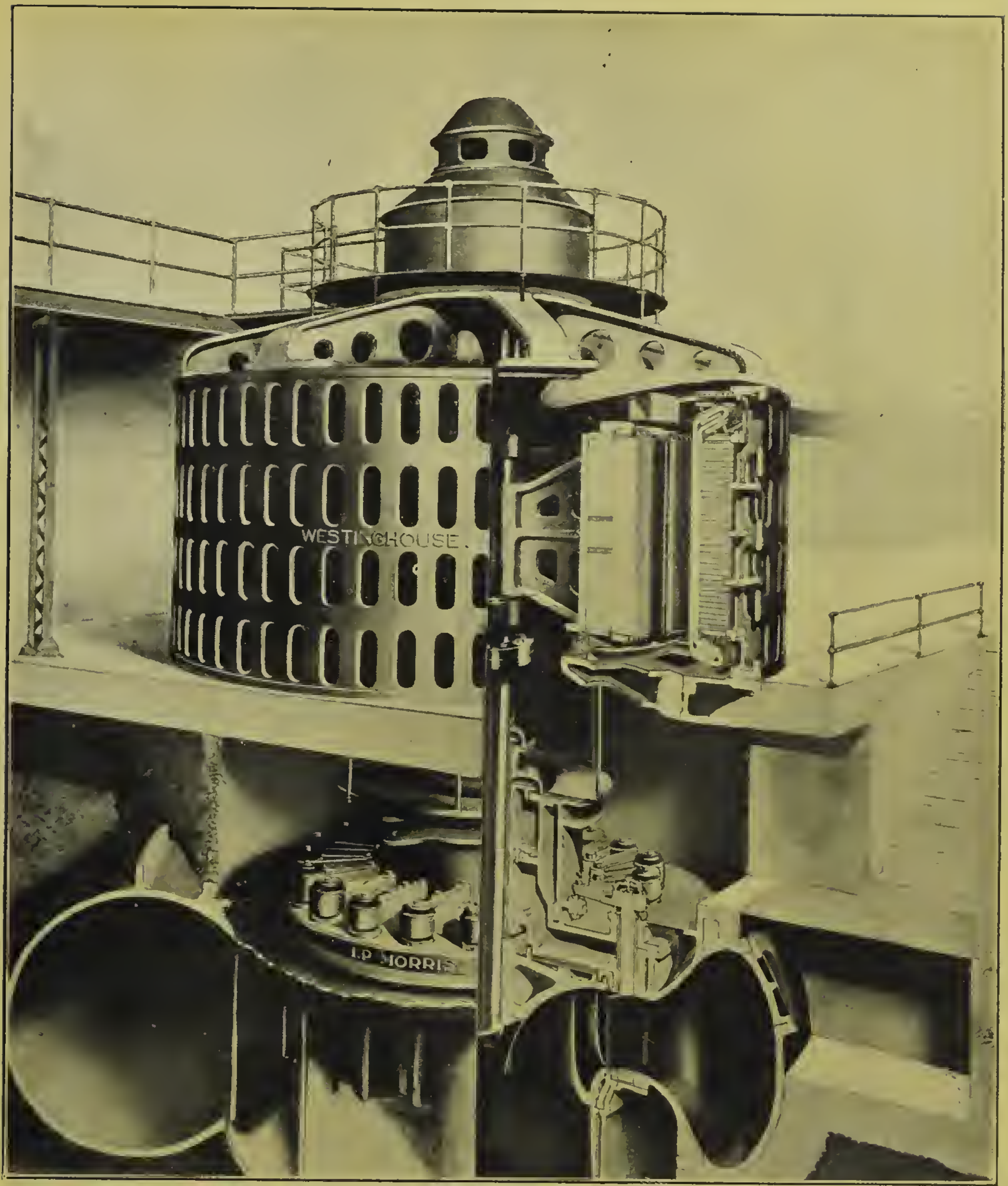
The highest-head plant in operation in the United States is Big Creek 2A plant of the Southern California Edison Company, which has impulse wheels operating under a 2418-ft. head. This station contains two 56,000-horse-power units.

DEVELOPED WATER POWER IN THE UNITED STATES, JAN. 1, 1929, AS REPORTED BY THE U. S. GEOLOGICAL SURVEY

(Plants of 100 horse power and over)

	Total		Public Utility and municipal		Manufacturing and miscellaneous	
Division and States	No. of Plants	Capacity in horse power	No. of Plants	Capacity in horse power	No. of Plants	Capacity in horse power
United States	3,375	13,571,530	1,605	11,886,336	1,770	1,685,194
New England	1,203	1,653,654	262	879,914	941	773,740
Middle Atlantic	592	2,122,999	243	1,854,008	349	268,991
East North Central	390	1,075,660	265	841,435	125	234,225
West North Central	202	555,049	152	442,786	50	112,263
South Atlantic	338	2,595,304	173	2,444,992	165	150,312
East South Central	52	1,118,765	40	1,116,081	12	2,684
West South Central	34	47,082	23	43,577	11	3,505
Mountain	248	1,140,108	197	1,117,820	51	22,288
Pacific	316	3,262,909	250	3,145,723	66	117,186
New England:						
Maine	253	538,761	79	239,801	174	298,960
New Hampshire	244	278,002	62	143,711	182	134,291
Vermont	197	260,157	67	216,501	130	43,656
Massachusetts	325	362,123	28	159,211	297	202,912
Rhode Island	59	30,188	5	3,285	54	26,903
Connecticut	125	184,423	21	117,405	104	67,018
Middle Atlantic:						
New York	508	1,813,501	190	1,559,695	318	253,806
New Jersey	34	18,902	10	8,658	24	10,244
Pennsylvania	50	290,596	43	285,655	7	4,941
East North Central:						
Ohio	24	30,320	16	25,236	8	5,084
Indiana	26	56,521	17	50,620	9	5,901
Illinois	31	93,772	16	76,797	15	16,975
Michigan	134	378,315	113	319,884	21	58,431
Wisconsin	175	516,732	103	368,898	72	147,834
West North Central:						
Minnesota	73	292,649	49	198,327	24	94,322
Iowa	46	182,139	39	181,012	7	1,127
Missouri	7	20,560	5	20,260	2	300
North Dakota	1	245	0	0	1	245
South Dakota	9	19,671	5	7,050	4	12,621
Nebraska	45	23,649	41	22,954	4	695
Kansas	21	16,136	13	13,183	8	2,953
South Atlantic:						
Delaware	3	1,161	0	0	3	1,161
Maryland	16	415,815	5	411,765	11	4,050
District of Columbia	3	5,870	1	4,520	2	1,350
Virginia	63	140,239	33	98,625	30	41,614
West Virginia	12	91,279	7	81,174	5	10,105
North Carolina	120	814,000	50	775,000	70	39,000
South Carolina	60	574,000	33	546,000	27	28,000
Georgia	58	543,685	41	518,653	17	25,032
Florida	3	9,255	3	9,255	0	0
East South Central:						
Kentucky	7	142,255	4	141,351	3	904
Tennessee	31	177,425	24	176,170	7	1,255
Alabama	14	799,085	12	798,560	2	525
Mississippi	0	0	0	0	0	0
West South Central:						
Arkansas	4	15,680	4	15,680	0	0
Louisana	0	0	0	0	0	0
Oklahoma	4	1,948	4	1,948	0	0
Texas	26	29,454	15	25,949	11	3,505
Mountain:						
Montana	31	393,440	29	391,500	2	1,940
Idaho	54	357,577	47	354,575	7	3,002
Wyoming	11	17,355	10	17,029	1	326
Colorado	57	98,016	28	84,281	29	13,735
New Mexico	6	1,510	5	1,285	1	225
Arizona	10	104,360	10	104,360	0	0
Utah	69	154,200	59	151,440	10	2,760
Nevada	10	13,650	9	13,350	1	300
Pacific:						
Washington	74	747,407	68	704,275	6	43,132
Oregon	83	288,973	50	234,001	33	54,972
California	159	2,226,529	132	2,207,447	27	19,082
Outlying possessions:						
Alaska	....	32,000	....	....	....	....
Hawaii	....	32,224	....	....	....	....
Porto Rico (1925)	....	15,000	....	....	....	....

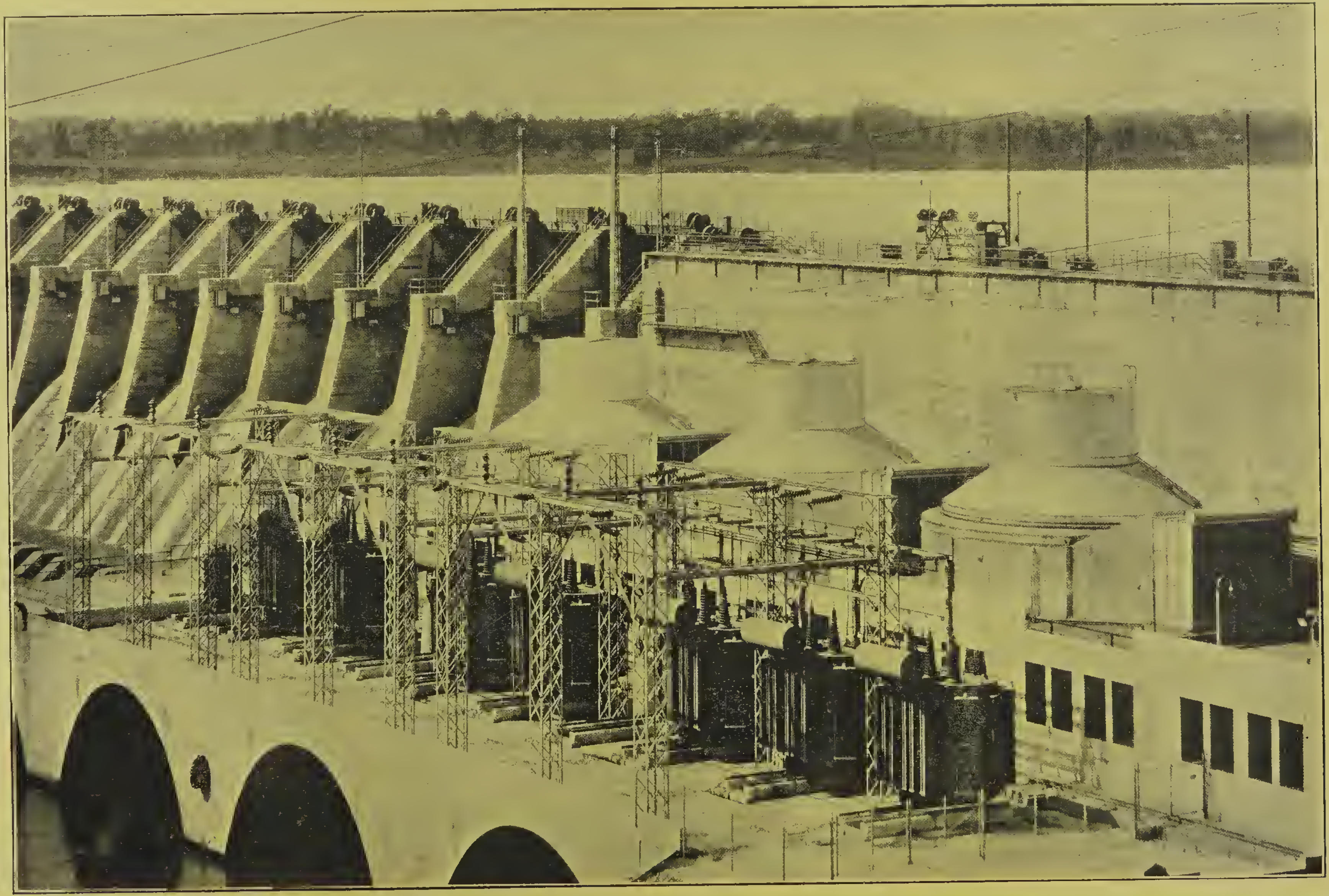
California ranks first, with 16.4 per cent of the developed water power; New York is second, with 13.3 per cent; North Carolina third, with 6 per cent; Alabama fourth, with 5.9 per cent; and Washington fifth, with 5.5 per cent.



Courtesy Westinghouse Electric and Manufacturing Company

HYDRO-ELECTRIC INSTALLATION AT THE NIAGARA FALLS POWER CO. PLANT

Diagrammatic view of No. 3-A unit including (above) a 32,000 Kv-a, 3-phase, 12,000 volts, vertical Westinghouse Waterwheel Generator operating at 150 revolutions per minute, and (below) a Morris Turbine



OUTDOOR POWER HOUSE AND SWITCHING STRUCTURE OF A MODERN AMERICAN STATION WITH AN INSTALLED GENERATING CAPACITY OF 62,000 KILOWATTS

NORWOOD HYDROELECTRIC DEVELOPMENT OF CAROLINA POWER AND LIGHT COMPANY

A notable low-head plant is that at Louisville, Ky., which contains eight 13,500-horse-power propeller-type wheels operating on a head that varies from 10 to 37 feet. The Rocky River Plant of the Connecticut Light & Power Co. is unique in that water for operation of the turbines is pumped up 240 feet into a storage reservoir during periods of off-peak steam power and is utilized to generate power through a 42,000-horse-power water turbine during peak-load periods. This is the only plant of its kind in the United States, although several such installations are now (1929) in operation in Europe, notably those in Italy.

Another development in New England worthy of special mention is the "Fifteen-mile Project" on the Upper Connecticut River in which 300,000 horse power will ultimately be produced in two stations. An unusual power plant is the Norwood Station of the Carolina Power & Light Co. in which the complete generating equipment, including generators, transformers, and switches, is of the outdoor type. This is the first plant to employ outdoor generators.

In 1928 in the electric public-utility power plants in the United States, about 34,000,000,000 kilowatt-hours of electricity was produced by the use of water power. To produce this quantity of power by the use of fuel would have required 31,000,000 tons of coal. The electricity produced by the use of water power for public-utility power plants in 1928 was over 40 per cent of the total.

Water Power in Canada. An analysis of the available and developed water power in Canada, according to the Dominion Water Power & Reclamation Service, shows a total available of 20,197,000 horse power for conditions of ordinary minimum flow during the entire year and 33,113,000 horse power for six months. The growth of developed hydroelectric power has been striking. The total installed horse power has grown from 977,000 in 1910 to 5,350,000 by the end of 1928. Of the latter, 445,700 horse power, or 83.1 per cent, is installed in central stations; 573,000 horse power, or 10.7 per cent, in the pulp and paper industry; and the remaining 6.2 per cent in other industrial plants such as sawmills, gristmills, mines, etc. In addition to its privately generated power, the pulp and paper industry purchases 789,500 horse power from the central stations, thus making it the largest industry using power in the Dominion. The largest central-station system in Canada is that of the Ontario Hydroelectric Power Commission, which in addition to its big Queenston Development of approximately 500,000 horse power operates other plants on the Canadian side at Niagara Falls and purchases large blocks of power from private developments in the Province of Quebec.

Water-power developments under construction in Canada (1929) were expected to add approximately 1,200,000 horse power to the total. These include the Beauharnais Project on the St. Lawrence, between Lake St. Francis and Lake St. Louis, which will ultimately contain ten 50,000-horse-power units, and the Bridge River project on the Columbia River which will have an initial capacity of 60,000 horse power and an ultimate of 700,000 horse power.

WATERS, Henry Jackson (1865–1925). An American college president and editor, born at Center, Mo., and educated at the University of Missouri and in Germany and Switzerland. From 1892 to 1895, he was professor of agriculture at the Pennsylvania State College, and from 1895 to 1909, he was director of the Agricultural Experiment Station and professor of agriculture at the University of Missouri. From 1909 to 1917, he was president of the Kansas State Agricultural College and in 1918 became managing editor of the Kansas City *Weekly Star.* He also served as commissioner to the Philippines to report on agricultural and educational development and was a member of several State agricultural boards. During the World War, he was Federal Food Administrator. He wrote *The Essentials of Agriculture* (1915); *The Development of the Philippine Islands* (1915); *Essentials of the New Agriculture* (1924); and *Laboratory Manual of Agriculture,* with J. D. Elliff (1918).

WATER SUPPLY. In the field of domestic water supply, the most important two developments in the period from 1914 have been the construction of aqueducts of constantly increasing length and size, truly stupendous and remarkable works, and in the almost complete eclipse of filtering methods for the removal of bacteria in water supplies by the plan of treatment with chlorine. As would be expected, the United States has occupied a leading position in the construction of great aqueducts and it is also in America that the chlorine method has been most extensively applied.

In early days, many American water supplies were privately owned, and, while many still are, one of the first developments was toward municipal ownership. In the campaign for municipally owned supplies, the slogan was based on the fact that water was an essential for life, and was to the effect that "water should be as free as air." The inevitable result of this policy has been a constant increase in the demand for water. The great difference between the per-capita consumption of water in America and Europe has often been pointed out. Whereas, in many central European cities, 10 to 20 gallons per capita per day suffice, the consumption in America ranges from 75 to 150 with a few notable examples of even greater demand. In earlier days, this demand, although high was much less, and, with small populations could be met at a reasonable expense. Today, with all nearby sources of supply fully developed, the great urban centres have had to turn to distant watersheds for the additional supplies needed to meet these great rates of consumption and the rapid increases in population. Thus, New York City, after fully developing the Croton area, has turned to sources in the Catskills, 70 to 100 miles distant; San Francisco is building her Hetch Hetchy aqueduct 156 miles long to reservoirs in Yosemite Park; Los Angeles is discussing the feasibility of a line almost 300 miles long to the Colorado River; and several New Jersey cities are combining in the construction of a North Jersey supply—only to mention a few outstanding works.

As also was natural, attention was turned, in the face of these great expenditures for additional supplies, to the problem of reducing the great waste of water which such high rates of consumption indicated. It was pointed out that probably 50 gallons per capita per day represented the actual use of water and that any consumption beyond this figure was probably waste. While some of this waste was legitimate and unavoidable, or so costly to locate and control that it was less expensive to permit it to occur than to attempt to stop it, there was much waste that could be prevented. As a result, numerous water-waste surveys have been made to locate leaky mains, connections, and fixtures, and there also has been much agitation for metering supplies and charging for the actual quantity used rather than by the usual method of a flat rate or fixed amount depending on the number of fixtures, tubs, wash basins, toilets, etc. supplied. While these efforts have had their effect in reducing waste, it has been clearly recognized that the demand is steadily increasing and many cities have paid little attention to curtailing waste.

During the earlier years of the twentieth century, great emphasis was put on the development of coagulation and filtration as a means not only for improving the physical quality of water, removing turbidity, color, etc. and in the improving of hard waters, but also on filtration as a means of removing bacteria dangerous to life. So many American cities were faced with the necessity of securing their water supplies from streams polluted by the sewage of other cities above, that typhoid epidemics forced attention to the necessity for adequate precautions. Indeed, the rapid increase in population made it increasingly difficult to find sources of supply free from pollution. The problem was older in Europe, but it had been answered in large measure by filtration, and America turned with force and determination to the filtration problem.

In the early years of the present century, large sums were expended in building the so-called slow sand filters through which the water flows by gravity. This type was particularly in favor with the large cities and where bacterial efficiency was the principal object sought. Mechanical filter plants, and coagulation and sedimentation basins were typical of the majority of smaller cities where turbidity and chemical improvement were problems. Just before the World War, chemical methods, ozone, chloride of lime, and sulphate of copper, were all being actively studied and experimented with. From these, the chlorine method, whereby small quantities of chlorine are mechanically introduced into the supply, has emerged as the modern process of disinfection. Many o the costly slow-filter plants have been abandoned and the use of chlorine has been widely introduced. It is probably true that this method, although very effective and far less expensive than filtration, has been relied upon in many cases where filtration also is essential to a thoroughly satisfactory supply. In Chicago, for example, probably one of the most backward cities in water supply in America, there is not only an unsatisfactory supply from the standpoint of quantity, caused largely by uncontrolled use and waste (consumption about 275 gallons per capita), but the quality also is frequently bad, due to the fact that the water is highly polluted and is rendered sterile by chlorine, the combination of polluting and sterilizing elements making the water far from pleasant. The future will doubtless show a return to filtration in many cases where it is essential for the improvement of physical and chemical properties, as well as the continued and extended use of the remarkable and effective chlorine method of disinfection.

In the details of water-supply construction, as in other construction fields, methods have been marked by the increasing use of labor-saving devices and means of rapidly executing great works, rather than any new developments in design. While we know of no recent figures on the types of supply now in use in America, it is probably true that there has been a steady trend toward replacing pumped supplies, particularly from ground water sources, by gravity systems wherever this has been possible. Data for the period before 1900 indicated that over half of the American supplies came from ground water sources and European supplies also show a preponderance of such supplies. With the great increases in demand and population in America, such supplies have often become inadequate. They also, while often less expensive in first cost, involve much higher operating and maintenance charges than gravity supplies and it has, therefore, been economical to replace them by the latter type where and when the future of a community became assured, and thus long-life design was justified and could be financed at reasonable cost. Gravity plants, involving small operating charges, also can be more efficiently run by the usual community where political preference seldom insures efficient management of pumping plants.

For the distribution piping in city streets, cast-iron pipe, first introduced about 100 years ago both in London and in Philadelphia, continues to be standard. A recent development in this field is the centrifugal method of casting, a scheme imported from France, whereby a more dense material is secured, thus permitting a thinner pipe to be used. There also has been a tendency toward making this pipe in greater lengths, 16 feet, for example, instead of the older 12-foot standard.

Among the important great aqueduct works of recent years, the following are particularly notable:

Greater New York Water Supply. Although construction was begun in 1907, it was not until the later months of 1915 that the first water from the Catskill system entered the city, and not until May, 1917, that the new system was in full use. From the Ashokan Reservoir, an artificial lake 12 miles long for storing the waters of Esopus Creek, the aqueduct extends 92 miles to the city limits and 35 miles within the city. The magnitude and cost, the complexity, variety, and difficulty of the physical problems encountered, mark it as the greatest waterworks man has ever built.

Notwithstanding the large capacity of the new supply, it was clearly understood that it was merely a step in the continued problem of furnishing additional supply to meet the constantly increasing demand and population. While the new aqueduct between the Catskills and the city was built of larger size than immediately necessary, and would therefore suffice for a number of years, it was necessary not only to continue to develop additional sources of supply in the Catskill region but also to provide increased distributing facilities, particularly in the Long Island and Staten Island sections which were rapidly growing.

The first additional source of supply was that furnished by the Schoharie watershed, immediately north of the Esopus. Water collected back of the Gilboa Dam, constructed in this new area, was led into the Esopus by means of the 18.1-mile Shandaken Tunnel, which was dug in record time, was opened in 1924, and is the longest continuous tunnel in the world. Excavation was accomplished both from the portals and from six intermediate shafts. It is concrete lined and of a horseshoe section, 11½ feet high by 10¼ feet wide. A maximum capacity of 600 m.g.d. (million gallons daily) was allowed for in the design.

In 1927 an additional supply of 600 m.g.d. was recommended from tributaries of the Delaware River within New York State and 100 m.g.d. from Rondout Creek, a tributary of the Hudson, just south of Esopus. These new plans involve five reservoirs on the Delaware tributaries and one on Rondout Creek. In addition, it is proposed to construct a new aqueduct leading from the new collecting area to the West Branch reservoir in the Croton watershed. This would permit some 100 m.g.d. to be diverted from the high-level sections of the Croton area (which is a low-level supply compared to the Catskill system and is now used for the lower levels of the city) into the new aqueduct and thus to Kensico and Hill View reservoirs of the Catskill system. Investigation of legal and other difficulties are under way for these additional works for which it is estimated there will be urgent need by 1935. Consult *Engineering News-Record*, Aug. 11, 1927.

One of the most interesting features of the Catskill system was the main distributing tunnel, deep under the city, from the shafts of which the supply finds its way into the usual cast-iron mains under the city streets. In October, 1928, contracts were awarded for the Catskill Water Supply System Tunnel No. 2, in New York City. This great work ($42,692,867) is practically a duplication of Tunnel No. 1, on an easterly location. No. 1 runs south from Hill View Reservoir on the high ground east of Van Cortlandt Park, crossing under the Harlem River below High Bridge, and extending southward for the entire length of Manhattan Island and under the East River to Brooklyn. The new tunnel, No. 2, turns eastward from Hill View Reservoir and southward, approximately on the line of the Bronx River, passing under Randall's Island to Steinway Avenue, Queens. It continues southward through Brooklyn and joins Tunnel No. 1 near Fort Greene Park. This new work will have a diameter of 17 feet and will be constructed at depths of 250 to 700 feet below the surface with outlets to the city distributing system from shafts rising from the tunnel level. It is estimated that construction will take about six years. Consult *Engineering News-Record*, Mar. 31, 1927.

In the meantime, much work has been done in extending the existing distribution system in south Brooklyn and Staten Island. Another line was added to the original 36-inch cast-iron pipe which crossed the Narrows from South Brooklyn to Staten Island and the terminal, Silver Lake Reservoir. The new line was 42 inches in diameter and 9400 feet long and was placed in a trench, excavated in the channel bottom, by means of a long inclined "ladder" from special scows—the greatest submarine pipe-line work of this kind ever undertaken.

In connection with this and other Brooklyn lines, an extensive use was made of riveted-steel pipe—an unusual type for water-supply distribution. Sizes from 66- to 72-inch diameter were employed and the lines included not only the connections from Shaft 23 at Flatbush and Third avenues, Brooklyn, to the new Narrows "siphon," but also the 16,800-foot Mt. Prospect conduit extending from Shaft 24 at Fort Greene Park to the Flatbush district.

Los Angeles Water Supply. Not satisfied with the record aquduct 240 miles long constructed in 1908–13, the Los Angeles authorities have had investigations under way to determine the feasibility of an even longer line (about 300 miles) to secure a supply from the Colorado River. Nearly $1,000,000 has been expended on surveys and studies alone for this great supply, a sum sufficient to build a fair-sized system, and plans for the remarkable work, which will bring some 970 m.g.d. to Los Angeles, sufficient to supply the demand for 50 years, are now awaiting final action.

San Francisco Water Supply. The Hetch Hetchy project is still under construction. After many years of discussion and plans, the city of San Francisco started this much-needed water supply development in 1919 by awarding the contract for the Hetch Hetchy, or O'Shaughnessy, Dam, situated on the Tuolumne River in Yosemite Park about 150 miles east of the city. From the reservoir thus formed, water is to be carried to San Francisco and the metropolitan district by means of a system of aqueducts with an ultimate capacity of 400 m.g.d. At the same time, due to the height of the reservoirs in the mountains, there has been developed 200,000 hydroelectric horse power. The aqueduct has been constructed in sections, the first or Mountain section beginning at Early Intake and extending, after a short open canal, in a tunnel through the mountains 18.3 miles to Moccasin Creek, where the power plant is located. The Foothill division has about 17 miles of aqueduct from Moccasin Creek to Oakdale Portal, and then there are 45 miles of steel pipe across the San Joaquin Valley to Tesla Portal. The Coast Range tunnel extends 31 miles to the east of San Francisco Bay at Irvington Gate House, where the line divides in three, the main portion extending westerly under the bay through a pipe line of 200 m.g.d. capacity to the San Francisco peninsula, another section going to the east bay cities, and the third southwest to San José. The new aqueduct, by means of a connection of 23 miles between the Alameda Creek and the Crystal Springs reservoir of the Spring Valley Water Company, is to be connected with that system. The Hetch Hetchy supply is thus made available through the Spring Valley system as required, so that the distribution facilities can be used so long as they are adequate.

It is expected that the supply will reach the city by 1932. The upper section to the Moccasin power plant is finished and this plant is bringing in a revenue of about $2,000,000 a year. The San Francisco Bay section also is complete, tunnels through the Coast Range are practically finished, and the bond issue for the San Joaquin pipe line has been authorized.

Mokelumne Water Supply. This project, under construction in 1929, is one of the most interesting of recent supplies. It is planned to deliver water from the Mokelumne River, through a 95-mile conduit, to cities on the east side of San Francisco Bay. The aqueduct consists in large part of a steel pipe line 65 inches in diameter, the lower levels of which are under a head of about 500 feet. Electric welding has been used for the first time in forming the longitudinal joints in this pipe which has a maximum thickness of one-half inch. This new departure is being watched with great interest by engineers as it is a pioneer experiment in the development of electric welding (see article BRIDGES). While the long pipe line is complete, the project has been held up by legal difficulties and the connecting tunnels and dam was not completed in 1930.

Springfield. This Massachusetts city in 1929 enlarged its municipal water-supply system by the construction of Cobble Mountain Dam and Reservoir on Little River above Westfield, the main outlet being a 7000-foot tunnel which also was to furnish water to a hydroelectric plant, located on the river, with an estimated output of 30,000 kilowatts. The supply line, 6 miles in length, consisted of a pipe, 48–54 inches in diameter, formed of two semi-circular plates welded together in 30-foot lengths with riveted, butt-strap, and transverse-field joints. The dam, of the hydraulic-fill type, rose 245 feet above the ledge in the stream and had a total volume of 1,800,000 cubic yards with capacity to impound 22,250,000,000 gallons of water. The Massachusetts Legislature in 1928 authorized $6,500,000 in bonds to enable the city to construct this system.

Boston. A critical situation has also arisen in the metropolitan system and some temporary, additional supply has been brought in pending the completion of the $65,000,000 project now under construction for bringing in a new supply from the Swift and Ware rivers. Work is under way on a 14-mile tunnel westward from the existing Wachusett Reservoir, on the Nashua River, to the Ware River and this will be extended to the Swift River, a total length of 25 miles. Flood flows of the Ware will be temporarily diverted to the Wachusett Reservoir, but later will flow first to a reservoir on the Swift River, and then by the tunnel to Wachusett.

Wanaque Aqueduct. The North Jersey District Water Supply Commission, which, in 1929, had under construction a 25-mile aqueduct as well as the huge Wanaque earth dam, completed the dam but ran into difficulties in connection with the aqueduct. It would appear that three groups of the eight cities represented in this commission (Newark, Kearney, Montclair, Bloomfield, Glen Ridge, Passaic, Paterson, and Clifton) had different ideas as to the possible effect on the aqueduct pressure of the various proposals for aërating the supply. At last reports, a settlement had been reached and the construction of the aqueduct was expected to go rapidly forward. The Wanaque Dam forms a reservoir 6 miles long and 1 mile wide, with a capacity of 28,000,000 gallons, and is expected to supply 100 m.g.d. It is a huge earth structure and a notable piece of construction.

Chicago. The supply of this city is totally different from the above-mentioned types of supply, for it pumps its water from Lake Michigan. There was under way in 1929, a new intake crib and tunnel construction. The so-called Two-Mile Crib, built 1865–67, was the earliest of the city's crib intakes, by means of which water from the lake is admitted to an intake tunnel from which in turn it is pumped into the supply system. A new 3-mile tunnel in rock at about 150 feet below water level extends out from the shore to the new crib. While earlier works were built in earth at less depth, in the more recent tunnels the plan of keeping the excavation in rock by going to greater depths has been followed. It is expected that the tunnel will be continued some 12 miles in length inland from the shore, and will improve supply conditions in the northern half of the city. Tunnel excavation had been under way for some time, but the new steel crib, which was built near the Navy Pier and is 90 feet in diameter at the base, 70 feet at the top, and 45 feet high, was not launched and floated into position until the summer of 1928.

Miscellaneous Works. Among other American works of interest, although of smaller scale, is the new supply line for Washington, D. C., which practically parallels and replaces the notable old aqueduct built by General Meigs in 1863. Cabin John Creek is crossed by a siphon instead of the old stone-arch bridge which was for so many years the most famous American arch. The line is only 9 miles long from the Great Falls of the Potomac to Dalecarlis Reservoir.

Kansas City, Mo., also has constructed an interesting supply with a tunnel under the Missouri River, which carries the filtered water from the Kansas side to the city pumping stations. St. Louis also has augmented her supply with a 16-mile, 60-inch pipe line to the Missouri River. Tulsa, Oklahoma, built in 1924, a 55-mile line, largely 54- to 60-inch reinforced concrete pipe and perhaps the longest line of its kind in the world, for water supply.

Apulian Aqueduct. One of the longest aqueducts in the world, including some 152 miles of main trunk and 841 miles of main and subsidiary branches or a total length of supply conduits of 993 miles, was put into service in 1924 in southern Italy. This project, which as regards total length is comparable with the Coolgardie pipe line in Australia, is 350 miles long and may be compared, in length but not in size, with the Los Angeles aqueduct, the longest in America, about 240 miles long. It was constructed to supply some 266 communities with a population of about 300,000 people, scattered over some 8100 square miles, and included in the ancient Apulia on the eastern or Adriatic slope of the Apennine Peninsula.

This work had been under construction since about 1907, and involved a main-trunk conduit beginning at the Caposele Springs at the head of the Sele River on the western slope of the Apennines, and extending in an easterly direction piercing the Apennine Mountains by means of a series of 38 grade tunnels, aggregating almost 50 miles in length. At a point 15 miles away from the Adriatic coast, the main aqueduct turns southeast and runs practically parallel with the coast for about 90 miles until it reaches Villa Castelli in the Province of Lecce. For this portion of the aqueduct, the construction was largely a cut-and-covered conduit. The total length of the main-trunk aqueduct is 244 kilometers (152 miles), and in this are included 99 tunnels of about 67 miles total length, about 76 miles of cut-and-covered conduit, 93 aqueduct approaches, having a total of 4.25 miles in length, and six siphons, having a total length of 4.6 miles. From the main trunk, branches were built to such towns and districts as Foggia, Bari, Brindisi, Toranto, etc. A very complete series of articles on this work appeared in the journal, *Engineering* (London), in 1928.

Winnipeg Aqueduct. A different type of aqueduct was this important water-supply system put under construction in 1913 and completed so that in 1919 the first water could be passed through. The country traversed is generally flat and the aqueduct is 80 miles in length from the intake at the lake reservoir to within 17 miles of Winnipeg. It is built of concrete pipe and arch sections and has a nominal capacity of 85 m.g.d., though this is exceeded. See WATERWORKS AND WATER PURIFICATION.

WATERWAYS. See CANALS.

WATER WHEELS AND TURBINES. Modern water wheels are divided into three main types, namely, the reaction turbine, the impulse wheel and the propeller type turbine. In the reaction turbine, often designated as the Francis type, water enters around the periphery of the runner, reacts on the vanes and discharges inward to a central draft tube. This type is used up to very large capacities and sizes—the 70,000 horse power units of the Niagara Falls Power Company, representing the greatest capacity in operation up to 1930, although four units of 84,000 horse power rating under a 116-foot normal head at that time were building for the Dnieper River project in Russia. It was expected that these latter units each would develop over 100,000 horse power under a maximum head of 123 feet. These units represented the record capacity to 1930. The 54,000 horse power units in operation at Conowingo on the Susquehanna River are the largest in physical dimensions, although of somewhat smaller capacity owing to operation at a lower head, 89 feet.

Reaction turbines are used on low and moderately high heads, the highest head so far employed with this type being 861 feet at Waterville, N. C. Incidentally, this was the highest head plant in the eastern part of the United States. Another high head installation employing this type of turbine was in operation at the Oak Grove, Oregon, plant of the Portland Railway Light & Power Company. This operated under an 850-foot head.

Efficiencies of over 90 per cent are common with the reaction-type of turbine, and a maximum efficiency of over 93 per cent was reported at the Big Creek No. 8 Plant of the Southern California Edison Company. An important factor in the increased efficiency of reaction turbines has been the attention given in late years to the design of draft tubes so that the water leaving the turbine will do so with a minimum of turbulence.

In the impulse wheel, known as the Pelton type, the water is converted into velocity before impinging tangentially on the buckets of the wheel. Impulse wheels are especially adapted to high heads, although they are also used for moderate heads. Many high-head impulse wheels are to be found in operation on the Pacific Coast. One of the highest head plants in service in that section is Big Creek No. 2-A of the Southern California Edison Company, where two 56,000-horse power, double, overhung units are operating under a head of 2200 feet. These units were reported to have developed a maximum of 70,000 horse power each over considerable periods. Efficiencies of impulse wheels are somewhat lower than those of reaction turbines, 85 per cent representing good practice with the former, as against over 90 per cent with the latter. Impulse wheels are generally of the horizontal type, and reaction wheels vertical. In some cases double impulse wheels have been employed, one on either side of the generator.

The propeller type, developed in Europe by Kaplan and in the United States by Nagler, employs a wheel similar to a ship's propeller. This type is adapted especially to low and variable heads up to 60 feet and to high speeds. It is now finding wide application. The largest propeller type wheels as to physical dimensions installed in the United States are those employed at Louisville, Kentucky, where the head varies over a range from 7½ to 37 feet. The plant contains eight 13,500-horse power units. This installation is unusual in that there is on the average forty days during the year when high water makes it impossible to generate any power whatever; therefore, the plant is used as a part of a system for the generation of secondary power.

In some instances adjustable blades have been employed under the control of the governor. This permits more efficient use of a variable flow under a variable head. An interesting application of the propeller type, as mentioned in the 1929 *Progress Report of the Hydraulic Division of the American Society of Mechanical Engineers*, is the Back River project of the Montreal Power and Light Company. Here two units have been built with injectors which are expected to increase the output of the machines approximately 1000 horse power each during periods of high water.

The increased economy of large steam plants, the opening up of large natural gas plants in certain sections, and the fact that most of the lower cost water power sites have been developed, has reacted for the present to retard water power development to some extent in the United States, although hydroelectric development is active in the Eastern Provinces of Canada. This competition from steam power is being met by attempts to lower investment costs in hydro plants and to increase the efficiency of units.

One effort in this direction has been the outdoor type of hydroelectric plant. A notable installation of this type is the Norwood Plant of the Carolina Power & Light Company, put into operation during 1928, where the water wheel units instead of being housed in a building are placed outside, with the generators inclosed in plate steel casings that are removable by means of a gantry crane.

Progress in the art of welding has also been a factor in the building of large turbine units, where through the use of steel plates and angles, rotors, stators and casings can be built up to replace heavy castings and thus greatly reduce the weight involved as well as the cost. This will make it possible to construct still larger units in the future. In Europe, and to some extent in the United States, welded pipe is being used extensively for penstocks. Finally, increased attention is being given to research in both the turbine design and the related structures, in which model testing and the testing of units under operating conditions is playing an important part.

A hydroelectric plant that is quite unusual and has attracted considerable attention is the Rocky River development of the Connecticut Light and Power Company, which went into service in 1928. Here the water is pumped up into a large reservoir by two 8100 horse power motor-driven pumps operated by off-peak power from a steam station on the system. This water is then utilized during peak periods through a 33,000 horse power vertical shaft water wheel, operating under a 240-foot head. The overall efficiency of the pumps and water wheels amounts to slightly over 60 per cent. The water is used a second time in another hydro plant on the Housatonic river below the Rocky River plant. Although this is the only plant of its kind in the United States, the principle has been applied in several instances in Europe.

There are some types of water wheels other than those previously mentioned which were used extensively in the earlier periods but are now employed only under very special conditions. Among these may be mentioned the current wheel in which large paddles dipped into the stream and were turned by the velocity of the current. These were used largely for raising water for irrigation, but had extremely low efficiencies. The undershot wheel with an inclosed flume and later the overshot wheel were outgrowths of the current wheel and were extensively used on low heads for driving mills during the middle of the nineteenth century. A few isolated installations are still to be found. Fairly good efficiencies of 50 to 60 per cent were obtained by some of the better wheels of this type.

Tidal power has also been employed on a small scale in some favored locations where the rise and fall of the tides is large. In these cases the gates are open on the incoming tide and the water is impounded in a reservoir. On the receding tide the gates are closed and the water allowed to flow through water wheels. By employing a series of reservoirs, which can be used alternately, continuous power is obtained. A large development of this character was projected on the Passamaquoddy River, Maine, near the Bay of Fundy, but no construction work had been undertaken up to 1930. Such a plant on a large scale involves a high investment cost per unit of power delivered. A similar tidal project was projected on the coast of Brittany for the development of about 5000 horse power. A small tidal plant is still in daily operation at a mill not far from Boston.

Wave motors form another source of power which occasionally receives popular attention. A few experimental installations have been built involving the use of large floats, which in rising with the waves impart power mechanically through a train of gears to a shaft. It has been found, however, that the ratio of the power obtainable to the investment cost is too small to warrant its commercial application. See WATER POWER.

WATERWORKS AND WATER PURIFICATION. In number of places and number of population supplied, as well as in general efficiency and vital relations to the health and safety of the public, waterworks lead among the municipal enterprises of the United States. The number of municipalities served with public water supplies in 1929 was unknown, but taking into account the rate of growth indicated by the various issues of *The Manual of American Waterworks* (1897, the latest), *The McGraw Waterworks Directory* (1915), and information gathered by *Engineering News-Record* in 1928, it may be assumed that over 10,000 places have public water supplies, including many with populations under 500.

A few hundred of these places were supplied from works outside their boundaries owned either by other municipalities or by private companies. In number of separate municipalities supplied, the Hackensack Water Company held the lead; it supplied some 50 different municipalities in northeastern New Jersey. A much larger population, although fewer separate municipalities, was supplied by State-built works in the Boston metropolitan district, operated under the direction of the Metropolitan District Commission. Both the first cost and operating expenses of these works are met by the municipalities, to which the water is delivered wholesale by meter measurement. After 1920 water districts embracing a number of municipalities increased rapidly.

By far the greater part of the entire water supply in most countries of the world is drawn from surface sources, but considerable areas are favored with underground water drawn from springs and wells, some of the latter tapping artesian sources. Broadly speaking, water supplies drawn from surface sources are subjected to some degree of purification—filtration in Europe and largely also in the United States and Canada, with chlorination widely used in the two latter countries and steadily being introduced elsewhere as a finishing process or insurance against stray disease-producing bacteria that may have escaped the filters. Chlorination is also extensively used in the United States where filtration has not been introduced. The chlorinating plants are relatively inexpensive in both first and operating cost. More than 50 of these were installed on the New York water supply; they ranged from capacities of many hundred million gallons a day on the Catskill Aqueduct supply down to small plants in other parts of the waterworks system. In 1929 New York City, Boston, San Francisco, Los Angeles, Portland, and Seattle were exceptional among larger American cities in not having filtration plants for their surface water supplies drawn from streams, and so are Chicago, Milwaukee, and Duluth among the cities on the Great Lakes. Nearly all the filtration plants of later construction in the United States and Canada have been of the rapid or mechanical type, as compared with the slow sand filters most commonly used in England and introduced quite largely in the United States from the early 1890's onward for some 10 or 15 years. Water softening, long common in England, was introduced somewhat sparingly in the United States but latterly was adopted in connection with a number of the mechanical filtration plants. In the case of some underground water supplies, aëration and filtration plants were built for the removal of iron and manganese.

Aside from the rapid introduction of chlorination and the increase in filtration plants, the most notable change in waterworks systems during the decade was the substitution of centrifugal for reciprocating pumps. The centrifugal pumps, except in the rare cases where water power is directly available, are most frequently driven by steam turbines; but many of the later installations of centrifugal pumps are electric-driven. Cast iron remained by far the most widely used material for water-pipe distribution systems, but for supply mains from source to city and large trunk mains within, steel and concrete gained in use after 1915 while in some localities wood-stave pipe, introduced much earlier, continued to be used on old and new installations. To keep down waste and to distribute justly the cost of the service according to the volume of water wasted and used, meters were becoming more and more common; many cities had practically all consumers metered. Besides enlargments constantly in progress in thousands of cities, notable additions were being made in 1929 to the water-supply systems of Boston, New York, Albany, Detroit, St. Louis, San Francisco, Oakland, and other large cities of the United States and to the waterworks of Ottawa and Toronto, Canada, while immense additional supplies were projected for New York, Rochester, and Los Angeles.

Bibliography. Consult Flinn, Weston, and Bogert, *Waterworks Handbook* (New York); Wegmann, *Conveyance and Distribution of Water* (New York); Hazen, *Meter Rates for Waterworks;* Stein, *Water Purification Plants* (New York); Wolman (editor), *Waterworks Practice*, a manual issued by the American Waterworks Association (New York). See also DAMS; MUNICIPAL OWNERSHIP; SEWERAGE AND SEWAGE TREATMENT.

WATSON, JAMES E. (1864–). An American public official, born at Winchester, Ind., and educated at De Pauw University. He began the practice of law in 1886 in his father's office. He was Representative from Indiana in the Fifty-fourth, Fifty-sixth, and Sixtieth Congresses. In 1916 he was elected United States Senator to fill the unexpired term of Benjamin F. Shively, deceased, and was reëlected for the terms of 1921–27 and 1927–33. He was chairman of the Senate Committee on Interstate Commerce.

WATSON, JOHN (1847–). A Canadian professor of philosophy (see VOL. XXIII). He published a volume of political philosophy, *The State in Peace and War* (1919), and in 1922 was honored by a collection of testimonial essays written by his former students.

WATSON, JOHN BROADUS (1878–). An American psychologist (see VOL. XXIII). He resigned from the faculty of The Johns Hopkins University in 1920. In 1921 he joined the staff of the New School for Social Research (New York City), and lectured on behaviorist psychology. His work on *Psychology from the Standpoint of a Behaviorist* (1919) was instrumental in directing a movement on the part of American psychologists away from introspection to the empirical observation of external behavior. See BEHAVIORISM.) Among his more recent works are *Behaviorism* (1925); *Psychological Care of Infant and Child* (1928); *The Ways of Behaviorism* (1928). He was editor of the *Journal of Experimental Psychology* (1915–27).

WATSON, THOMAS EDWARD (1856–1922). An American politician and writer (see VOL. XXIII). In 1916 he was for the third time tried for the publication of three chapters in his book, *The Roman Catholic Hierarchy,* and was finally acquitted. In 1917 he opposed conscripting soldiers for service abroad, and his magazines were barred from the mails. He was elected U. S. Senator from Georgia for the term 1921–27. See *Life of Thomas E. Watson,* by W. W. Brewton (1926).

WATSON, THOMAS LEONARD (1871–1924). An American geologist, born in Chatham, Va., and educated at the Virginia Agricultural and Mechanical College and later at Cornell University. During 1892–95 he was instructor in geology at the Virginia Agricultural and Mechanical College and during 1904–07, professor there. Meanwhile (1901–04), he held the chair of geology at Denison University and (1907–10) that of economic geology at the University of Virginia, where, after 1910, he was also head professor of the school of geology. In addition to many articles on geological subjects contributed to various journals and reports of surveys with which he was connected, he was associated with H. Ries in the authorship of *Engineering Geology* (1914) and *Elements of Engineering Geology* (1921).

WATSON, SIR WILLIAM (1858–). A British poet and epigramatist (see VOL. XXIII) He was created a knight in 1917. His later publications include, *Pencraft: A Plea for the Older Ways* (1916); *Retrogression* (1916); *The Man Who Saw the Superhuman Antagonists* (1919); *Ireland Unfreed* (1920); *A Hundred Poems* (selection, 1922); *Poems Brief and New* (1925), *Selected Poems, with Notes* (1928).

WATTS, MARY STANBERY (MRS. MILES TAYLOR WATTS) (1868–). An American novelist (see VOL. XXIII). Her later works include: *The Boardman Family* (1918); *From Father to Son* (1919); *The Noon Mark* (1920); *The House of Rimmon* (1922); and *Luther Nichols* (1923).

WAUGH, FRANK ALBERT (1869–). An American horticulturist, born at Sheboygan Falls, Wis., and educated at the Kansas Agricultural College and at Cornell University, and in Germany. For several years, he was engaged in newspaper work and after 1902 was professor of horticulture and landscape gardening at the Massachusetts Agricultural College. He wrote: *Landscape Gardening* (1898); *The Landscape Beautiful* (1910); *Beginner's Guide to Fruit Growing* (1912); *Rural Improvement* (1914); *Outdoor Theatres* (1917); *Downing's Landscape Gardening* (1921); *Textbook of Landscape Gardening* (1922); *Country Planning* (1924); *Formal Design in Landscape Architecture* (1927). He was also landscape engineer collaborating with the United States Forest Service.

WEATHER AND WEATHER FORECASTING. See METERОROLOGY.

WEBB, BEATRICE (1858–). An English economist and author (see VOL. XXIII), wife of Sidney Webb (see below). She was a member of several important committees during and after the World War, including the reconstruction committee in 1917–18, the war cabinet committee on women in industry in 1918–19, and the Lord Chancellor's advisory committee for women justices in 1919–20. From 1919 to 1927, she was a justice of the peace in London. Besides helping her husband in his writing, she wrote *Men's and Women's Wages: Should They Be Equal?* (1919), and *My Apprenticeship* (1926). She received honorary degrees from Manchester, Edinburgh, and Munich universities.

WEBB, RT. HON. SIDNEY, FIRST BARON PASSFIELD (1859–). An English economist and Socialist (see VOL. XXIII). He served on many governmental committees, including the Coal Industry Commission (1919), entered Parliament as a Labor member (1922), and was president of the Board of Trade in the MacDonald government (1924). He was made a member of the Privy Council (1924), and received an honorary degree in Munich. In June, 1929, he was appointed Secretary of State for Dominion Affairs and the Colonies in the second Labor cabinet, and shortly afterward was created Baron Passfield. His later works include: *Towards Social Democracy?* (1916); *The Works Manager To-day* (1917); and *The Story of the Durham Miners (1662–1921)* (1921). He edited *How to Pay for the War* (1916) and *Fabian Essays* (1920 edition). In collaboration with his wife, Beatrice Webb (see above), he published *A Constitution for the Social Commonwealth of Great Britain* (1920); *The Consumers Co-operative Movement* (1921); *English Prisons under Local Government* (1922); *The Decay of Capitalist Civilization* (1923); and *English Poor Law History* (part i, 1927).

WEBB-POMERENE ACT. See TRUSTS.

WEEKS, JOHN WINGATE (1860–1926). An American banker and public official (see VOL. XXIII). He succeeded Winthrop Murray Crane as United States Senator from Massachusetts in 1913, but failed of reëlection in 1919. During the World War, he assisted in investigations which resulted in the reorganization of the Ordnance and Quartermaster departments and also of the aircraft-production board. President Harding appointed him Secretary of War in 1921. He remained in President Coolidge's cabinet until October, 1925, when he resigned.

WEEVIL. See ENTOMOLOGY, ECONOMIC.

WEINGARTNER, vīn'gärt'nēr, FELIX (1863–). An Austrian musical conductor (see VOL. XXIII). From 1919 to 1924, he was chief conductor and general director of the Volksoper at Vienna. In the fall of 1924, he entered on his duties as general director of the Deutsches Opernhaus in Charlottenburg (Berlin), but resigned the next year. In 1927 he settled in Basel as director of the Conservatory and conductor of the Allgemeine Musikgesellschaft. His recent works include two operas, *Meister Andrea* and *Terokayn* (both produced in Vienna, 1920); an overture, *Aus Schwerer Zeit*; a second violin concerto; a 'cello concerto; two more symphonies, No. 4 (in F), No. 5 (in C minor).

WEINMAN, ADOLF ALEXANDER (1870–). An American sculptor (see VOL. XXIII). Among his later works are a bronze statue of Lincoln in the Capitol at Frankfort, Ky.; the pediment group of the Capitol at Madison, Wis., and several war memorials. His most important decorative works are the sculptures for the Pennsylvania Station in New York City, and those for the Municipal Building, New York City. He recently became well known as a medalist, having designed besides others the medals of the National Institute of Arts and Sciences, the American Numismatic Society (1920), and the dime and half-dollar of the national currency. In 1920 he was awarded the Saltus Medal of the American Numismatic Society.

WEISMANN, THEORIES OF. See HEREDITY.

WEIZMANN, CHAIM (1874–). A president of the World Zionist Organization, who was born in Motol, Province of Grodno, Russia, and educated in Pinsk and the universities of Berlin and Freiburg. He was a lecturer in chemistry in Geneva and later in biochemistry at the University of Manchester. From 1916 to 1919, he was director of the British Admiralty Laboratories. For many years a leader in the Zionist movement, he was instrumental in securing the proclamation of the Balfour Declaration in favor of a Jewish national home in Palestine. In August, 1929, he was reëlected head of the World Zionist Organization and also president of the Jewish Agency Council, an organization of Zionists and non-Zionists interested in the establishment of a national home in Palestine.

WELCH, WILLIAM HENRY (1850–). An American pathologist (see VOL. XXIII). Professor Welch has collected and published many individual contributions with the title, *Papers and Addresses* (1920), and assumed the editorship of the *American Journal of Hygiene* (1921). In 1926 he was appointed professor of the history of medicine at Johns Hopkins. He has played a leading part in the organization of the new William H. Welch Medical Library of that university dedicated in October, 1929, which was named in his honor.

WELDING, ELECTRIC. See ELECTRIC WELDING.

WELFARE LEGISLATION. See CHILD LABOR.

WELLAND CANAL. See CANALS.

WELLER, STUART (1870–1927). An American geologist, born in Maine, N. Y., and educated at Cornell and Yale universities. In 1895 he became connected with the University of Chicago, where from 1915 until his death he was professor of palæontological geology. In addition to his professional work, he had wide experience on State geological surveys. He was also assistant geologist on the United States Geological Survey during 1901–06 and geologist, 1906–27. His specialty was Palæozoic palæontology, particularly in its relation to geologic problems. In addition to papers on geological subjects, he was the author of many reports on palæontology contributed to the publications of the National and State geological surveys with which he was connected.

WELLESLEY COLLEGE. A nonsectarian institution for the higher education of women at Wellesley, Mass., founded in 1875. The enrollment of students in 1914 was 1452, as compared with 1597 in 1928; the faculty numbered 140 in the earlier year, as compared with 164 in the latter; and the library increased from 80,000 to 125,000 volumes. In 1914 the main building of the college burned and thereafter two dormitories, Tower Court, given by Mrs. Ellen Stebbins James, and Claflin Hall, named in memory of Governor Claflin and Mrs. Claflin; Founder's Hall, a recitation building, the student-alumnæ building, and two faculty residence buildings were erected. A $2,000,000 endowment fund was raised to which the Rockefeller Foundation gave $750,000; the General Education Board, $200,000; two anonymous donors, $100,000 each; and Andrew Carnegie, $95,000. Severance Hall, a dormitory, and a botany building, including lecture rooms and laboratories, were opened in 1927. In that year, the curriculum was changed to reduce prescribed work by six hours weekly. Two dormitories, Stone and Olive Davis, were opened in 1928 and ground was broken in that year for a faculty apartment house. The total endowment in 1928 amounted to $8,995,406. President, Miss Ellen Fitz Pendleton, Litt.D., LL.D.

WELLESZ, EGON (1885–). An Austrian composer and musicologist, born at Vienna. He studied there under Arnold Schönberg (counterpoint) and Bruno Walter (composition), at the same time taking courses in musicology at the university under Professor Adler. In 1911 he became professor of the history of music at the Neues Konservatorium in Vienna. His literary essays, contributed to various important musical journals, deal mainly with Byzantine and Oriental music. As a composer, he is a follower of his teacher, Schönberg, and an extreme futurist. His compositions consist of the operas, *Prinzessin Girnara* (Frankfort, 1921) *Alkestis* (Mannheim, 1924), *Scherz, List und Rache* (Stuttgart, 1928); the ballets, *Diana, Persisches, Achilles auf Skyros, Die Nächtlichen;* a symphonic poem, *Vorfrühling;* four string quartets; piano pieces; and many songs.

WELLS, FREDERIC LYMAN (1884–). An American psychiatrist and psychologist (see VOL. XXIII). He was attached to the McLean Hospital at Waverley, Mass., from 1918 to 1921, when he became head of the psychology department at the Boston Psychopathic Hospital and instructor at the Harvard Medical School. His works after the World War include *Mental Adjustments* (1917); *Pleasure and Behavior* (1923); and *Mental Tests in Clinical Practice* (1927).

WELLS, H(ERBERT) G(EORGE) (1866–). An English novelist (see VOL. XXIII). He wrote several serious works which achieved wide circulation and added considerably to his already high reputation. These included: *The Research Magnificent* (1915); *Bealby* (1915); *Mr. Britling Sees It Through* (1916); *The Elements of Reconstruction,* under the pseudonym "D. P." (1916); *War and the Future*; *God, the Invisible King*; *The Soul of a Bishop* (1917); *In the Fourth Year,* on the League of Nations; *Joan and Peter* (1918); *The Undying Fire* (1919); *The Outline of History,* an effort "to replace narrow nationalist history by a general review of the human record"; *Russia in the Shadows* (1920); *The Salvaging of Civilization* (1921); *The Secret Places of the Heart*; *Washington and the Hope of Peace*; *A Short History of the World* (1922); *Men like Gods* (1923); *The Dream* (1924); *The Story of a Great Schoolmaster* (F. W. Sanderson) (1924); *A Year of Prophesying* (1924); *Christina Alberta's Father* (1925); *Collected Works* (Atlantic Edition, 1925); *The World of William Clissold* (1926); *Mr. Belloc Objects to the Outline of History* (1926); *Democracy Under Revision* (Sorbonne Lecture, 1927); *The Open Conspiracy* (1928); *Mr. Blettsworthy on Rampole Island* (1928); and *The Way The World is Going* (1928). Consult *H. G. Wells,* by Ivor Brown (1923); *H. G. Wells, Educationalist,* by F. H. Doughty (1926), and *The Works of H. G. Wells, 1887–1925, a Bibliography, Dictionary, and Subject Index,* by Geoffrey H. Wells (1926).

WELLS COLLEGE. An institution for women, founded in 1868 at Aurora, N. Y. Due to a limitation on enrollment, the student body did not show any marked increase in numbers between 1913, when there were 194 students, and 1927–28, when there were 242. The faculty increased during that period from 33 to 42 members, and the volumes in the library from 25,160 to 60,000. Largely through two endowment drives, one for $500,000 and the other for $1,000,000, the funds of the college increased from $361,800 to $1,528,764, of which sum $300,000 was contributed by the General Education Board. The income for 1927–28 amounted to $78,840. During the period under review, a comprehensive examination system for matriculation was adopted, honors courses instituted, and a modification of the group system put into force. A wing was added to Glen Park, six cottages were purchased, the campus was increased from 76 to 350 acres, an athletic club house was received from R. L. Zabriskie, and a golf course of nine holes was added to the athletic equipment. President, Kerr Duncan Macmillan, B.A., B.D., S.T.D.

WENCKEBACH, KARL FRIEDRICH (1864–). An Austrian physician, known chiefly as a prominent member of the later school of cardiac specialists which came into being as the result of improved methods of diagnosis. He received his medical degree from the University of Vienna and was made a professor of internal medicine there in 1914. His first work on the heart was *Die Arrhythmie als Bestimmter Funktionsstörungen des Herzens* (1903), which appeared in English translation; and in 1914 he added *Die Unregelmässige Herzthätigkeit,* brought out in a new edition of 2 vols. (1927), in collaboration with H. Winterburg.

WERFEL, FRANZ (1890–). An Austrian poet and dramatist, born at Prague, and educated there and in Leipzig. He is the author of *Der Weltfreund* (1911); *Wir Sind* (1913); *Einander* (1915); *Die Troerinnen* (1915); *Gesänge aus den Drei Reichen* (1917); *Der Gerichstag* (1919); *Besuch aus dem Elysium* (1919); *Nicht der Mörder, der Ermordete ist Schuldig* (1920); and the dramas, *Spiegelmensch* (1920) and *Bocksgesang* (1922), which have had a sensational success. His later works are *Schweiger,* a tragedy (1923); *Beschwörungen,* poems (1923); *Verdi,* a novel (1924); *Juarez und Maximilian,* a drama (1924); *Paulus unter den Juden,* drama (1926); and the novels *Der Tod des Kleinbürgers* (1926), *Geheimniss eines Menschen* (1927), and *Der Abituriententag, die Geschichte einer Jugendschuld* (1928, English trans., *Graduation Anniversary—the Story of a Youthful Crime*).

WERRENRATH, REINALD (1883–). An American concert baritone, born in Brooklyn, N. Y. He studied first with his father, then with C. Dufft, A. Mees, and Percy Rector Stephens, and made his début at the Worcester Festival of 1907. He then made several transcontinental tours and everywhere met with enormous success. In 1918–19 he was a member of the Metropolitan Opera Company. He is especially fine in oratorio. He has written some male choruses and edited a collection of modern Scandinavian songs.

WERTHEIMER, MAX (1880–). A German psychologist, born at Prague and educated in philosophy and psychology at the universities of Prague and Berlin. He performed experiments at the psychological institutes of Berlin and Würzburg. He was professor at the University of Berlin and one of the editors of the review, *Psychologische Forschung.* His published monographs deal largely with the perception of movement, which he investigated from a new point of view. He was one of the leaders of the school of Gestaltpsychologie, or psychology of forms. His works include: "Experimentelle Studien über das Sehen von Bewegung" (*Zeitschrift für Psychologie,* 1912); "Untersuchungen zur Lehre von der Gestalt" (*Psychologische Forschung,* 1922); a doctoral dissertation, *Experimentelle Untersuchungen zur Tatbestandsdiagnostik*; and *Gestalttheorie* (1925).

WESLEYAN METHODIST CONNECTION (OR CHURCH) OF AMERICA. A denomination formed in 1843 in Utica, N. Y., largely as an outgrowth of a controversy in the Methodist Episcopal Church over the right to discuss the slavery question freely. In doctrine, this non-episcopal connection resembles other Methodist bodies. At the quadrennial conference, in June, 1927, the use of tobacco in any form, its growth, sale, or manufacture, was made a test of full membership. There were, in 1928, 23 annual conferences, besides mission conferences in India and Africa. Membership in the church increased slightly from 20,939 in 1923 to 21,000 in 1928; and the number of ministers rose from 628 to 666; the Sunday-school enrollment dropped, however, from 35,254 to 30,124. The denomination publishes a weekly, *The Wesleyan Methodist.* It maintains, among other institutions, Central College, Central, S.C.; Houghton College, Houghton, N. Y., which received its permanent charter in 1927; Marion College, Marion, Ind.; and Miltonvale College, Miltonvale, Kans. The headquarters of the church are at 330 East Onondaga Street, Syracuse, N. Y.

WESLEYAN UNIVERSITY. A nonsectarian institution for the higher education of men at Middletown, Conn., founded in 1831. In 1919 the trustees voted to limit the enrollment to approximately 500; in the fall of 1928, it was 620. During the period 1914–1928, the number of members in the faculty was increased from 42 to 71, and the library from 100,000 to 160,000 volumes. The Van Vleck observatory, largely the gift of Joseph Van Vleck in memory of his brother, Prof. John Monroe Van Vleck, was opened in 1916; in the same year, Mrs. Gardner Hall, Jr., gave $150,000 to build a chemistry laboratory in memory of her husband. Ralph Ensign and his son, Joseph R. Ensign, gave $30,000 to remodel the chapel; John Gribbel gave $10,000 for an organ; and the class of 1863 gave a set of chimes. The university received in 1923 from Mrs. Dexter Smith of Springfield, Mass., $175,000 toward a new library building. In the spring of 1922, William Arnold Shanklin, president of the university since 1909, completed a campaign for adding $3,000,000 to the productive endowment, the total of which in 1928 was $4,627,486.52. The Hall Laboratory of Chemistry was completed in 1926, and the Olin Library in 1927. The library, the Harrison Dormitory, and the Shanklin Laboratory of Biology were dedicated the following year. President, James Lukens McConaughy, Ph.D.

WEST, Rebecca (1892–). An English author, educated at George Watson's Ladies' College in Edinburgh. In 1911 she became a reviewer on the staff of the *Freewoman* and in 1912 began writing political articles for *The Clarion.* Later, she wrote many articles for magazines and newspapers in England and America. Her books include: *Henry James* (1916); *The Return of the Soldier* (1918); *The Judge* (1922); *Strange Necessity* (1928); *Harriet Hume: A London Fantasy* (1929). She edited *Selected Poems of Carl Sandburg* (1926).

WEST, Roy Owen (1868–). An American lawyer and public official. He was born at Georgetown, Ill., and graduated from De Pauw University, Greencastle, Ind. (1890). Admitted to the bar at Chicago, he became assistant county attorney of Cook County (1894) and city attorney of Chicago (1895–97). From 1898 to 1914, he served as member of the Cook County Board of Review. He was five times chosen chairman of the Illinois Republican State Central Committee, was a member of the Republican National Committee from 1912 to 1916, and served as secretary of that body in 1924. From 1917 to 1924, he was attorney of the South Park Commissioners. President Coolidge appointed him Secretary of the Interior in 1927 and he held that office until the close of the Coolidge Administration in March, 1929.

WESTCHESTER, Ill. See City and Regional Planning.

WESTERMANN, William Linn (1873–). An American professor of history, born at Belleville, Ill., and educated at the University of Nebraska and in Berlin. He was instructor in Latin and Greek at the University of Missouri (1904–06), assistant professor of history at the University of Minnesota (1906–08), assistant professor of history at the University of Wisconsin (1908–20), and professor of ancient history at Cornell University (1920–23). After 1923 he was professor of history at Columbia. In 1926–27 he was in charge of the American school of classical studies at the American Academy in Rome. At the Peace Conference in Paris, he acted as adviser on Turkish matters and as chief of the division of western Asia of the American delegation. Professor Westermann wrote *Story of the Ancient Nations* (1912) and contributed to American historical and philological journals. He was also the editor of *Westermann's Classical and Historical Map Series.*

WESTERMARCK, wĕs′tĕr-märk, Edward Alexander (1862–). A Finnish anthropologist (see Vol. XXIII). His later works are *Marriage Ceremonies in Morocco* (1914); *The Belief in Spirits in Morocco* (1920); *Ritual and Belief in Morocco* (2 vols., 1926); *A Short History of Marriage* (1926); *The Goodness of Gods* (1926); and *Reminiscences,* in Swedish (1927).

WESTERN AUSTRALIA. A state of the Australian Commonwealth occupying the entire western third of the continent. Area, 975,920 square miles; population in 1911, 284,114; in 1928, 400,048. Full-blooded aborigines were estimated at 25,034 in 1928. Perth, the largest city, including its suburbs, had 191,791 inhabitants in 1928 (85,945 in 1911). Cultivation was spreading, there being 3,720,100 acres under crops in 1928 (1,537,922 acres in 1914). The wheat acreage continued to increase. Other agricultural products are oats, hay, barley, and fruits. The Government, after the World War, continued to apply itself to aiding settlers. Soldiers in particular were singled out for loans. Pastoral activities remain important. Sheep increased from 4,421,375 in 1913 to 8,447,480 in 1927. In 1927 the total wool clip was 62,702,073 pounds. Gold production showed decreases after 1914. The output of 1927 was valued at £1,735,000, as compared with £5,237,351 in 1914. There was a falling off in total mineral production: total value in 1913, £6,036,265; in 1927, £2,202,437. For 1926–27 the value of production was: agriculture, £13,034,025; pastoral, £7,190,770; dairy, poultry and bee farming, £1,800,024; forest and fisheries, £2,664,531; mining, £2,348,913; manufacturing, £6,618,473; total, £33,656,736. Imports and exports for 1914 were £8,960,397 and £8,406,182; for 1927–28, £18,287,876 and £18,240,775. Government accounts showed: revenues and expenditures for 1913–14, £5,205,343 and £5,340,754; for 1927–28, £9,807,949 and £9,834,415. The public debt of £30,728,078 in 1914 mounted to £67,528,626 in 1928. Railroad construction continues. Railway lines in 1928 totaled 3977 miles (2967 miles in 1914). Tonnage entering Western Australian ports in 1927–28 totaled 1,289,066 tons.

WESTERN COLLEGE FOR WOMEN. An institution at Oxford, Ohio, founded in 1855. The student enrollment increased from 260 in 1914 to 401 in 1928–29, the faculty was increased from 28 to 39 members, and the number of volumes in the library from 20,000 to 30,000. The productive endowment grew from $250,000 to $850,000, and two new dormitories, a heating plant, and a stone chapel, were built during the period 1914–1928. President, William W. Boyd, A.M., Ped.D.

WESTERN RESERVE UNIVERSITY. A nonsectarian institution of higher education at Cleveland, Ohio, chartered in 1826. It included two colleges of liberal arts and sciences, Adelbert College for men and the college for women, with

815 undergraduates in 1914, and 1746 in 1928; and five professional schools with 544 students enrolled in 1914, and eight professional schools with 2111 students in 1928. The summer school in 1928 enrolled 1983 students, and 1838 teachers in service were taking courses in 1928. In that year, there was a registration of 3114 in Cleveland College, which was founded in 1925 as an independent organization affiliated with Western Reserve University and the Case School of Applied Science, giving evening courses in liberal arts, business administration, and engineering, the faculty for the most part being drawn from the teaching staffs of the affiliated institutions. During the period 1914–28, the faculty of the University was increased from 228 to 668 on the regular staff, and the libraries from 82,000 to 300,000 volumes. The endowment in 1914 was $3,521,081.22, as compared with $7,819,483.00 in 1928, and the income was $269,006.10 in the earlier year, compared with $1,739,906 in the later. Twelve acres adjoining the main campus were bought for the medical school in 1915, and in 1921 Samuel Mather gave $500,000 to assure the removal of the school to the new site. In the following year, he pledged himself for the entire cost of the new buildings, which were completed in 1925. The new campus included the University Hospital, a group consisting of Lakeside Hospital, the Babies' and Children's Hospital, the Maternity Hospital, the school of medicine, and the school of nursing. Additional buildings constructed since 1914 include Flora Mather House, a dormitory for women; a gymnasium for men; and laboratories for the school of pharmacy and for the department of household administration of the college for women.

In 1927 facilities were acquired to meet the physical needs of the rapidly growing graduate school and this was followed in 1928 by the appointment of men to devote all their time to graduate instruction and research. In the same year, the university and the Board of Education of the City of Cleveland, by contract, undertook to operate the Cleveland School of Education with which the university forthwith merged its departments of education and nursing, kindergarten and primary training. The entrance requirements of the undergraduate colleges were broadened in 1919 by an increase in the number of electives which might be offered, and a diminution in the number of prescribed subjects. In 1922 the dental school increased its entrance requirements to include a year of college work, the school of pharmacy instituted a four-year course leading to the B.S. degree, and a department of nursing education was added to the college for women. In 1922 a course in business administration was added to the liberal arts curriculum, leading to the B.A. degree, and in 1923 the department of nursing education was organized as a separate school of the university with an initial endowment of $500,000, the gift of Mrs. Chester C. Bolton. President, Robert E. Vinson, D.D., L.H.D., LL.D.

WEST INDIES. See the articles on the island groups and the separate islands: Bahamas; Barbados; Cuba; Jamaica; Haiti; Porto Rico; Leeward Islands; Windward Islands; Trinidad; Virgin Islands; Guadeloupe; Martinique.

WESTMINSTER COLLEGE. An institution for men and women under the auspices of the United Presbyterian Church, at New Wilmington, Pa., founded in 1852. The student enrollment increased from 206 in 1914 to 528 in the autumn of 1928, and the faculty from 18 to 33 in 1927–28. The endowment rose from $150,000, to $750,000 in 1928, and the income for 1927–28 was $180,000. A Bible chair fund of $40,000 was raised during the period under review; a gymnasium was built in 1921 and Browne Hall a freshman residence building, in 1928, at a cost of $185,000, as well as Old Main Memorial, at a cost of $350,000. President, W. Charles Wallace, D.D.

WEST POINT. See United States Military Academy.

WEST VIRGINIA. The fortieth State in size (24,170 square miles) and the twenty-seventh in population; capital, Charleston. The population increased from 1,221,119 in 1910 to 1,463,701 in 1920, a gain of 19.9 per cent; estimated population, 1928, 1,724,000. The white population increased from 1,156,817 (1910) to 1,377,235 (1920); Negro, from 64,173 to 86,345; native white, from 1,099,745 to 1,315,329; foreign-born white, from 57,072 to 61,906. Urban population rose from 228,242 to 369,007; rural, from 992,877 to 1,094,694. The growth of the principal cities was as follows: Wheeling, 1910, 41,641; 1920, 56,208; Huntington, 31,161 to 50,177; Charleston, 22,996 to 39,608.

Agriculture. Agriculture in West Virginia has undergone some decline in its general aspects. The number of farms decreased 9.7 per cent, or from 96,985 in 1910 to 87,289 in 1920, but rose to 90,380 in 1925; the total area in farms decreased 4.6 per cent, or from 10,026,442 acres in 1910 to 9,569,790 in 1920, and fell farther to 8,979,849 in 1925. The improved land in farms totaled 5,520,308 acres in 1920. The percentage of the total land area in farms decreased from 65.2 (1910) to 62.2 (1920) and 58.4 (1925). The total value of farm property rose 57.7 per cent, or from $314,738,540 in 1910 to $496,439,617 in 1925, but receded to $411,159,152 in 1925; the average value per farm was $3255 in 1910, $5687 in 1920, and $4549 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 74,943 were operated by owners; 662, by managers; and 14,775, by tenants. The corresponding figures for 1910 were 75,978; 872; and 19,835. White farmers in 1920 numbered 86,785 and colored farmers, 504. In 1925 white farmers numbered 89,666; colored, 714. There were 9104 farms reported as under mortgage in 1925; 10,274 in 1920. Cattle numbered 587,462 in 1920; 567,769 in 1925; dairy cows numbered 255,021, in 1920; 137,323 in 1925. Sheep numbered 509,831 in 1920; 441,401 in 1925; swine, 305,211 in 1920; 177,012 in 1925. The estimated production of the principal farm products in 1928 was as follows: Corn, 16,524,000 bushels; wheat, 1,586,000; oats, 5,712,000; potatoes, 7,500,000; tobacco, 5,100,000 pounds; and hay, 1,198,000 tons. Comparative figures of 1913 are corn, 22,692,000 bushels; wheat, 3,055,000; oats, 2,760,000; potatoes, 3,984,000; hay, 925,000 tons; and tobacco, 10,200,000 pounds.

Mining. West Virginia is fifth among the States in the value of its mineral products first in the production of natural gas as to value, and second in that of coal. Coal is by far its most valuable mineral, although the outputs of natural gas, petroleum, and clay products are also of great importance. The progress of coal mining during the period starting with 1914 is indicated by the following production figures: 1914, 71,707,626 net tons, valued at $71,391,408; 1915, 77,184,069, $7,561,349; 1916, 86,460,127, $102,366,092; 1917, 86,441,667, $200,659,368; 1918, 89,935,839, $230,508,846; 1920, 89,970,707, $390,046,000; 1921, 72,786,996, $206,661,500; 1926, 143,509,340, $264,736,000; 1927, 145,122,447, $249,730,000; and 1928, 132,952,159, $211,480,000. The greatly increased value of the coal produced from 1917 to 1920 was due chiefly to conditions in the coal-mining field which resulted in a greater demand for coal, and partly to the inflation of the currency which reduced the buying power of money and thereby increased prices. The production of natural gas, in 1914 was 236,489,175 M cubic feet; 1918, 265,160,917; 1920, 239,718,800; 1921, 174,920,800; 1926, 180,223,000. In later years, the production of natural gas gasoline was large and valuable: in 1920, 58,941,488 gallons; in 1926, 63,807,000. The production of petroleum was as follows: 1914, 9,680,033 barrels; 1916, 8,731,184; 1918, 7,866,628; 1920, 8,249,000; 1922, 7,021,000; 1926, 5,946,000. Clay products increased from a value of $5,761,411 in 1914 to $7,634,321 in 1916; $10,988,677 in 1918; and $16,121,172 in 1926. In addition to the minerals mentioned above, the State also produces salt, sand and gravel, and stone. The total value of the mineral production in 1926 was $395,941,940, compared with $547,872,937 in 1920; $298,168,194 in 1919; $327,962,260 in 1918, and $133,633,229 in 1914.

Manufactures. West Virginia has many important industries. These had a steady growth from 1909. There were in the State in 1920, 10 cities with more than 10,000 inhabitants, which contained 17.9 per cent of the total population and reported, in 1919, 41.2 per cent of the value of the State's manufactured products. There were in the State in 1909, 2586 manufacturing establishments; in 1919, 2785; in 1925, 1395; and in 1927, 1313. Persons engaged in manufactories numbered 71,463, 93,688, 80,700, and 77,630, respectively. The capital invested amounted to $150,922,586 in 1909, and $339,189,678 in 1919. The value of products in 1909 amounted to $161,949,526; in 1919, to 471,970,877; in 1925, to $470,821,582; and in 1927, to $451,555,334. The increase in value of products about 1919 was in great measure due to the change in industrial conditions brought about by the War and cannot be taken to indicate a proportionate increase in the manufactures; but the increase in the number of persons employed clearly indicated a growth in the State's manufacturing activities. The principal industry in point of value of its product is the iron and steel and rolling mill, with an output valued in 1909 at $22,435,000; in 1919, $85,036,000; and in 1925, at $92,565,227. Lumber and timber products rank second in point of value, amounting to $28,758,000 in 1909; $46,314,000 in 1919; and $26,787,495 in 1925. The manufacture of glass, third in value, had a product valued at $7,779,000 in 1909; $14.631,000 in 1914; and $42,730,000 in 1919. Wheeling and Huntington were the leading manufacturing centres. In 1909 there were in Wheeling 176 manufacturing establishments, with a product valued at $27,077,000; in 1914, 201 with $27,879,000; and in 1919, 243 with $72,640,000. Parkersburg had, in 1909, 75 with $5,498,000; in 1914, 83 with $7,143,000; and in 1919, 73 with $24,056,000.

Education. Among the notable features in the more recent educational development of West Virginia was the addition to the Department of Education of a supervisor of teacher training, a supervisor of health and sanitation, and a supervisor of physical education. A high-school assistant supervisor and two rural professors also were added as part of the organization. The Legislature of 1919 passed three important measures: the teacher's-salary law; a measure providing for the standardization of rural schools; and a law increasing the general school fund by $1,000,000 for each of the next two years. A high-school movement in the State made progress, with the result that the number of classified high schools rose from 171 in 1919–20 to 205 in 1922 and that in 1925–26, 227 school houses were employed for secondary instruction exclusively. The Negro schools of the State made noteworthy improvement. There were in 1922 16 recognized Negro high schools, 6 of which were high schools of the first class. The enrollment in colored high schools increased from 484 in 1919 to 2324 in 1925–26. The development of vocational education kept pace with that of other branches. There was a very considerable enrollment in home economics, trades, and industries, and mining and vocational agriculture. The Legislature of 1921 took an advanced step by passing what is known as the compulsory part-time law, requiring all cities with a population of 10,000 or more, and other industrial centres where as many as 50 young people are working under labor permits, to establish part-time schools or classes. In coöperation with the Federal government, the State Board of Education organized a civilian rehabilitation service, which was thought very effective in its operation. The total enrollment in the high and elementary schools in 1912 was 435,611; in 1925–26 it was 382,830. In the high schools, in the latter year, there were enrolled 36,114. The total colored enrollment in 1925–26 in kindergarten, elementary, and secondary grades was 22,225. The expenditure for public day schools in 1925–26 was: current, $22,070,820; outlays for new buildings, sites, and equipment, $4,164,659. The percentage of illiteracy in the State decreased from 10.2 in 1910 to 8.2 in 1920: in the native white population, from 8.4 to 6.1; in the colored, from 24.2 to 18.9. In the foreign-born white population it increased from 23.9 to 24.5.

Finance. State expenditure in the year ending June 30, 1927, as reported by the U. S. Department of Commerce, was: for maintenance and operation of State departments, $12,952,347 (of which $2,228,610 was for local education); for interest on debt, $2,510,508; for permanent improvements, $11,964,378; total, $27,427,233 (of which $12,452,106 was for highways, $2,319,868 being for maintenance and $10,132,238 for construction). Revenues were $20,758,241; of these, property and special taxes formed 23.4 per cent; departmental earnings, 8 per cent; receipts from licenses, 57.7 per cent. Assessed property valuation was $2,130,255,951; State taxation thereon, $2,982,358. Net State debt on June 30, 1927, was $51,536,254.

Political and Other Events. On July 1, 1914, a drastic prohibition law went into effect, as a result of a State-wide prohibition amendment passed in 1912. In 1915 a report was made on the long-standing controversy between Virginia and West Virginia as to the liability of the latter in the State debt of Virginia before the separation of the two States. Charles D. Littlefield, special arbitrator, decided that West

Virginia should pay part of the debt. The Supreme Court, on June 14, 1915, decreed that West Virginia should pay $12,393,929. In 1916 the Democrats elected as governor John J. Cornwell. The Republicans elected Howard Sutherland United States Senator. For President, Hughes received 141,432 votes; Wilson, 139,013. In 1918 Davis Elkins, Republican, was elected to the United States Senate. In 1920 E. F. Morgan, Republican, was elected governor. For President, Harding received 282,007 votes; Cox, 220,789. In May, 1921, as a result of disorders arising from strikes in the coal mines, Mingo County was placed under martial law by Governor Morgan. The strike was the result of an attempt to unionize the mines in this part of the State. The trouble continued until September, when the armed miners surrendered to Federal troops, who took charge of the situation. In 1922 M. M. Neely, Democrat, was elected United States Senator. For President, Coolidge received, in 1924, 288,635 votes; Davis, 257,232; La Follette, 36,723. Howard M. Gore, Republican, was elected governor in 1925; in 1928 William G. Conley, also Republican. For President, the vote in 1928 was: Hoover, 375,551; Smith, 263,784. Henry D. Hatfield (Rep.) was elected Senator.

Legislation. In 1915 the Legislature enacted an amendment to the prohibition law. The Legislature of 1917 amended the election laws and passed a measure providing for the protection of judges against personal violence. This Legislature refused to make provision for the payment of the State's portion of the Civil War debt, but the session of 1919 adopted a resolution for settling the debt. The Legislature of 1919 provided for a constitutional amendment dividing the legislative session into two parts, the first, lasting 15 days, to be devoted to the introduction of bills; the second, after a recess, to be given to their consideration and final action. This Legislature authorized the creation of a State police force and enacted measures forbidding child labor. It also compelled school attendance of children under 14 years of age. A special session of the Legislature was held in 1920 to ratify the woman-suffrage amendment. By virtue of a constitutional amendment ratified by the people in 1920, the Legislature of 1921 authorized the governor to issue $50,000,000 in bonds for permanent road improvement. A further amendment, for the issue of $35,000,000 more, was proposed in 1927. A mine-regulatory act, creating the Department of Mines, was passed in 1925.

WEST VIRGINIA UNIVERSITY. A coeducational State institution of higher education at Morgantown, W. Va., founded in 1867. The student enrollment increased during the period 1914–28, with 775 registered in the earlier year and 2650 in the latter. Faculty membership increased from 80 to more than 300, and the number of volumes in the library from 47,000 to 92,000. Woman's Hall, Oglebay Hall, the medical building, and the law school building were constructed during the period. A gift of valuable coal lands was received from Dr. I. C. White, and a farm and live stock from the estate of Lawrence A. Reymann. In 1924 a course leading to the degree of B.S. in public health was established. A chemistry building, a woman's gymnasium, and a field house for men were completed in 1927–28. President, John Roscor Turner, Ph.D.

WHARTON, EDITH (1862–). An American novelist (see VOL. XXIII). Her later books are *Summer* (1917); *The Marne* (1918); *French Ways and Their Meaning* (1919); *The Age of Innocence* (1920); *Glimpses of the Moon* (1922); *A Son at the Front* (1923); *False Dawn* (1924); *Mother Recompense* (1925); *The Writing of Fiction* (1925); *Here and Beyond* (1926); *Twilight Sleep* (1927); *The Children* (1928); *Hudson River Bracketed* (1929).

WHEAT. For the countries reporting their yields every year, the production of wheat increased from an annual average of 1,500,000,000 bushels for the 3 years 1891–93 to 3,632,720,000 for the 3 years 1926–28. In the United States, production rose rapidly during the World War. For the years 1914–24, the average annual production was 837,464,000 bushels, as compared with 681,368,000 for 1904–13. The largest crop ever grown, 1,025,801,000 bushels, was produced in 1915 and the highest acreage, 73,099,421, an increase of 20 per cent over any previous year, was harvested in 1919. The general effect of the War was to increase production and to limit consumption. The principal governments of the world passed laws requiring a maximum percentage of flour in grinding, prescribing minimum percentages of wheat-flour substitutes in baking, placing wheat-flour consumption on a rationing basis, regulating the trade in wheat, and fixing the price. In the United States, wheat prices, beginning to rise with the outbreak of the War, had reached $1.40 per bushel by May, 1915. In 1917 the United States Food Administration fixed the price of No. 1 Northern Spring Wheat at $2.20 per bushel at Chicago with differentials for grades and other terminal markets. The price had reached $2.58 per bushel on June 1, 1920, a month before price fixation by the Government terminated, and a downward movement began which, by December, 1921, had reduced the price to $0.90 per bushel. In purchasing power, the price of $0.94 on Dec. 1, 1921, was below that of the low price of $0.49 on Dec. 1, 1894.

Since 1920 the quantity of protein in wheat has become an increasingly important price factor and by 1928 a high protein content in the bread wheats quite generally commanded a premium. At present, testing wheat for protein content by either State or commercial laboratories is an accepted practice at the principal terminal markets of the Central West, which receive the winter and spring hard wheats. Plans are under advisement by which the grower may be assured of the full market value of his product to which he may be entitled on the basis of protein content.

The combined harvester and thresher, or combine, confined to the Pacific States for 50 years, made its appearance in the Great Plains region about 1917, and since then its use has spread to all the important grain-producing sections of the United States and Canada. These machines are operated with horses or tractors and vary in size and type to meet requirements. A machine cutting 16 feet wide harvests about 30 acres per eight-hour day.

Standards and Grading. The United States Grain Standards Act of Aug. 11, 1916, authorized the Secretary of Agriculture to investigate the handling and grading of grain, establish official standards, and license grain inspectors. Under this law, all wheat in interstate and foreign commerce is graded by the licensed inspectors according to the official wheat standards of the United States, as revised and effective Sept. 15, 1927. These standards, based on color and texture of kernels, as indicating quality, comprise the following classes and subclasses: Class

I, hard red spring wheat, with subclasses (a) dark northern spring, (b) northern spring, and (c) red spring; Class II, durum wheat, and subclasses (a) amber durum, (b) durum, and (c) red durum; Class III, hard red winter wheat, including subclasses (a) dark hard winter, (b) hard winter, and (c) yellow hard winter; Class IV, soft red winter wheat, including subclasses (a) red winter, and (b) Western red; and Class V, white wheat, with subclasses (a) hard white, (b) soft white, and (c) Western white. Each subclass is divided into five grades, determined by test weight per bushel, moisture content, percentage of damaged kernels, purity, cleanness, and condition. Wheat failing to meet the specifications for any one of these grades is designated "sample grade." In addition, grades for mixed wheat, mixed durum, treated, garlicky, smutty, and weevily, wheat are included. A campaign to eradicate the common barberry, on which the spring stage of black stem rust of wheat occurs, has been in progress since 1918. Consult U. S. Department of Agriculture *Year Book* for 1921 and 1927. See AGRICULTURE.

WHEATON COLLEGE. An institution for the higher education of women at Norton, Mass., founded under the direction of Mary Lyon as a seminary in 1834, and chartered as a college in 1912. Admission is by college-entrance board examinations. There was a student enrollment of 497 in 1927–28, and the faculty consisted of 10 men and 40 women in the autumn of 1928. The productive funds of the college increased from approximately $1,000,000 in 1924 to $1,025,000 in 1928, and the value of buildings and equipment from $1,000,000 to $1,606,246. The campus covers more than 100 acres, including large stretches of pine woods, and the plant consist of 33 buildings, including dormitories, chapel, science building, gymnasium, observatory, power house, and library (with 25,000 volumes). President, J(ohn) Edgar Park, A.B., D.D., LL.D.

WHEAT RUST. See PLANTS, DISEASES OF.

WHEELER, BURTON KENDALL (1882–). A United States Senator, born at Hudson, Mass., and educated at the University of Michigan. He began his career as a stenographer in Boston, but later became a lawyer in Butte, Mont., and attracted much attention by his success in winning damage suits for the miners against the big copper companies. The liberal political element in Butte sent him to the State Legislature in 1911, and he was Federal district attorney in Montana during 1913–19. In 1922 he was elected to the United States Senate by a large majority. While in charge of the investigation of former Attorney General Daugherty, he was indicted in Montana on a charge of accepting a fee illegally, but was exonerated by a special Senate committee. In 1924 he was nominated for the office of Vice President of the United States on La Follette's Progressive ticket. He was reëlected to the Senate in 1928.

WHEELER, WILLIAM MORTON (1865–). An American zoölogist (see VOL. XXIII.) He has continued as professor of entomology and dean of the Bussey Institute for Research in Applied Biology at Harvard. He wrote *Social Life among the Insects* (1923).

WHIPPLE, GEORGE HOYT (1878–). An American pathologist. He was born at Ashland, N. H., graduated from Yale, and received his M.D. degree from The Johns Hopkins Medical School (1905). Until 1908 he conducted pathological researches in Ancon Hospital, Panama, and from 1909 to 1914, he was pathologist at The Johns Hopkins University and Hospital. He then went to the University of California as director of medical research (1914–21) and dean of the medical school (1920–21). Since 1921 he has been dean and professor of pathology at the University of Rochester School of Medicine and Dentistry. In 1927 he became a trustee of the Rockefeller Foundation. He was elected a member of the National Academy of Science in 1929.

WHIPPLE, GUY MONTROSE (1876–). An American psychologist, born at Danvers, Mass., and educated at Brown and Cornell universities. He began teaching in 1902 at Cornell and went to the University of Illinois in 1914. The Carnegie Institute of Technology employed him from 1917 to 1919 as acting director of its bureau of salesmanship and as professor of applied psychology. He was professor of experimental education in the University of Michigan from 1919 to 1925. During the World War, he was a member of the committee on mental examination of army recruits. His writings include: *Questions in School Hygiene* (1909); *Manual of Mental and Physical Tests* (2d ed., 1914); *How to Study Effectively* (1916); *Classes for Gifted Children* (1919); *Problems in Educational Psychology* (1922); *Problems in Mental Testing* (with Helen D. Whipple, 1925).

WHITAKER, MILTON C. (1870–). An American chemist, born in Frazeysburg, Ohio, and educated at the University of Colorado. In 1903 he became chemist and general superintendent of the Welsbach Company, but resigned in 1911 to accept the professorship of chemical engineering at Columbia University. This chair he held until 1917, when he was made vice president of the United States Industrial Alcohol Company and president of the United States Industrial Chemical Company. He resigned from both positions in 1927. In 1923 he received the Perkin Medal of the American section of the Society of Chemical Industry for his original work on the chemistry and production of alcohol and its derivatives. In 1911–16 he was editor of the *Journal of Industrial and Engineering Chemistry.*

WHITE, FRANK (1856–). An American public official. He was born at Stillman Valley, Ill., and graduated from the University of Illinois (1880). Having settled in North Dakota, he was elected to the House of Representatives of that State (1891–93) and to the State Senate (1893–99). He was major of the First North Dakota Volunteer Infantry in the Spanish-American War and served in the Philippines. From 1901 to 1905, he was Governor of North Dakota. In the World War, he was a colonel of infantry (41st Division), serving fourteen months in France. During the years 1921–28, he was Treasurer of the United States and since 1928 has been president of the Southern Mortgage Guaranty Corporation of Chattanooga, Tenn.

WHITE, JAMES (1863–1928). A Canadian geographer (see VOL. XXIII). He was made chairman of the advisory board on wild life protection in 1917 and in the same year won the Alexandre Roquette Prize. In 1921 he was employed in the Labrador boundary case and in 1922 became technical adviser to the Minister of Justice. He was chairman of the geographic board from 1925 until his death.

WHITE, JOHN ELLINGTON (1868–). An American Baptist clergyman and college president, born at Clayton, N. C., and educated at the

Wake Forest College. Ordained to the Baptist ministry in 1892, he served as pastor in churches in North Carolina and South Carolina. From 1916 to 1927, he was president of Anderson College. He was the founder of a system of Baptist schools for the mountaineers and president of the Clifton Conference for Negro Schools. From 1914 to 1916, he was preacher and lecturer at the University of Chicago. Since 1927 he has been pastor of the First Baptist Church of Savannah, Ga. He is the author of *The Silent Southerners* (1906); *The New Task and Opportunity of the South* (1908); *Southern Highlanders* (1913); and *A Yielded Pacifist* (1917).

WHITE, William Alanson (1868–). An American neurologist and alienist (see Vol. XXIII). Since 1914 Dr. White has produced several major works, beginning with the treatise on neurology written in collaboration with Jelliffe, *Diseases of the Nervous System* (1915). The ninth edition of his *Outlines of Psychiatry* appeared in 1923. The following monographs also came from his pen: *Mechanisms of Character Formation* (1916); *The Principles of Mental Hygiene* (1917); *The Mental Hygiene of Childhood* (1919); *Thoughts of a Psychologist on the War and After* (1919); *Foundations of Psychiatry* (1921); *Insanity and the Criminal Law* (1923); *Essays in Psychopathology* (1925); *The Meaning of Disease* (1926); and *The Major Psychoses* (1928).

WHITE, William Allen (1868–). An American journalist and author (see Vol. XXIII). During the World War, the American Red Cross sent him to Russia as an observer, and he was appointed a delegate to the Russian Conference at Prinkipo in 1919. His later publications include: *God's Puppets* (1916); *In the Heart of a Fool* (1918); *The Martial Adventures of Henry and Me* (1918); *Life of Woodrow Wilson* (1924); *Life of Calvin Coolidge* (1925); *Masks in a Pageant* (1928).

WHITEHEAD, Alfred North (1861–). A British mathematician and philosopher (see Vol. XXIII). He was professor of applied mathematics at the Imperial College of Science and Technology, South Kensington (1914–24), president of the Mathematical Association (1915–16), and of Section A of the British Association (1916), and professor of philosophy at Harvard University (since 1924). He received the first James Scott Prize of the Edinburgh Royal Society (1922), and the Sylvester Medal of the Royal Society (1925). After terminating his joint inquiry with Bertrand Russell into the foundations of mathematics and logic, published as *Principia Mathematica* (3 vols., 1910–13), he devoted himself to the elaboration of a philosophy of physical science. This philosophy, although conducted on realistic presuppositions, was free from the deterministic dogmatism characterizing so many realistic philosophies. In *The Principle of Relativity* (1922), he presented what he regarded as an alternative rendering of the theory of relativity. He retained the metrical formula of Einstein's special theory but discarded the general theory and so reframed the equations as to maintain the traditional distinction between physics and geometry. His other works since 1914 include *Principles of Natural Knowledge* (1919); and *The Concept of Nature*, Tarner Lectures delivered in Trinity College, Cambridge, 1919 (1920); *Science and the Modern World*, Lowell Lectures (1925); *Religion in the Making*, Lowell Lectures (1926); *Symbolism; its Meaning and Effect* (1927); and *The Aims of Education and other essays* (1929).

WHITEHEAD, John Boswell (1872–). An American electrical engineer, born in Norfolk, Va., and educated at The Johns Hopkins University. In 1897 he returned there as instructor in applied electricity, and in 1910 he was advanced to a professorship. Since 1919 he also has been dean of the faculty of engineering there. His original researches have had to do with such subjects as magnetic effect of electric displacement, single-phase railway system, and submarine detection. Besides many papers on engineering and physical topics, he wrote *Electric Operation of Steam Railways* (1909) and *Dielectric Theory and Insulation* (1927).

WHITE SLAVERY. See League of Nations.

WHITHORNE, Emerson (1884–). An American composer, born at Cleveland, Ohio. He studied there with J. Hartman (piano and harmony) and J. Rogers (composition). From 1904 to 1906, he continued his studies in Vienna under Leschetizky (piano) and R. Fuchs (composition) and spent the following year in Berlin with Arthur Schnabel (piano). In 1907–14 he lived in London as a teacher and writer on musical subjects and served as critic on the *Pall Mall Gazette* (1913–14). In 1915 he settled in St. Louis as editor for the Art Publication Society. In 1907 he married the pianist Ethel Leginska, but separated from her in 1909. His works include the symphonic poems, *Ranga*, *The City of Ys*, *In the Court of the Pomegranates*, and *Fata Morgana*; the orchestral suites, *Japanese*, *Adventures of a Samurai*, and *New York Days and Nights* (also arranged for piano); several minor works for orchestra; three string quartets; a song cycle for vocal quartet, *Songs of Sappho*; piano pieces; and songs. He is the author of *Instruments of the Modern Symphony Orchestra* (1921).

WHITING, William F. (1864–). An American paper manufacturer and Secretary of Commerce. He was born at Holyoke, Mass., and after being graduated at Amherst College (1886), developed and expanded the paper-making industry inherited from his father. Never seeking public office, he was keenly interested in politics, and was a delegate to the Republican National Convention in 1920, 1924, and 1928. In August, 1928, President Coolidge, a personal friend of many years' standing, appointed him Secretary of Commerce to succeed Herbert Hoover, who had been nominated for President. Mr. Whiting served in this office until the close of the Coolidge administration in March, 1929.

WHITLOCK, Brand (1869–). An American author and diplomat (see Vol. XXIII). As United States Minister to Belgium during the World War, he opposed German aggression with great boldness and considerable success and on many occasions saved the Belgians from the effects of drastic edicts. He was Ambassador to Belgium from 1919 to 1920, and for his services during the War received numerous European decorations. In 1918 he wrote *Memories of Belgium Under the German Occupation.* He published the following novels: *J. Hardin and Son* (1923); *Uprooted* (1926); *Transplanted* (1927); and *Big Matt* (1928), and a biography, *La Fayette* (1929).

WHITMAN COLLEGE. A coeducational institution of higher learning at Walla Walla, Wash., founded in 1859. Student enrollment in the fall of 1928 was 546. In the same year, productive funds amounted to $1,182,851.04 and annual income to $222,624. Gifts included $250,000 from the General Education Board and $75,000 from the Weyerhaeuser family. New buildings included Lyman House, a men's dormitory costing $100,000, Prentiss Hall, a dormitory for women, costing $200,000, and a heating plant costing $50,000. Two financial campaigns in the interest of the college resulted in subscriptions of approximately $1,500,000. President, Stephen Beasley Linnard Penrose, D.D., LL.D.

WHITNEY, Gertrude Vanderbilt (Mrs. Harry Payne Whitney) (1877–). An American sculptor. During the World War, she founded a hospital in France and labored unremittingly among the soldiers. Her war sculptures are unique in their quality of distinctly feminine sympathy and tenderness for the young soldiers. Among the best of them are "Found," "Engineers," and "Not Yet Discharged." These are all figures and groups of American soldiers.

WICA, L. See William (Wilhelm), Prince of Sweden.

WICKERSHAM, George Woodward (1858–). An American lawyer and public official (see Vol. XXIII). In 1915 he was delegate-at-large and chairman of the judiciary committee of the New York Constitutional Convention. From 1914 to 1917, he was president of the Association of the Bar of the City of New York. He was a member and later vice chairman of the District Board of the City of New York under the United States Selective Service Law in 1917–18. In 1920 he was president of the American Prison Association and chairman of the executive committee of the New York Prison Association. He has been president of the American Law Institute since 1923, and since 1924, a member of the commission on progressive codification of international law, appointed by the Council of the League of Nations. In 1925–26 he served on the Commission for the Reorganization of the New York State Government. In 1929 President Hoover appointed him chairman of the National Law Enforcement Commission. He received the honorary LL.D. degree from Harvard (1921), Hobart (1922), and the University of Michigan (1927). He wrote *Spring in Morocco* (1923).

WIDAL, vė̄-dȧl (Georges) Fernand Isidore (1862–1929). A French bacteriologist and clinician (see Vol. XXIII). In the decade since 1914, he added to the laurels which he had won in serodiagnosis and in the salt-poor diet for renal dropsy, by innovations in the prognosis of chronic kidney disease by determining the amount of residual blood nitrogen. In collaboration with Roger and Teissier, he produced *Nouveau Traité de Médicine* (1920) and, with Teissier and others, *Rhumatismes* (1924).

WIDDEMER, Margaret (Mrs. Robert Haven Schauffler) (?–). An American author, born at Doylestown, Pa., and graduated from the Drexel Institute Library School in 1909. She wrote poems when a child. A child-labor poem entitled *The Factories*, her first published work, attracted wide attention. Among her other writings are *The Rose-Garden Husband* (1915); *Winona of the Camp Fire* (1915); *Why Not?* (1915); *The Wishing-Ring Man* (1917); *Winona's War Farm* (1918); *The Old Road to Paradise* (1918), which gained her a share of the Pulitzer Prize for the best book of poems, in the year 1919; *Graven Image* (1923); *Gallant Lady* (1926); *Collected Poems* (1928).

WIEDENFELD, Kurt (1871–). A German economist and public official, who was born in Berlin and educated at the universities of Lausanne, Munich, Leipzig, and Berlin. He became a lecturer on economics at the University of Berlin in 1903, later served as director of the German Foreign Trade Department, and in 1918 was for a short time Minister for Foreign Affairs. During 1921–22 he was German Chargé d'Affaires in Russia, after which he became professor of economics at the University of Cologne and (in 1923) at the University of Leipzig. He wrote *Die Nordwesteuropäischen Welthäfen* (1923); *Das Persönliche im modernen Unternehmertum* (1911, 1920); *Lenin und sein Werk* (1923), translated into English as *The Remaking of Russia*; *Gewerbepolitik* (1927).

WIELAND, vē'länt, Heinrich (1877–). A German chemist, who was born at Pforzheim and educated at the universities of Munich, Berlin, and Stuttgart. He became professor of chemistry at the technical high school of Munich in 1917 and at the university there in 1925. In 1927 he received the Nobel Prize for chemistry for his discovery of the structure of the substance which gives bile its color and its relation with chlorophyl and hemoglobin. In addition to his work in chemistry, he holds doctorates in medicine, engineering, and philosophy. He is a member of the academies of Munich, Göttingen, and Heidelberg and chairman of the German Chemical Society. His publications include numerous works on chemistry and biochemistry. He also edited *Liebig's Annals of Chemistry*.

WIENER, Franz von. See Croisset, Francis de.

WIESBADEN AGREEMENT. See Germany, under *History*; Reparations.

WIGGIN, Kate Douglas (Mrs. George C. Riggs) (1859–1923). An American author (see Vol. XXIII) who died in London. Among her later stories were: *Bluebeard*, a musical fantasy (1914); *Penelope's Postscripts* (1916); *Ladies in Waiting* (1918); and *Homespun Tales* (1920). Her reminiscences were published posthumously as *My Garden of Memories* (1924).

WIGMORE, John Henry (1863–). An American professor of law (see Vol. XXIII). He was professor of law at Northwestern University, Chicago, Ill., from 1893 to 1928, serving as dean of the law faculty during the last 27 years of that period. He retired with the title of dean emeritus. His later works included *Problems of Law, Its Past, Present, and Future* (1920) and *A Panorama of the World's Legal Systems* (1928). He was editor and co-editor of various legal treaties. In the World War, he served as colonel and was awarded the Distinguished Service Medal.

WILAMOWITZ-MÖLLENDORF, vē'lȧ-mō'-vĭts-mĕl'en-dôrf, Ulrich von (1848–). A German philologist (see Vol. XXIII). He translated and edited many Greek classics. His later works are *Antike Metrik* (1922); *Pindar* (1923); *Reden und Vorträge* (1925–26); *Die Heimkehr des Odysseus, neue homerische Untersuchungen* (1927); *Erinnerungen, 1848–1914* (1928).

WILBUR, Curtis Dwight (1867–). An American lawyer and public official, born at Boonesboro, Iowa. He was graduated at the United States Naval Academy in 1888, resigned from the Navy in the same year, and in 1890 began the practice of law in Los Angeles. He was judge of the Superior Court of Los Angeles County from 1903 to 1918 and became justice of the Supreme Court of California in 1919. He organized the Juvenile Court of Los Angeles and drew up several of the juvenile-court laws of California. On the resignation of Edwin Denby, Judge Wilbur was appointed Secretary of the Navy by President Coolidge and served from March, 1924, to 1929.

WILBUR, Ray Lyman (1875–). An American physician, educator, and former president of Stanford University (see Vol. XXIII). In 1917 he was chief of the conservation division of the United States Food Administration and a member of the California State Council of Defense. In 1918 he was a regional director of the Students' Army Training Corps and in 1919 president of the California State Conference of Social Agencies. He was president of various medical societies, chairman of the medical council of the U. S. Veterans' Bureau (since 1924), chairman of the Institute of Pacific Relations at Honolulu (since 1925), and a member of the American delegation to the sixth Pan-American Conference at Havana in 1928. In March, 1929, he was appointed Secretary of the Interior in President Hoover's cabinet.

WILCZYNSKI, Ernest Julius (1876–). An American mathematician, born in Hamburg, Germany, and educated at the University of Berlin. Coming to the United States in 1897, he taught mathematics at the University of California (1898–1907), and at the University of Illinois (1907–10), then transferring to the University of Chicago as associate professor (1910–14), and professor (since 1914). He is a member of the National Academy of Sciences. He wrote *Projective Differential Geometry of Curves and Ruled Surfaces* (1906); *The New Haven Colloquium*, with E. H. Moore and M. Mason (1910); *Plane Trigonometry and Applications* (1913); and *College Algebra with Applications* (1916).

WILDER, Harris Hawthorne (1864–1928). An American zoölogist, born at Bangor, Me., and educated at Amherst College and at Freiburg. He was professor of zoölogy at Smith College (1892–1928). His most important researches were on the embryology and anatomy of vertebrates, the epidermic markings of the palms and soles of the primates, and the teratology of vertebrates. He published *Invertebrate Zoölogy* (1894); *History of the Human Body* (1910); *Personal Identification* (1902); *Manual of Anthropometry* (1920); *Man's Prehistoric Past* (1923); *The Pedigree of the Human Race* (1925).

WILDER, Thornton Niven (1897–). An American author. He was born at Madison, Wis., and graduated from Yale (1920), after having served for four months in 1918 in the Coast Artillery Corps. After graduation, he passed two years in Italy and one year in the Graduate School at Princeton. He then became a master at the Lawrenceville School. His first published work to win recognition was *The Cabala* (1926). This was followed by *The Bridge of San Luis Rey* (1928), and *The Angel That Troubled the Waters and Other Plays* (1928).

WILDMAN, Edwin (1867–). An American editor and author, born at Corning, N. Y., and educated at the General Wesleyan Seminary, Phillips Exeter Academy, and Harvard University. He was editor and proprietor of newspapers in Georgia and New York, was a writer and war correspondent for *Leslie's Weekly* (1897–98), served as special war correspondent in the Philippines from 1898 to 1900, and was special commissioner with the allied troops during the Boxer Rebellion in China (1900–01). From 1918 to 1920, he was president and editor of *The Forum*. He wrote *Writing to Sell* (1915); *America's Attitude toward the War* (1917); *American Leaders of Industry* (1919, 1921); *Famous Leaders of Character* (1922); *Founders of America* (1924); *Builders of America* (1925); *Jewish Leaders of America* (1928).

WILES, Irving Ramsey (1861–). An American portrait painter (see Vol. XXIII). His later portraits, particularly those of women, continued his able, academic manner. In 1919 he received the Maynard Portrait Prize from the National Academy of Design, New York City, and the Lippincott Prize from the Pennsylvania Academy, Philadelphia.

WILEY, Hugh (1884–). An American writer, born at Zanesville, Ohio, and educated in the public schools. From 1902 to 1917, he was an engineer and contractor. During the World War, he served in the Engineers Corps as captain. Besides contributing short stories, many of them in Negro dialect, to magazines, he wrote *The Wildcat* (1920); *Jade* (1921); *Lady Luck* (1921); *Fo' Meals a Day* (1927); *Manchu Blood* (1927); *Here's Luck* (1928).

WILHELM, Prince of Sweden. See William (Wilhelm), Prince of Sweden.

WILKINS, Ernest Hatch (1880–). An American college president. He was born at Newton Center, Mass., graduated at Amherst College, and took graduate work at The Johns Hopkins and at Harvard (Ph.D., 1910). After teaching Romance languages at Amherst (1900–04) and at Harvard (1906–12), he went to the University of Chicago as associate professor of Romance languages (1912–16) and from 1916 to 1927 held a full professorship there. He was also dean of the colleges of arts, literature and science from 1923 to 1926. In the World War, he was associate executive secretary of the war personnel board, national war work council, Y. M. C. A., and later directed the educational bureau in charge of educational work carried on by the Y. M. C. A. in camps in the United States. Since 1927 he has been president of Oberlin College. He is the author of *Dante—Poet and Apostle*, and *The Changing College* (1927); joint author of *Concordance to the Latin Works of Dante*; and translator of Papini's *Four and Twenty Minds*.

WILKINS, Sir George Hubert (1888–). An Australian aviator and polar explorer. Born on a ranch in South Australia, he was graduated in electrical engineering from the Adelaide School of Mines (1906). He gave up an engineering career to become photographic correspondent of a London newspaper in the Balkan Wars. In 1913 he accompanied Vilhjalmur Stefansson on the latter's first arctic expedition. At the outbreak of the World War, he joined the Australian Flying Corps and was second in command of the Military History Department as official photographer.

After the War, Sir George conducted explorations for the British Museum of Natural History in northern Australia and the islands of the Pacific. He was second in command of the British Imperial Antarctic Expedition to Graham Land in 1920–21 and returned the following year with the ill-fated Shackleton-Quest Expedition. Turning next to aërial exploration, he headed the Detroit Arctic Expedition of 1925 and the *Detroit News*-Wilkins Expedition of 1927, both of which were in the main unsuccessful, due to unfavorable weather and other circumstances. On the latter trip, he was forced down north of Alaska on the frozen Arctic Ocean. With his pilot, he succeeded in reaching an Eskimo settlement on foot, after great hardships. In April, 1928, he surprised the world by flying from Point Barrow, Alaska, to Green Harbor, Svalbard, Norway, covering the distance of 2200 miles over the polar regions in 20 hours. For this exploit, he was knighted by King George. Later the same year, he led an airplane expedition to the Antarctic; studied meteorological conditions, and flew over previously unexplored territory. In 1929 he returned to the Antarctic to survey Ross Sea by airplane and chart the region between Graham Land and the Bay of Whales. He wrote *Flying the Arctic* (1928), a book which definitely contributed to polar science.

WILLARD, Daniel (1861–). An American railway president, born at North Hartland, Vt., and educated at the Massachusetts Agricultural College. He entered the railway service in 1879 and became assistant general manager of the Baltimore & Ohio Railroad in 1899 and its president on Jan. 15, 1910. In 1917 he became chairman of the Advisory Commission of the Council of National Defense and in the next year was made chairman of the War Industries Board. He was commanding colonel of engineers in the U. S. Army in 1918. Since 1926 he has been president of the board of trustees of The Johns Hopkins University. In April, 1929, he was awarded the gold medal of the National Institute of Social Sciences for distinguished social service.

WILLCOX, William Russell (1863–). An American lawyer (see Vol. XXIII). From 1916 to 1918, he was chairman of the Republican national committee.

WILLEBRANDT, Mabel Walker (1889–). An American lawyer, born at Woodsdale, Kan. She graduated from the Temple (Ariz.) Normal School in 1911 and from the law department of the University of Southern California in 1916. After teaching law for several years, she was admitted to the bar and practiced in Los Angeles. She acted as public defender of women and was attorney in some 2000 cases. In 1921 she was appointed Assistant Attorney General of the United States, the first woman to fill that office. She was placed in charge of the enforcement of the prohibition law, tax laws, and the Bureau of Federal Prisons. She played a prominent part as a supporter of Herbert Hoover in the presidential campaign of 1928. In May, 1929, she resigned as Assistant Attorney General and became counsel to Washington aviation interests.

WILLETT, Herbert Lockwood (1864–). An American theologian, born at Ionia, Mich., and educated at Bethany College, W. Va., and Yale, Chicago, and Berlin universities. In 1890 he was ordained to the ministry of the Christian Church and for several years was a pastor at Dayton, Ohio. He was associate professor (1909–15) and professor of Semitic languages and literature (since 1915) at the University of Chicago. From 1908 to 1920, he was minister of the Memorial Church of Christ of Chicago. He was well known as a lecturer and wrote: *Life and Teachings of Jesus* (1898); *Prophets of Israel* (1899); *The Moral Leaders of Israel* (1916); and *Our Bible—Its Origin, Character, and Value* (1917). From 1916 to 1920, he was president of the Chicago Church Federation, and in the latter year became Chicago representative of the Federal Council of Churches of Christ in America.

WILLIAM II (Friedrich Wilhelm Victor Albert) (1859–). Ex-Emperor of Germany and ex-King of Prussia (see Vol. XXIII). The virtually absolute monarch of a great and powerful nation and generally considered an able and energetic leader, William II was probably the outstanding world figure at the outbreak of the World War. Its close found him bereft of every vestige of power, a fugitive from his own people, and hated by millions the world over. Animosity toward him gradually waned in the decade following the Armistice, only to be replaced by an almost complete indifference. His responsibility for the War remained a matter for debate. He repeatedly protested that he did his utmost to maintain peace and recent revelations indicate that he made half-hearted efforts which were nullified by the militaristic influences surrounding him, the belligerency of Austrian and Russian officialdom, and lack of coöperation on the part of the German Embassy at St. Petersburg. The Allies charged him with full responsibility and found support for their thesis in the memoirs of Prince Lichnowsky, German Ambassador to London in 1914, and in the works of Maximilian Harden, Dr. Wilhelm Mühlon, and other German writers.

William signed the order for the German mobilization on Aug. 1, 1914, and thereafter receded more and more into the background. His peace offer of 1916, his opposition to the peace resolution of the Reichstag in 1917, and his visits to the various battle fronts were his only significant activities. Failure of the German offensive of 1918 brought assurance from his generals that defeat was inevitable, but he refused to capitulate, urging the army to fight to the last. On Oct. 8, 1918, he was forced to announce his decision to "offer peace to the enemy." His tottering prestige was further shattered by an agreement among the other German sovereigns curtailing his power to make war and sign treaties and by President Wilson's refusal to treat with "Germany's present rulers." He then authorized the formation of a constitutional ministry, left Berlin with its threatening populace on October 30, and took refuge with the army. The Socialist Minister, on November 3, demanded his abdication, but he hesitated until November 28 before complying, although informed November 9 by Hindenburg that the army would not support him. Shortly afterward, he fled to Holland, where he lived for a year as the guest of Count Bentinck at Amerongen, and then purchased (1920) the chateau of Doorn near Utrecht, where he subsequently resided.

The Allies, in Article 227 of the Paris Peace Treaty, demanded his punishment for "a supreme offense against international morality." Plans for his trial before a special court of Allied jurists were balked by the refusal of Holland to extradite him. William's sons and a number of leading Germans, including Hindenburg, had offered to stand trial in his place and 432,000 Germans petitioned the new Republic to "save the Kaiser."

Joachim, one of his seven sons, committed suicide in 1920 and William's wife, the former Kaiserin Augusta-Victoria, died on Apr. 11, 1921. To the indignation of many former subjects, he married Princess Hermine of Schonaich-Carolath (née of Reuss) Nov. 5, 1921. He gradually abandoned hope of his restoration. In October, 1926, the Prussian government settled 250,000 acres of land and 15,000,000 gold marks upon him in return for his confiscated property in Prussia. The failure of the Reichstag to renew the law for the defense of the Republic expiring June 27, 1929, left the way open for his return to Germany without sanction of the Government, but he did not avail himself of the opportunity.

Bibliography. William published *Comparative History, 1878–1914*, a defense of his reign (Eng. trans., 1921); *Ereignisse und Gestalten aus den Jahren 1878–1918* (1922); *Aus Meinem Leben 1859–1888*, memoirs (1927); and *Meine Vorfahren* (1929). The so-called "Willy-Nicky correspondence" between William and Czar Nicholas, brought to light by the Soviet government in 1917, was translated into French (1924) as *Correspondence entre Guillaume II et Nicholas II, 1894–1914*. Consult also *As We See It*, by René Viviani (Eng. trans., 1924); *Twelve Years at the Imperial German Court*, by Count Robert Zedlitz-Trütschler (Eng. trans., 1924); *Kaiser Wilhelm II*, by Emil Ludwig (1926); *Chronicles of the Prussian Court*, by Anne Topham (1926); *Schuld und Schicksal: Die Tragödie Wilhelms II*, by Josef Sonntag (1927); *Der Kaiser, das wahre Gesicht Wilhelms II*, by Edgar von Schmidt-Pauli (1928); and *Briefe 1882–1924 und Briefwechsel mit Kaiser Wilhelm II*, by Houston Steward Chamberlain (1928).

WILLIAM (FRIEDRICH WILHELM VICTOR AUGUST) (1882–). Ex-Crown Prince of Prussia and Germany (see VOL. XXIII). At the outbreak of the World War, he was put in command of the 5th Army on the west which won the battles of Longwy and Longuyon on Aug. 22 and 24, 1914. Later, he was nominally in charge of the unsuccessful operations against Verdun. In November, 1918, he followed his father to Holland and took refuge on the island of Wieringen in the Zuyder Zee. On Dec. 1, 1918, he formally renounced his rights of succession to the crowns of Prussia and the former German Empire.

WILLIAM (WILHELM), PRINCE OF SWEDEN AND DUKE OF SODERMANLAND (1884–). A Swedish writer and explorer, second son of King Gustavus V. His marriage to the Grand Duchess Maria Pavlovna of Russia (1908) was dissolved in 1914, leaving their son Prince Lennart with Prince William. He was a naval officer, and visited the United States (1907), India, Siam, Indo-China, and East Africa, and commanded a division of destroyers throughout the World War. It was then that he began to write, and he published his first book under the pseudonym L. Wica. At the close of the War, he resigned from the navy in order to pursue a literary career. He was dramatic critic for *Idun*, a Stockholm weekly, and traveled to Spitzbergen. Central America, and Central Africa to get material for his books. In 1927 he made a lecture tour in the United States, telling of the latter trip, on which he was supervising a collection for the Riksmuseum in Stockholm, and during which he nearly died of malaria. His writings include three volumes of poetry (1916–22); several collections of his short stories; the plays *Kinangozi* (1924), *Ombord* (*On Board*, 1926). and *The Other One* (1927); and the books based on his travels: *In the Lands of the Sun* (1915); *Between Two Continents* (1921); *Among Pygmies and Gorillas* (1923); *At the Water Holes*; *Wild African Animals I Have Known* (1923); and *Sydfranskt* (Provence) (1926).

WILLIAM AND MARY, COLLEGE OF. A coeducational State institution at Williamsburg, Va., founded in 1693. Student enrollment increased from 242 in 1916 to 1356 in 1928; the faculty from 21 to 70, in the same period; and the library from 15,000 to 60,000 volumes. In 1918 women were admitted to the college for the first time and a dormitory was built for them in 1921. A men's dormitory and a gymnasium were opened in 1925. Courses in commerce, accounting, and other business subjects were offered in 1919. The Kate Waller Barrett Dormitory for Girls, the William Barton Rogers Science Hall, and Old Dominion Hall for men were completed in 1927. President, Julian A. C. Chandler, LL.D.

WILLIAM JEWELL COLLEGE. A coeducational institution of higher learning at Liberty, Mo., founded in 1849. Student enrollment in the fall of 1928 was 420. Productive funds in the same year were $1,148,933.03 and income $136,439.96. Early in 1929, a gymnasium costing $150,000 was completed. President, John F. Herget, A.M.

WILLIAMS, ALFORD JOSEPH, JR. (1891–). An American naval aviator, who was born in New York City and educated at Fordham University (A. B., 1914) and the Georgetown Law School. He became an aviation student in 1917 and was commissioned ensign in the U. S. Naval Reserve Force in November, 1918. He entered active service in February, 1922, as test pilot at the Hampton Roads naval air base, with the rank of lieutenant, and in November, 1926, was transferred to the Bureau of Aëronautics at Washington, D. C. He established two world's speed records at the Pulitzer Air Races in St. Louis in 1923, where he won first place in the 100- and 200-kilometer races with a speed of 243.81 miles an hour and 243.67 miles an hour, respectively. Later, he established another record by flying 266.59 miles an hour for three kilometers. In 1929 he was selected to represent the United States in the Schneider Air Races held in England, but was forced to withdraw when preliminary tests of his plane was unsatisfactory.

WILLIAMS, CHARLES TURNER (1874–). An American banker and Red Cross official, born at Warrenton, N. C., and educated in the public schools. He worked as a stenographer, newspaper reporter, and railroad executive before entering the private banking business in Richmond, Va., in 1904. In 1910 he became interested in investment banking in Baltimore. During 1917–19 he was captain in the Red Cross Mission to Rumania. He crossed Siberia into Russia with a trainload of supplies, thence to Archangel, and carried the first supplies from the United States south to Rumania. In 1918 he was promoted to the rank of major and placed in charge of the American Red Cross Mission which took relief supplies to Archangel.

WILLIAMS, JESSE LYNCH (1871–1929). An American journalist, author, and playwright (see VOL. XXIII). He received the Litt. D. degree from Princeton in 1919 and in 1925–26 was holder of a fellowship in creative arts at the University of Michigan. His later works were the plays *And So They Were Married*, comedy (1915); *Why Marry?*, a new edition of the same play which won the Pulitzer Prize (1917); *Why Not?*, comedy (produced New York, 1922); *Lovely Lady*, comedy (produced Washington, 1925).

WILLIAMS, RALPH VAUGHAN (1872–). An English composer, born at Down Ampney in Wiltshire. He received his musical education at the Royal College of Music under H. Sharpe and

G. Moore (piano), W. Parratt (organ), and Hubert Parry and Charles Villiers Stanford (composition). In 1897–98 he was in Berlin with Max Bruch, and later, developing a strong leaning toward impressionism, he spent some time with Ravel in Paris. With the exception of a short period as organist at South Lambeth Church (1896–99) and as extension lecturer at Oxford University, he held no official position but devoted his entire time to composition until, in 1920, he became professor of composition at the Royal College of Music and conductor of the London Bach Choir, which latter post he resigned in 1928. He wrote for orchestra, *A London Symphony, Pastoral Symphony, The Solent, Bucolic Suite, Heroic Elegy, Norfolk Rhapsodies* (three), *Harnham Down*, and *Boldrewood*; and a suite, *Flos Campi*; a symphonic impression, *In the Fen Country*; *Concerto Accademico*, for violin and orchestra; *Fantasia*, for piano and orchestra; the choral works with orchestra, *Toward the Unknown Region, Willow-wood, A Sea Symphony, The Garden of Prosperpine, Five Mystical Songs*; incidental music to Aristophanes' *The Wasps* and Ben Johnson's *Pan's Anniversary*; a mass in G minor; two piano quintets; two string quartets; many part-songs and songs; the operas, *The Shepherds of the Delectable Mountain* (London, 1922) and *Hugh the Drover* (London, 1924; Washington, 1928); a ballet, *Old King Cole* (Cambridge, 1923).

WILLIAMS, Sidney Clark (1878–). An American editor and author, born at Wells, Me., and educated in the public schools and privately. For several years, he was on the staff of papers in Maine and in Boston. He was literary editor and dramatic critic of the *Boston Daily Advertiser* (1912–14), literary editor of the *Boston Herald* (1914–19), of the *Philadelphia North American* (1920–25), and the *Philadelphia Inquirer* (since 1925). He wrote *A Reluctant Adam* (1915); *The Eastern Window* (1918); *The Body in the Blue Room* (1922); *In the Tenth Moon* (1923); *Mystery in Red* (1925); *The Drury Club Case* (1927).

WILLIAMS COLLEGE. A nonsectarian institution for the higher education of men at Williamstown, Mass., founded in 1793. Student enrollment increased from 499 in 1914 to 807 in 1928; the faculty from 59 to 82 members, in the same period; the library from 78,000 to 125,000 volumes; and productive funds from $1,842,243 to $5,591,579.66. The Institute of Politics, which holds its meetings during the summer, was authorized by vote of the trustees of the college in 1913, but the members of the board of advisers were not chosen until 1919. Annual sessions have been held since 1921. See Politics, Institute of. A field house was built in 1926 and in that year, honors courses were introduced for juniors and seniors of good scholarship. A gymnasium and Lehmann Hall, a freshman dormitory, were opened in 1928. President, Harry A. Garfield, L.H.D., LL.D.

WILLINGDON, Freeman Freeman-Thomas, First Viscount (1866–). A British Governor General of Canada. He was a Liberal member of the British Parliament for Hastings (1900–06) and for the Bodmin Division of Cornwall (1906–10). He served as Junior Lord of the Treasury from 1905 to 1912, as Governor of Bombay (1913–19) and of Madras (1919–24). In 1924 he was delegate for India at the Assembly of the League of Nations. Since 1926 he has been Governor General of Canada.

WILLIS, Frank Bartlette (1871–1928). A United States Senator. He was born at Lewis Center, Ohio, and graduated from Ohio Northern University, where for twelve years he held the professorship of history and economics, serving also as a member of the Ohio House in 1901–04. In 1906, having studied law, he was admitted to the bar. He represented the Eighth Ohio District in the Sixty-second and Sixty-third Congresses (1911–15) as a Republican, and in 1914 was elected governor for the term ending 1917. In 1920 he was elected United States Senator to succeed Warren G. Harding, and was reëlected in 1926. He was noted as a political orator, having placed Mr. Harding in nomination for President at the Republican National Convention. He died suddenly when about to deliver a political address in Ohio. At the time of his death, he was chairman of the Senate Committee on Territories and Insular Possessions.

WILLIS, H(enry) Parker (1874–). An American economist (see Vol. XXIII). He was professor of banking at Columbia University (after 1917), editor-in-chief of the New York *Journal of Commerce* (since 1919), secretary (1914–18) and director of research (1918–22) of the Federal Reserve Board, Washington, D. C., president of the Philippine National Bank (1916–17), and chairman of the Banking Commission of the Irish Free State (1926–27). His later publications include *The Modern Trust Company*, with Kirkbride and Sterrett (1919); *Business and Banking*, with G. W. Edwards (1921); *The Federal Reserve System* (1923); and *Federal Reserve Banking Practice*, with W. H. Steiner (1925).

WILLOUGHBY, William Franklin (1867–). An American economist, born in Alexandria, Va., and educated at The Johns Hopkins University. He was treasurer of Porto Rico (1901–07), president of the executive council of the Porto Rican Legislative Assembly during 1907–09, and assistant director of the United States Census (1909–11). A member of the President's Commission on Economy and Efficiency (1911–12), he was then called to the chair of jurisprudence and politics at Princeton University, but resigned in 1916 to become director of the Institute for Government Research. In addition to many reports and special articles, he is the author of *Workingmen's Insurance* (1898); *Territories and Dependencies of the United States* (1905); *The Problem of a National Budget* (1918); *The Government of Modern States* (1919); *Government Organization in War Time and After* (1919); *Reorganization of the Administrative Branch of the National Government* (1923); *The National Budget System, with Suggestions for Its Improvement* (1927); and *The Legal Status and Functions of the General Accounting Office* (1927).

WILLSIE, Honoré (Mrs. William Morrow) (?–). An American editor and writer, born at Ottumwa, Iowa, and educated at the University of Wisconsin. She was editor of *The Delineator* in New York City from 1914 to 1919. Her novels portray Western life. *Heart of the Desert* (1913) was her first published novel, and won immediate recognition. Others were: *Still Jim* (1915); *Lydia of the Pines* (1916); *Benefits Forgot* (1917); *The Forbidden Trail* (1919); *The Enchanted Canyon* (1921); *Judith of the Godless Valley* (1922); *We Must March* (1925); *Forever Free* (1926); *The Father of Little Women* (1927); *Mary Todd Lincoln* (1928);

With Malice Toward None (1928); *The Splendor of God* (1929).

WILLY, Colette. See Colette.

WILMER, William Holland (1863–). An American physician and ophthalmologist, born in Powhatan County, Va., and educated at the Episcopal High School, Alexandria, Va., the University of Virginia, the New York Polyclinic, and in Europe. He spent his interneship at Mt. Sinai Hospital, New York, was an instructor in the New York Polyclinic, and then practiced in Washington, D. C. (1889–1925), meanwhile serving as professor of ophthalmology at Georgetown University (1906–25), and as surgeon to the Episcopal Eye, Ear, and Throat Hospital (1895–1925). In the latter year, he went to The Johns Hopkins University, becoming director of the Wilmer Ophthalmological Institute there, professor of ophthalmology and ophthalmologist in chief to The Johns Hopkins Hospital. A new building for the institute was dedicated in 1929. During the World War, Dr. Wilmer was surgeon in charge of the U. S. Army Medical Research Laboratories in France, with the rank of colonel, winning the D. S. M. for his services. Later, he became a brigadier general in the Medical Reserve Corps. He received an honorary Sc. D. degree from Princeton in 1926. He is a member and officer of numerous medical societies.

WILMINGTON. The largest city of Delaware. The population increased from 87,411 in 1910 to 110,168 in 1920, and to 128,500 in 1928, by estimate of the U. S. Bureau of the Census. The enactment of a zoning ordinance has provided districts for residences, office buildings, and factories, and defines the type of construction in each zone. During 1927 Wilmington experienced its greatest construction year, 1281 building permits, representing a value of $6,927,279, being issued. A reënforced concrete bridge was built in 1923 across Brandywine Creek was a memorial to the veterans of the World War. It is 720 feet long and 72 feet wide and is supported by three arches, the longest of which has a span of 250 feet. The same year, a new public library was erected at a cost of $535,224. In 1923 the city completed the construction on the Delaware and Christiana rivers of a deep-water terminal costing $3,410,000. It is fully equipped with loading and unloading facilities, railroad sidings, transit and storage sheds, and has berthing space for five average-sized vessels. It is the first unit of an extensive port-development plan. The Wilmington airport, Bellanca Field, which is located approximately 6 miles south of the city on the Delaware River, is on the New York-Atlantic air route. In 1925, 13,993 persons were employed by approximately 190 industrial establishments in Wilmington and received $17,926,025 in wages; the value of products manufactured was $81,705,752. The clearings of 16 banks in 1928 amounted to $222,311,141; the assets of 16 building and loan associations were $6,310,537. The assessed valuation of property in 1928 was $136,050,650; the net debt in 1927 was $10,455,201.

WILMOTTE, Maurice (1861–). A Belgian professor of philology at Liége University, born in Brussels. He was a member of the Royal Academy of Brussels. His works include *La Belgique morale et politique* (1902); *Études Critiques sur la Tradition littéraire en France* (1909); *La Culture française en Belgique* (1912).

WILSON, Charles Stetson (1875–). An American diplomat, born at Bangor, Me. He began his diplomatic career as secretary of legation in Greece, Rumania, and Serbia in 1901. After serving in the legations in many capitals, among them Buenos Aires, Rome, and Havana, he was secretary of the Embassy at Madrid (1916–18), and later counselor there and chargé d'affaires at Sofia in Bulgaria (1918–21). He was named Minister to Bulgaria in October, 1921. In 1928 he was transferred to Rumania.

WILSON, Charles Thomson Rees (1869–). A British physicist. He was born at Glencorse, Midlothian, and educated at Owens College, Manchester, Sidney Sussex College, and Cambridge. Since 1895 he has been engaged in research on condensation of nuclei of ions and atmospheric electricity. He has been Jacksonian professor of natural philosophy at Cambridge since 1925. In 1927 he shared with Professor Arthur H. Compton, of the University of Chicago, the Nobel Prize in physics, awarded for his method of observation of electric particles.

WILSON, Edwin Bidwell (1879–). An American mathematician, born in Hartford, Conn., and educated at Harvard and Yale universities, and in Paris. He became instructor in mathematics at Yale in 1900 and assistant professor in 1906; a year later he accepted a call to the Massachusetts Institute of Technology, where he was professor of mathematical physics and head of the department of physics during 1917–22. Since 1922 he has been professor of vital statistics at the Harvard School of Public Health. He was president of the American Academy of Arts and Sciences (1927), and editor of the *Proceedings of the National Academy of Sciences* (since 1915). His original investigations include studies of vector analysis, multiple algebra, geometry, mechanics, and relativity. His publications include *Gibbs' Vector Analysis* (1910); *Advanced Calculus* (1912); and *Aëronautics*, Lowell Lectures (1920).

WILSON, Sir Henry Hughes, First Baronet (1864–1922). A British field marshal, born in Ireland. He joined the army in 1884 and served in Burma and South Africa. Promoted to the rank of colonel in 1904, he later became commandant of the staff college. In 1910 he was appointed director of military operations and in 1914, deputy chief of the general staff and liaison officer between the French and British forces. He commanded the 4th Army Corps in 1915, went to Russia on the Milner mission in 1917, and later served as British military representative on the new Supreme War Council. In February, 1918, he became chief of the Imperial General Staff, and in 1919, a field marshal and baronet. He resigned from the War Office in 1921 and was elected a member of the Irish Parliament in Ulster the next year. Shortly afterward, he was assassinated by two men who were connected with the Sinn Fein Army.

WILSON, Hugh Robert (1885–). An American diplomat, who was born at Evanston, Ill., and graduated from Yale. He later studied at the École Libre des Sciences Politiques, Paris. He was private secretary to the American Minister to Portugal in 1911 and Secretary of Legation at Guatemala in the following year. After serving in legations and embassies at Buenos Aires, Berlin, Vienna, Berne, and Tokyo, and at Washington, D. C., he became chief of the Division of Current Information, State Department (1924–27). Since April, 1927, he has been Minister to Switzerland. He served as secretary of the Conference for the Limitation of Naval Armaments at Geneva in 1927. He also acted as American representative to the Geneva conferences (1927) on communications and transit and for abolition of import and export prohibitions and restrictions.

WILSON, James Thomas (1861–). A British anatomist, born at Moniaive, Dumfriesshire, Scotland. He was graduated from Edinburgh University in 1883 and soon afterward was made demonstrator of anatomy. He was called to the University of Sydney, N. S. W., Australia, in 1890, remaining until 1920, when he was made professor of anatomy at the University of Cambridge. In 1924 he was chosen president of the Anatomical Society of Great Britain and Ireland. He is the author of many papers on human and comparative anatomy and embryology.

WILSON, Samuel Alexander Kinnier (?–). A British physician and neurologist, born in New Jersey, U. S. A., where his father, an Irish clergyman, was temporarily located. He was educated at the University of Edinburgh (M.D., 1911) and afterward studied at Leipzig and Paris. He specialized in neurology in London and became associated with several clinics. Through brain studies, he succeeded in isolating a new disease or syndrome, technically called degeneration of the lenticular nucleus, but more familiarly known as "Wilson's disease." He translated into English Meige and Feindel's monograph, *Les tics*, and is editor of the *Journal of Neurology and Psychopathology.* In 1926 appeared his monograph on aphasia.

WILSON, (Thomas) Woodrow (1856–1924). The twenty-eighth President of the United States (see Vol. XXIII). The first two years of President Wilson's administration were marked by noteworthy achievements; the reduction of the tariff, the establishment of the Federal Reserve Bank System (1913), the Clayton Anti-trust Act and the Federal Trade Commission (1914) were in large part due to his personal leadership of the Democratic Party. The "new freedom" of domestic policy was marked by the keynotes of democracy and justice in foreign affairs. He withdrew from the Chinese financial consortium, deprecated economic imperialism and territorial aggrandizement in Latin America, tried to make amends to Colombia for the Panama Canal seizure, and pursued his course of "watchful waiting" with respect to Mexico, intervening only reluctantly when popular opinion demanded bold action to satisfy the national honor. The outbreak of the World War elicited from him an appeal to his fellow-countrymen to "be impartial in thought as well as in action." From the beginning, he believed it would be the mission of the United States to step forward, at the proper moment, as disinterested peacemaker. At times, this hope was imperiled; the *Lusitania* and *Sussex* notes brought the United States to the verge of a break with Germany; but he could go to the country, in the election of 1916, on the issue that "he kept us out of war," and his reëlection in November, 1916, by a popular plurality of nearly 600,000, seemed to express the nation's approval of his course.

The events of 1917 clearly indicated that the lot of the United States could not remain that of a disinterested spectator. Germany's announced policy of unrestricted submarine warfare, the failure of her leaders to realize that President Wilson's severance of diplomatic relations threatened war, the continuance of submarine outrages, compelled him to ask Congress on Apr. 2, 1917, for a war declaration. Only then did he give full utterance to his belief that German autocracy must be crushed and the world "made safe for democracy." The war was prosecuted to the fullest extent of American resources.

The United States under President Wilson gained a material leadership first and then a spiritual one. Wilson's historic "Fourteen Points" speech of Jan. 8, 1918, and his address of Sept. 27, 1918, promising justice even to "those to whom we do not wish to be just," won him so commanding a position as spokesman of the Allies that to him Germany's peace overtures were directed. The calling of the Peace Conference found him ready to attend in person, and the extraordinary enthusiasm with which the peoples of Europe greeted him, as the prophet of justice and the hope of the world, convinced him of the wisdom of his decision. The story of his courageous fight for a just peace and the League of Nations, of his departure for the United States in February, 1919, with the draft of the Covenant, of his return to Paris in March, his conflicts with the Italians regarding Fiume, with the French concerning the Rhine, and with the Japanese regarding Shantung, and his voyage home at the end of June with the completed Peace Treaty is told in the article Peace Conference and Treaties. The making of the peace had estranged him from Colonel House and Secretary Lansing; the opposition of the Republican Senate to the Treaty strengthened his resolve to make plain to the country the nature of his achievement. On Sept. 3, 1919, he began his coast-to-coast tour, but the great strain placed on him compelled him to retire to Washington, a very sick man. The disappointment of the rejection of the treaty by the Senate in March, 1920, was tempered for him somewhat by knowledge of the instrument's ratification by the European Powers and the establishment of the League itself in January, 1920. The last blow showed him how unsympathetic public opinion was: the presidential elections of November, 1920, to which he had looked for a "solemn referendum" on the League, gave an overwhelming majority to the Republican candidate, Warren G. Harding, who opposed the League.

On Mar. 4, 1921, he retired to private life and continued his residence in Washington. He lived to see the League of Nations firmly established, and he continued to deplore America's "sullen and selfish isolation" (speech of Nov. 11, 1923). He died on Jan. 30, 1924. See World War, Diplomacy of the; United States, *History;* Peace Conferences and Treaties. Consult *Life of Woodrow Wilson,* by William Allen White (1924); *Woodrow Wilson and World Settlement,* by Ray Stannard Baker (3 vols., 1922); *The Public Papers of Woodrow Wilson,* edited by Ray Stannard Baker and William E. Dodd (6 vols., 1925–26).

WILSON DAM. See Dams.

WINDAUS, Adolf (1876–). A German chemist, winner of the Nobel Prize for chemistry in 1928. A professor of chemistry at the University of Göttingen and head of the Chemical Institute in that city, he received the Nobel Prize for his successful repetition of experiments proving that ultra-violet light confers anti-rachitic properties on ergosterol. He is a member of the German Academy of Natural Sciences.

WINDS. See Meteorology.

WINDWARD ISLANDS. A group of islands in the British West Indies, consisting of Grenada, St. Vincent, the Grenadines (half under St. Vincent and half under Grenada), and

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WOODROW WILSON

St. Lucia. These constitute three separate colonies but are administered by a single governor. Total area, 524 square miles; total population in 1911, 157,264; in 1927, 178,459 (estimated). The leading products are cocoa, lime juice, sugar, rum, cotton, nutmegs, mace. Commercial and financial statistics for 1927 follow (1913 figures in parentheses): imports, £816,549 (£694,219); exports, £865,950 (£756,809); revenue, £294,468 (£193,121); expenditure, £277,196 (£192,353); public debt, £476,711.

WINNIPEG. The capital of the Province of Manitoba and the fourth city in size in Canada. The area is 15,961 acres and the population which in 1921 was 179,087, in 1928 was estimated to be 202,377. In 1918 the Board of Control, or executive body of the city government, was abolished as a result of a popular referendum. In 1920 the Winnipeg Charter was amended, reducing the number of wards into which the city was divided from 7 to 3 and increasing the number of aldermen from 14 to 18, three aldermen being elected annually from each ward for a period of two years. Since that year, the city government has been vested in the mayor and aldermen who constitute the City Council. The council as a whole is the legislative body and carries on its executive work through standing committees. On July 15, 1920, the Parliament Buildings of the Manitoba Legislature were officially opened, the occasion being the fiftieth anniversary of Manitoba's entry into the confederation. Winnipeg supplies through its municipal hydroelectric system, which was inaugurated in 1905, the cheapest electric power of any city in North America. In 1919 the city opened a notable water-supply system by which 100,000,000 gallons of soft water could be delivered daily to the city from Shoal Lake, 96 miles distant. The cost of this construction was more than $15,000,000. The city also owns and operates its central steam-heating system, street-lighting system, stone quarry, and asphalt plant. Winnipeg is the railroad centre of western Canada, 27 main and branch railways radiating from it. Its stock yards are the largest in Canada, representing an investment of more than $1,000,000 and covering some 200 acres of land. In Greater Winnipeg, including the city of St. Boniface, there are more than 600 industrial establishments whose output is more than $100,000,000 annually. The pay roll of these industries exceeds $23,000,000 annually. Winnipeg stands third among Canadian cities in point of bank clearings, which in 1928 amounted to $3,443,151,986. In 1928, 2652 building permits, representing a value of $10,547,400, were issued. The assessed valuation of property in 1928 was $229,748,400; the net general debt was $4,275,841.

WINTER, Georg (1856–). A German gynæcologist and obstetrician, distinguished for his efforts in the prevention of cancer. Born in Rostock, he received his medical education at the University of Heidelberg, and in 1897 was made professor of obstetrics and diseases of women in the University of Königsberg and director of the clinic for women. In 1896, in collaboration with Rüge, he published his important work, *Lehrbuch der Gynäkologische Diagnostik*, which was translated into Russian and English. His small work, *Die Bekämpfung des Uteruskrebs*, appeared in 1904. His prolonged study of the subject of falling birth rates led to the publication of two companion books, *Die Indikationen zur Künstlichen Unterbrechung der Schwangerschaft* (1918) and *Die Indikationen zur Künstlichen Sterlisation der Frau* (1920). In 1922 a *Festschrift* volume was published and in 1927 he published *Lehrbuch der operativer Geburtshilfe.*

WINTER GRIPPE. See Influenza.

WIRELESS TELEGRAPHY. See Radio Telegraphy.

WIRELESS TELEPHONY. See Radio Telephony.

WIRTH, Karl Joseph (1879–). A German public official, born in Baden and educated at the University of Freiburg. He became a teacher of economics at the Technical College in Freiburg in 1908. As a member of the Catholic Centre Party, he was elected to the Diet of Baden in 1913 and was Minister of Finance, 1918–20. He was elected to the Constituent Assembly by the Reich at Weimar in 1919 and received the portfolio of Finance in March, 1920. When the ultimatum on reparations was presented by the Allies in May, 1921, Dr. Wirth was asked to form a new cabinet. He secured the coöperation of Democrats, Catholics, and Socialists. The new ministry then accepted the Allies' reparation terms, and by Aug. 31, 1921, the first half-yearly installment had been paid. Dr. Wirth stood his ground solidly against various attempts to overturn the German Republic, but did not conceal his fear that the partition of Upper Silesia would render it impossible for Germany to fulfill her obligations. He resigned as chancellor in 1922 and has since been a leading member of the Reichstag.

WISCONSIN. The twenty-fifth State in size (56,066 square miles) and the thirteenth in population; capital, Madison. The population was 2,333,860 in 1910 and 2,632,067 in 1920, an increase of 12.8 per cent; estimated population, 1928, 2,933,000. The white population increased from 2,320,555 (1910) to 2,616,938 (1920); Negro, from 2900 to 5201; native white, from 1,807,986 to 2,156,810. The foreign-born white population decreased from 512,569 to 460,128. Both urban and rural populations mounted, the former from 1,004,320 to 1,244,568; the latter from 1,329,540 to 1,387,499. The growth of the principal cities was as follows: Milwaukee (q.v.), 1910, 373,857, 1920, 457,147; Racine, 38,002 to 58.593; Kenosha, 21,371 to 40,472. Superior's population decreased; in 1910 it was 40,384; in 1920, 39,671.

Agriculture. As Wisconsin is one of the important grain-growing States, agricultural conditions have been materially affected by the general agricultural situation during the War and in the post-war period. The general situation is discussed fully under Agriculture and in the articles on various grains, Wheat, Corn, and others. The number of farms increased 6.9 per cent, or from 177,127 in 1910 to 189,295 in 1920, and rose further to 193,155 in 1925; the total area of land in farms increased from 21,060,066 in 1910 to 22,148,223 acres in 1920, but fell thereafter to 21,850,843 in 1925. The improved land in farms totaled 12,452,216 acres in 1920. The percentage of the total area in farms in 1925 was 61.8. The total value of farm property rose 89.5 per cent, or from $1,413,118,785 in 1910 to $2,677,282,997 in 1920, falling thereafter to $2,272,402,472 in 1925; the average value per farm was $7978 in 1910, $14,143 in 1920, and $11,765 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 162,052 were operated by owners; 1167, by managers; and 29,936, by tenants. The comparthere. He was a member of the Royal Flemish Academy. His first noteworthy poem, *Chromos*, published when he was sixteen years old, attracted immediate attention. Before he was twenty, he had published other volumes of poetry, in English translation, *The Father's House*; *The Orchard of Birds and Fruits*; *The Golden Shadow*; *Interludes* (1912); *The Man of Mody*; *Substrata*; and *Backwards Sun*. His prose works include several books of essays and criticism, a study of primitive Flemish painters, and the novels, *Janus Bifrons, The Continual Presence, Divine Images* and an epistolatory novel written in collaboration with Herman Teirlinck.

WOJIECHOWSKI, Stanislas (1869–). A President of Poland. Exiled as a young man for protesting against Russian oppression, he went to Geneva, Paris, and London, and when he returned to Poland in 1904, definitely broke with international socialism and threw all his efforts into the coöperative movement. When the World War began, he urged a united stand against Germany. Driven from Warsaw by the Austro-German invasion, he helped form the Polish Legion in France, and in 1919 he returned to Poland and was made Foreign Minister under Paderewski. He was President of Poland from Dec. 20, 1922, until Pilsudski's *coup d'état* of May, 1926, when he resigned his office and retired from Warsaw.

WOLFE, Humbert (1885–). A British poet, who was educated at Bradford Grammar School and Wadham College, Oxford. He served as principal assistant secretary to the Ministry of Labor and substitute British government member of the governing board of the International Labor Office. In 1918 he was made a Commander of the Order of the British Empire and in 1925, a Companion of the Bath. His poems included *London Sonnets*; *Circular Saws* (1923); *The Unknown Goddess* (1925); *Humoresque, News of the Devil* (1926); *Requiem, Lampoons,* and *Kensington Gardens* (1927); and *Cursory Rhymes* and *Dialogues and Monologues* (1928). He edited the *Augustan Books of English Poetry*, 2d series (since 1927) and wrote *Labour Supply and Regulation*, published by the Carnegie Endowment for International Peace (1923).

WOLFF, vôlf, Albert (1884–). A French conductor and composer, born at Paris. In 1898 he entered the Conservatoire, where his teachers were Leroux, Vidal, and Gédalge. He began his career as organist at St. Thomas d'Aquin (1907–11). In 1911 he was appointed second conductor at the Opéra Comique and of the Concerts Rouges and, in the following year, also conducted the orchestra of the Cercle International at Vichy. Until the outbreak of the World War, he appeared as guest-conductor in several cities of France and in Buenos Aires. During the War, he served in the French Army. After the Armistice, he returned to his post at the Opéra Comique. From 1919 to 1923, he was conductor of the French repertoire at the Metropolitan Opera House from which he resigned because of the demands made on his time by his duties at the Opéra Comique, where, in 1920, he had been appointed Messager's successor as first conductor and general musical director. In 1924 he resigned and accepted a similar position at the Théâtre des Champs Élysées, but returned the following year to the Opéra Comique. In 1928 he succeeded Paray as conductor of the Lamoureaux Orchestra. He wrote the operas, *Le Marchand de Masques* (Nice, 1904), *L'Oiseau Bleu* (New York, 1919), and *Sœur Béatrice* (not produced); a ballet, *Kilidja*; a symphonic poem; and a violin sonata.

WOMAN SUFFRAGE. In almost no other movement was the influence of the War so decisively effective as in the struggle for woman suffrage. There was a striking advance between 1914, when the political franchise was exercised by women in only four countries, and 1918, when full suffrage had been granted them in Austria, Canada, Czechoslovakia, Denmark, Finland, Germany, Holland, Hungary, Iceland, Ireland, Norway, Poland, Serbia, Sweden, and the United Kingdom. In general, the new countries created by the War incorporated woman suffrage in their constitutions, as in Palestine and the Ukraine, and the Baltic states. In the Covenant of the League of Nations, there was a clause making women eligible for all appointments under it.

In 1924 Spain granted the municipal franchise and eligibility to single women, widows, and female heads of families over 23. In 1928 Great Britain finally extended the franchise to all women 21 years and over. By 1928, in addition to the countries listed above, women had the full franchise in Australia, New Zealand, Russia, the United States, and Great Britain. In 41 other countries, women had a limited franchise and went to the polls. The fact is, on the Continent of Europe, only in France and Switzerland were the women denied some form of the franchise. During the second half of the period under survey, the woman's movement shifted its emphasis from merely political equality to complete legal equality between the sexes. Women's organizations, however, were not united in their aims. With the gaining of the franchise, in most countries a schism developed in which the right wing took up the support of a social reform programme in which peace was the outstanding objective; the left wing, on the other hand, concentrated its efforts entirely on the single goal of equality.

In the United States, the aims of the left wing have been militantly advocated by the National Women's Party which has sought the passage of a constitutional amendment giving women complete equality free of every "distinction, restriction, prohibition, or permission" based upon sex. Unfortunately, the party has become identified in the public eye with an effort to eliminate from the statute books all legislation giving women in industry special protection, and for this reason it has been the target of much effective criticism. It was pointed out in 1928 by the Federal Women's Bureau that the chief argument of the National Women's Party is not true, viz., that as a result of protective legislation women are discriminated against by employers. (See Women in Industry.) On the other hand, the National League of Women Voters has found a secure place for itself in the political life of the country by studying and advocating programmes of social reform. The organization in 1929 had branches in 44 States and in three-fourths of the congressional districts. The six standing committees of the league indicate the catholic character of its interests: legal status of women, child welfare, women in industry, education, living costs, social hygiene.

United States. Although presumably the first expression of the desire of women for the franchise was made in the United States, the country was among the last to grant woman suffrage, in 1920, after 70 years' agitation. The campaign for the ballot for women had latterly been carried on along two lines: one aiming to secure State action, the other to put through a Federal amendment. By 1914 full suffrage had been granted by 12 States and Territories: Wyoming, 1869; Colorado, 1893; Utah and Idaho, 1896; Washington, 1910; California, 1911; Arizona, Kansas, and Oregon, 1912; Alaska, 1913; Montana and Nevada, 1914. In 1915, it was estimated that about 4,000,000 women in the United States were eligible to vote. By 1920, at the time the Federal amendment passed, full suffrage had already been won in 15 States (New York, 1917; Michigan, Oklahoma, and South Dakota, 1918), presidential suffrage in 13, the vote in primary elections in 2, and muni ipal suffrage in a few others. The effort to secure Federal action had met with less encouragement. In 1913 a National woman-suffrage-amendment resolution was defeated on the ground that the question was a State, not a National, issue. This was followed by mass meetings and parades in protest, petitions to Congress, delegations to the President, and a nation-wide demonstration. The movement made evident progress in the next yew years. Whereas, in 1912 Roosevelt had been the first important presidential candidate to support it, by 1916 all the presidential candidates had declared for woman suffrage, although the Democratic Party did not favor Federal action in the matter. In 1918 the same Federal amendment which, in substance, had been 12 times before Congress since 1878 and four times since 1913, came within two votes of passage by the Senate; but even President Wilson's plea for it as a war measure could not bring about the necessary two-thirds' vote. In 1919, however, its passage was finally achieved; by Mar. 22, 1920, 35 States had ratified; and the amendment, now being hastened by both Republican and Democratic parties, came into force, with the ratification of Tennessee in August, in time for women to take part in the presidential election of that fall.

It was not possible to measure the results of this extension of the franchise. As a rule, the proportion of eligible women who voted was smaller than that of the eligible men. The women's vote was recognized as an active menace to vice and the liquor interests; it was given credit in large measure for such achievements as the passage of the Federal act giving equal rights of citizenship to married women; it was credited with having rallied to the support of the Eighteenth Amendment and having aided in the election of Herbert Hoover in the presidential campaign of 1928; and its influence was felt in the increasing volume of welfare legislation throughout the States.

By the end of 1928, the presence of women in politics was no novelty. Important places were reserved for them in the counsels of both the major parties; a woman was one of the chief strategists of the Smith campaign; a woman held the office of Assistant Attorney General in the Coolidge administration; in 1928, four women were elected to the Lower House of the National Congress. During 1927 there were 122 women legislators in 34 States and senators in 11 States. Women, as women, however, accounted for no distinct change in the complexion of our political life; they accepted party loyalties as faithfully as did the men, found no difficulty in fitting into the system of "boss" government characteristic of all the cities, and showed, too, that they were not beyond fraud and corruption while in office. (In 1928, for example, a New York State jury found the former woman Secretary of State Mrs. Florence E. Knapp, guilty of corruption in connection with the administration of the State census.) In other words, the enfranchisement of women seemed to indicate that the only real result was a doubling of the number of persons eligible to vote.

Other Countries. In England, after the succession of the unsympathetic Premier Asquith in 1908, sensational violence and vandalism had been resorted to by the militant wing of the woman-suffrage movement, in an effort to overcome public apathy. Atfer 1913 the nonmilitant suffragists had thrown their influence solidly to the sympathetic Labor Party, in the endeavors to undermine the Asquith government. Between the two forces, the woman-suffrage issue had achieved great prominence. On the outbreak of the War, however, all obstructionist tactics were immediately forsworn by the women of both followings, in favor of prompt and full coöperation with the Government. This action and the part that women subsequently played in both administration and industry, during the emergency, quickly converted even those most hostile to the cause of political equality. It was not, however, until 1918 that the Representation of People Act was passed; and then, in order to preserve a majority of male voters, the franchise was granted only to women at least 30 years of age. Some acceleration in welfare legislation became evident thereafter and, through the Women's Freedom League, efforts were pledged to gain certain legal equalities; but, in the 10 years following, the main emphasis continued to be upon the extension of the franchise to all women 21 years and over.

The Ramsay Macdonald Labor government pledged its support to the extension, but was unseated before it could introduce a franchise measure. The Conservative government under Stanley Baldwin resisted all efforts of the National Suffrage Association until 1927, then finally, on April 13, the Premier announced that his Government at the next session of Parliament would introduce a bill to give the vote to all women 21 years and over on the same terms as those possessed by men. On Mar. 29, 1928, by a vote of 387 to 10, the House of Commons passed the Women's Franchise Bill through its second reading and in this fashion gave its approval for the enfranchisement of approximately 5,000,000 women. By its passage, 14,500,000 women could vote in Great Britain, thus outnumbering the male voters by approximately two millions.

In Canada, where there had already been some extension of the privilege, except in Quebec, and full suffrage in the three prairie provinces from 1916, the Dominion government granted the full franchise in 1917 to women who had near relatives at the front; then, in 1918, to all women who had reached the age of 21. In Australia, where full parliamentary suffrage was granted by the Federal government in 1902, there were 1,100,000 women voters in 1916; but although eligible to both Federal Houses, women were entitled to sit in the state Houses of only South Australia and Queensland. In New Zealand, where full suffrage dated from 1893, about 300,000 women possessed the ballot in 1916 and used it in nearly the same relative proportion as men; they were eligible to all offices except seats in Parliament.

Finland, the first division in Europe to grant actual full political enfranchisement to women (1906), had 24 women in its Diet in 1917. Norway established full suffrage and eligibility in 1913. Iceland in 1914 granted the suffrage to women 40 years of age and over; in 1924 suffrage was universal at 25 years. The limited woman's franchise in Denmark was extended in 1915 to equal suffrage. The women of Holland, enfranchised in 1919 and voting for the first time in 1922, sent seven women to the Parliament of 100 members. After the provisional Government established in Germany in 1918 granted universal suffrage at the age of 20 years, 40 women were elected to the National Assembly, which incorporated adult suffrage in the new constitution. In Italy, a suffrage bill passed the Chamber of Deputies in 1923 but was opposed by Mussolini, who, however, approved a bill granting women municipal suffrage. With the defeat of a woman-suffrage bill in the Senate in 1922, the issue was shelved in France.

WOMEN IN INDUSTRY. The twentieth century has seen a revolution taking place with respect to the entrance of women into industry. In the United States in 1870, of all gainfully employed workers 16 years and over, women made up only 14 per cent (1,645,188 out of 11,766,759). In 1880 the proportion of women was 14.5 per cent (2,353,988 out of 16,273,743). In 1890 the proportion of women in industry was 16.5 per cent (3,596,615 out of 21,814,412). In 1900 the proportion was 17.7 per cent (4,833,630 out of 27,323,055). In 1910 the proportion was 20.6 per cent (7,438,686 out of 36,177,111). In 1920 the proportion was 20.2 per cent (8,202,901 out of 40,553,390). The careful researches of Joseph A. Hill in the U. S. Census Monograph *Women in Gainful Occupations, 1870 to 1920*, have shown that out of the 34,241,749 women in the country 16 years of age and over in 1920, fully 24 per cent were engaged in gainful occupations. Of the rest, 65.7 per cent were housekeepers without gainful occupations, 4.2 per cent were attending schools or colleges, and 6.1 per cent were in all other groups. While this was the distribution for the whole country, in the large cities a greater proportion of the women 16 years and over was gainfully employed. In most cities of over 100,000 population, the proportion was usually in the neighborhood of one-third. In New York, the percentage of women in gainful occupations was 34.2 per cent; in Chicago, it was 32.3 per cent; in Philadelphia, 32.2 per cent; in St. Louis, 33.0 per cent; in Baltimore, 33.5 per cent; in San Francisco, 33.2 per cent; in Boston, 37.2 per cent. In the mill towns of New England, the percentages were high. In Fall River, for example, the proportion was 45.7 per cent and in New Bedford it was 46.1 per cent. Among the various racial and nativity groups, there were to be found marked differences. Of the native white women of native parentage, the proportion was 20 per cent gainfully employed; of the group one or both of whose parents were foreign born, the proportion was 29.2 per cent; of the white immigrant group, the proportion was 18.8 per cent; among Negro women, 43.7 per cent.

The census of 1910 recorded 7,438,686 women, 16 years of age and over, out of the total of 29,188,575 in these groups as being gainfully employed, or 25.6 per cent. In the 1920 census, the figure was 8,202,901 out of 34,241,749, or 24 per cent. This would apparently show a decline. It is, however, to be explained by the fact that the change of the time of enumeration from the spring to the winter and the change in the instructions given to the enumerators resulted in a marked falling off in the number of women engaged in agriculture. Thus, in 1910, 1,397,324 women were reported to be in agriculture, or 4.8 per cent of the total. In 1920 the number was 896,057, or 2.6 per cent. In other words, the proportion of women in nonagricultural pursuits rose somewhat over the period 1910–20. In 1910, there were 6.041,362 (20.7 per cent) women working in industry; in 1920 the number was 7,306,844 (21.3 per cent). There were other factors affecting the situation. Mr. Hill, in the monograph above cited, shows that with the stoppage of immigration following the war, the American population became an older group and therefore the number of younger women in industry was smaller than in the previous decade. Another important change over the period 1910–20 was the decline in the number of women employed in five important occupations, viz., servants, dressmakers and seamstresses, (not in factories), laundresses (not in laundries), milliners and millinery dealers, boarding- and lodging-house keepers. The total number of women engaged in these five occupations decreased from 2,458,737 in 1910 to 1,785,036 in 1920. Thus, if the figures are corrected further, we find these significant conclusions: "The percentage of women employed in nonagricultural pursuits exclusive of the five occupations above mentioned increased from 12.3 per cent in 1910 to 16.1 per cent in 1920. . . . The conclusion seems to be justified that, if agricultural pursuits (for which the census figures are misleading) and the five occupations (from which women are apparently turning away) are left out of account, the movement of women into other gainful occupations—commercial, clerical, industrial, and professional—underwent no check or retardation in the last decade. On the contrary, when due allowance is made for the changes noted in age composition, it seems probable that the increase in the tendency for women to engage in gainful occupations, outside of those above excluded, was greater between 1920 and 1910 than in the preceding decade." (Hill.)

It must be understood that the place of women in industry, because of its comparatively recent development, has not reached a position of equilibrium. To a large extent, women are restricted by their education, training, abilities, opportunities, and, sometimes, by temporary conditions as in the case of the use of women in war-time activities. The War, for a time, served to draw women into work in unusual numbers and often in unusual capacities. Whether it was the War, or the mechanization of industry, or the higher standards of living that introduced more and more women into certain types of industry, the fact remains that over the decade 1910–20 there were great changes in the types of employment women were going into. The nonagricultural occupations to show the greatest numerical increases were the following: clerks (except clerks in stores) from 119,385 to 463,570, an increase of 288.3 per cent; semiskilled operatives, manufacturing, from 955,423 to 1,274,719, an increase of 33.4 per cent; stenographers and typists, from 261,202 to 559,748, an increase of 114.3 per cent; bookkeepers, cashiers, and accountants, from 185,299 to 356,603, an increase of 92.4 per cent; saleswomen and clerks in stores, from 350,723 to 514,056, an increase of 46.6 per cent; school teachers, from 476,661 to 635,207, and increase of 33.3 per cent; telephone operators, from 86,081 to 175,469, an increase of 103.8 per cent; laborers in manufacturing, from 80,048 to 160,133, an increase of 100 per cent; trained nurses, from 76,481 to 143,664, an increase of 87.8 per cent; waitresses, from 83,597 to 114,718, an increase of 37.2 per cent.

Other interesting increases were to be found in the following pursuits: religious, charity, and welfare workers, from 8877 to 26,927, an increase of 203.3 per cent; college presidents and professors, from 2958 to 10,075, an increase of 240.6 per cent; manufacturers and officials in manufacturing, from 6161 to 13,276, an increase of 115.5 per cent. The outstanding decrease over the decade was the falling off of the number of women working as servants. In 1910 there were 1,234,758 women working in this pursuit; in 1920 the number had declined to 981,557, a decrease of 20.5 per cent. In addition to the other four occupations cited above in which decreases were to be found, the following pursuits showed losses, charwomen and cleaners, compositors and type-setters, and musicians and teachers of music.

It is of interest to note the great increase of women in professional activities. The percentage of teachers increased, for example, from 5.8 per cent of all the women workers in nonagricultural pursuits in 1870 to 8.7 per cent in 1920. Taking females 10 years of age and over in nonagricultural pursuits, the following proportions were to be found in the professions over the period 1870–1920: 1870, 6.4 per cent; 1880, 8.5 per cent; 1890, 9.5 per cent; 1900, 10.0 per cent; 1910, 11.6 per cent; 1920, 13.3 per cent. The following figures show the number of women in the principal professions for 1870, 1910 and 1920: actresses, 692, 11,992, 13,237; architects, designers, inventors, 14, 3,130, 7,340; artists, etc., 412, 15,429, 14,617; clergymen, 67, 9,574, 28,714; dentists, 24, 1,254, 1,829; editors and reporters, 35, 4,181, 5,730; lawyers, 5, 1,343, 3,221; literary and scientific persons; 159, 13,521, 25,205; musicians and teachers of music, 5,753, 84,478, 72,678; photographers, 228, 4,964, 7,119; physicians, surgeons, etc., 527, 13,687, 16,784; teachers and professors in college, etc., 84,047, 484,115, 652,500.

Within the manufacturing and mechanical industries, increases of more than 10,000 women since 1910 were found among semi-skilled operatives in the food, iron and steel, and clothing industries, in silk and knitting mills, and in electrical supply, shoe, cigar, and tobacco factories; among laborers in cotton mills; and among forewomen and overseers in manufacturing. The changes in the rate of increase or decrease for the two sexes were entirely disproportionate, and in far the greater number of cases the women took the lead in the rate of increase. It was significant that while women operatives in automobile factories increased 1408 per cent (from 848 in 1910 to 12,788 in 1920), the largest percentage increase for women in any one industry, men operatives in automobile factories increased only 435.4 per cent, from 20,243 in 1910 to 108,376 in 1920. Although the number of married women, 16 years of age and over, at work, rose from 1,890,661 in 1910 to 1,920,281 in 1920, this group constituted in the latter year only 9 per cent of total number of women and 23 per cent of the number of women in this age group at work, as compared with 10.7 per cent and 24.7 per cent, respectively, in 1910.

If we eliminate the women in agricultural pursuits, we get a slightly different result. The fact is, the percentage of married women who were employed in nonagricultural activities increased from 3.3 per cent in 1890, to 3.9 per cent in 1900, 6.8 per cent in 1910, and 7.3 per cent in 1920. The proportions of married women to total women in nonagricultural pursuits increased over the same period as follows: in 1890, 12.1 per cent of all the women at work in nonagricultural pursuits were married women; in 1900 the proportion was 13.3 per cent; in 1910, it was 19.8 per cent; in 1920, it was 21.2 per cent.

These census figures show the following: that from two-thirds to three-fourths of the total number of married women at work are following a gainful occupation that takes them away from their homes and their families. Similarly, they are going into the factories, stores and offices in increasing numbers and away from domestic activities. A special effort was made to show the family relationship of working women in a group of cities. Of the total of 373,204 women 16 years of age and over in gainful occupations, the following were the distributions by the individual family relationships: 78.6 per cent were living at home, 13.5 per cent were boarding or lodging, 8.0 per cent were living with their employers. Of those living at home, the following were the distributions in terms of the total working group: head of family, 15.2 per cent; living with father, 25.8 per cent; living with mother, 11.9 per cent; with husband, 14.3 per cent; with other relative, 11.4 per cent.

Nearly 40 per cent of the 8,202,901 women 16 years of age gainfully employed in 1920 were under 25 years of age. For men gainfully employed, the corresponding figure was 20.6 per cent. This is largely to be explained by the fact that in the older age groups, the women are the homemakers and that over 90 per cent of the women married do not follow a gainful occupation. Of the women 18 and 19 years of age, 42.3 per cent are working; in the age group 20 to 24 years, the proportion at work is 38.1 per cent; in the age group 25 to 44 years, the proportion is 22.4 per cent; in the age group 45 to 64 years, the proportion is 17.1 per cent. We may further analyze the number of married women at work in 1920, by age groups. Of the married women 16 to 19 years, 12.7 per cent were working; of the married women 20 to 24 years, 11.4 per cent were working; of the married women 25 to 34 years, 9.7 per cent were working; of the married women 35 to 44 years, 9.5 per cent were working; of the married women 45 years and over, 6.6 per cent were working. Of the total number of women 16 years of age and over in 1920, 19.4 per cent were neither married nor gainfully employed. There were 6,653,030 women in this group. Of this group, 1,900,168 or 28.6 per cent, were young women between 16 and 20 years of age; 2,933,974, or 44.1 per cent were women past 45 years of age, and of these probably 75 per cent were widows or divorced women.

As a result of all this, it was inevitable that the problems presented by women in industry should receive public attention. Minimum-wage laws were passed (see MINIMUM WAGE); the Federal government concerned itself particularly with the protection of the mother (see MATERNITY PROTECTION); and the States passed bills giving mothers' pensions to those women who were deprived of the support of the male breadwinner (see MOTHERS' PENSIONS.). Special legislation, greatly influenced by the investigations carried on by the Federal Women's Bureau, made their appearance on the statute books. At the end of

1928, for example, the following efforts had been made to restrict the *hours of work* of women: A maximum working day and week was fixed in 43 States. The 48-hour week was observed in 15 States; in 12 States, the law required an 8-hour day, in 2 States an 8½-hour day, and in 1 State (New York) a 9-hour day. In 13 States, the laws called for the observance of a 54-hour week and a 9-hour working day. In 14 States, the working day was fixed at 10 hours; in New Hampshire, it was 10¼ hours; in Vermont and Tennessee, it was 10½ hours; and in North Carolina, it was 11 hours. In only 16 States was night work forbidden by law and, even here, the laws were not all-inclusive. In Indiana, Massachusetts, and Pennsylvania, the acts covered only manufacturing; in South Carolina, only stores were affected; in Maryland and New Hampshire, night work was prohibited during the hours of 10 P. M. and 6 A. M.; Massachusetts forbade textile work during the hours from 6 P. M. to 6 A. M.

Some of the States had taken measures to prevent women from being employed in *dangerous occupations.* In 17 States, women were forbidden to work in and around mines; lead work was prohibited in Pennsylvania and New Jersey; work with abrasives was prohibited in New York and Ohio; oiling moving machinery was prohibited in Louisiana, Minnesota, Missouri, and West Virginia; the lifting of heavy weights was prohibited by the States of California, Massachusetts, Minnesota, New York, Ohio, and Pennsylvania. The Ohio law of 1919 was the only one with an extensive list of prohibited occupations and the Wisconsin law of 1923 gave the State's industrial commission power to ban any job which might affect the welfare of a woman worker. The fact is, such advances as did take place in the protection of the women industrial workers were largely in the Northern States. In surveys made by the Women's Bureau, it was established that from 34 to 68 per cent of women at work in Northern States were employed 48 hours or less per week. On the other hand, in the nine Southern States of Mississippi, Alabama, Georgia, South Carolina, Virginia, Maryland, Kentucky, Tennessee, and Arkansas, the range was from 1 per cent (Georgia) to 21 per cent (Arkansas).

In contemplating the efforts being made in this direction, the question then naturally arose, Has protective legislation helped or harmed the status of woman in industry? The Woman's Bureau in 1928 published a voluminous report after three years of inquiry, and, as a result of the study made in a group of industries in a number of States, found that such legislation was regarded with favor. In all, a total of 1661 establishments in 179 towns in 11 States employing 665,000 women was examined. The industries covered were these five: boots and shoes, hosiery, paper boxes, electrical products, and clothing. The bureau's findings with regard to the effect of a shorter working day for women on their possibilities for employment were as follows: "The general attitude of the present-day manager in industry . . . shows that the adoption of the shorter-day standard is an almost universal development. . . . The enforced or voluntary shortening of hours for women seems to have brought with it in most instances a similar decrease for men; but whether or not they have been shared by men, there is absolutely no indication in any of the establishments studied that the shorter-hour schedules have been in any way a handicap for women."

Nowhere has a minimum-hour law led to the preference of men over women, even in the case of restaurant workers. Where men were given preference, the reasons lay outside the law, i.e., that high-class restaurants demanded men, that men should have first chance at the jobs where the tips were higher, etc. In the cases of those industries where women were dropped out, the causes were not due to restrictive legislation but to the fact that women were fundamentally unsuited for the jobs. This was true of women car conductors, taxi drivers, metal workers, etc.

Latterly, an interesting phase of public sentiment became observable. A group of women, active in the equal-rights movement in America, and objecting to certain existing legal discriminations against women because of sex, advocated a constitutional amendment to take the following form: "Men and women shall have equal rights throughout the United States and every place subject to its jurisdiction. Congress shall have power to enforce this article by appropriate legislation." On the other hand, another large group of women, comprising almost every organization of workingwomen and of women concerned with improving industrial conditions in the United States, although they were deeply interested in the question of equal rights and recognized the need of abolishing unjust legal discriminations against women, objected to the proposed amendment on the score that it was ambiguous and likely to jeopardize those labor laws for women enacted during the preceding 70 years in the various States and regulating to some extent conditions of employment for approximately 4,000,000 women. The proponents of the amendment argued that special labor laws for women curtailed their opportunities, but the opponents maintained that actual information concerning women in industry disproved such a theory and that special legislation to control standards of women's employment was essential in the interest of the race because they had always been in a weaker position economically than men.

An important outgrowth of the War was the Women's Bureau of the Department of Labor, created as the Woman in Industry Service in 1918 and made permanent in 1920. This bureau, which represents and advises the Secretary of Labor in all matters concerning women in industry, did much to clarify the situation and to organize efforts toward improvement. It conducted various general investigations of women's hours, working conditions, and prevailing wages, of women as an economic factor in the home, and of the social bearing of the "living wage"; carried on research work; made special studies of the census, of domestic serivce, of industrial accidents among women, and of special industries; and through monthly bulletins or correspondence developed as a clearing house for ideas and experiences in regard to wage-earning women.

During the period of its operation, the bureau has issued 64 of these studies. The following are the standards it has been working for in the interests of women in industry, on behalf of both health and efficiency; "The 8-hour day, Saturday half-holiday, one day of rest in seven, adequate time allowance for meals, rest period at stated intervals, prohibition of night work; a living wage without discrimination because of sex; clean workrooms, lighting without glare, adequate ventilation, cool and accessible drinking water; washing facilities with hot and cold water, soap and individual towels; an adequate number o clean and accessible toilets; cloak rooms; lunch rooms and rest rooms; careful protection from machinery risks and from danger of fire, exposure to dirt, fumes, and other occupational hazards; prohibition of home work."

WOMEN'S CHRISTIAN TEMPERANCE UNION, National. This body was organized in 1874 for the purpose of abolishing the legalized liquor traffic, and since the passage of the Eighteenth Amendment, it has continued its policy of agitation and education against the consumption of liquor. To celebrate its fiftieth anniversary, the National W. C. T. U. raised a jubilee fund of $1,000,000 which was to be used for the promotion of special departments of the organization's work, such as the Americanization of foreign-speaking women, the promotion of child welfare, social morality and the education of the public, especially children, on the scientific truths concerning alcohol. Following the World's W. C. T. U. Convention at London in 1920, Miss Anna Gordon, president of the National W. C. T. U., 1914–25, made a survey of the European countries in the interest of that movement, subsequently going to South America in 1921, and to Mexico in 1922. Miss Gordon was elected president of the World's W. C. T. U. in 1925, Mrs. Ella A. Boole taking her place in the National organization. Immediately following the election of Herbert Hoover as President in 1928, the National W. C. T. U. and its Young People's Branch organized the Youth's Roll Call to enlist young people in a movement to abstain from liquor drinking and to support President Hoover in his law-enforcement policies. At the fifty-fifth annual convention held at Indianapolis, Ind., in 1929, the union presented to the State of Indiana a bronze tablet, to be placed in the State Capitol, in honor of Frances E. Willard, one of the founders of the organization. In addition to its extensive temperance literature, the National W. C. T. U. publishes the *Union Signal*, and the *Young Crusader*. Headquarters are at Evanston, Ill., and Mrs. Lenna Lowe Yost, legislative director of the Department of Legislation maintains offices in Washington, D. C.

WOMEN'S CLUBS, General Federation of. An organization established in 1889 for the purpose of bettering community life; it is composed of local and national clubs in the United States and other countries, numbering approximately 14,000 clubs in 1928. The work of the Federation has been carried on for several years under the following departments: American citizenship; American homes; education; fine arts; international relations; legislation; press and publicity; and public welfare. The Federation has been active in organizing rural and junior clubs, and the work accomplished during the World War is continued by coöperation with veteran soldiers. It attempts to improve motion-picture and radio programmes, and it offers a medical-scholarship loan, and an exchange Pan-American scholarship. In addition to these lines of activity, the Federation, in 1924, undertook the support of the Federal education bill, the child-labor amendment, law enforcement, and the World Court. In 1925 it commenced a survey of American homes, with the idea of furthering the installation of labor-saving devices, and in 1927 it made a survey of adult illiteracy. The *General Federation News* is the official publication. Headquarters are at 1734 N Street, N. W., Washington, D. C. Mrs. John F. Sippel is president, and Miss Josephine Judkin is manager of the research and club service.

WOOD, Clement (1888–). An American author, born at Tuscaloosa, Ala., and educated at the University of Alabama and Yale University. He began the practice of law at Birmingham, Ala., in 1911. After holding the offices of assistant city attorney and recorder of Birmingham, he came to New York Cit, taught in the Barnard School for Boys from 1915 to 1920, and was vice principal of the Dwight School, 1920–22. His writings include: *Glad of Earth*, poems (1917); *The Earth Turns South* (1919); *Jehovah* (1920); *Mountain*, a novel (1920); *The Laugher* (1922); *Nigger* (1922); *Poets of America* (1925); *Amy Lowell* (1926); *Outline of Man's Knowledge* (1927); *The Shadow from the Bogue* (1928); *King Henry the Rake* (1929). He received the first prize of the Newark (N. J.) Committee of 100 in 1916 for his poem *The Smithy of God* and a prize for his *Jehovah* in 1919.

WOOD, Francis Carter (1869–). An American pathologist, director of cancer research at the Crocker Research Laboratory, Columbia University (see Vol. XXIII). He was active in educational campaigns of the American Society for the Control of Cancer and in 1925 received the honorary degree of D.Sc. from Tufts College. His work, *Delafield and Prudden's Text-Book of Pathology*, reached its 14th ed. in 1927.

WOOD, Leonard (1860–1927). An American soldier and administrator (see Vol. XXIII). At the outbreak of the World War, he was given command of the Department of the East, which he held till 1917, and was later transferred to the Southeastern Department. He organized and trained the 89th National Army Division, the 10th Division of the Regular Army, and many special regiments and battalions during 1918–19, and commanded the Central Department headquarters in Chicago from 1919 to 1921. He was appointed Governor General of the Philippine Islands in 1921. In 1923 he was awarded the Roosevelt Medal of Honor "for distinguished service." His administration of the Philippines was marked by an active agitation for independence on the part of native leaders. He wrote: *The Military Obligation of Citizenship* (1915); *Universal Military Training* (1917); *Our Military History, Its Facts and Fallacies* (1921).

WOOD ALCOHOL. See Chemistry, Applied.

WOODBURY, Helen Sumner (1876–). An American writer, born at Sheboygan, Wis., and educated at Wellesley College. For 25 years, she has worked with the American Bureau of Industrial Research. During 1906–07 she investigated equal suffrage in Colorado and in 1913 entered the Children's Bureau of the Department of Labor as an industrial expert; she was assistant chief from 1915 to 1918. She visited New Zealand and Australia in 1919–20. During 1924–26 she was with the Institute of Economics. Her writings include: *The White Slave* (1896); *Labor Problems*, with Thomas S. Adams (1905); *Equal Suffrage* (1909); *History of Women in Industry*, vol. ix; *Report on Women and Children in Industry*, United States Labor Bureau (1911); *Child Labor Legislation in the United States*, with Ella A. Merritt (1915); *Administration of Child Labor Laws in Connecticut and in New York*, with Ethel E. Hanks (1915; 1916); *History of Labor in the United States*, with John R. Commons and others (1918); *The Working Children of Boston* (1922); *Standards Appli-*

cable to the Administration of Child Labor Laws (1924).

WOOD MEMORIAL FOR THE ERADICATION OF LEPROSY. See LEPROSY.

WOOD PULP. See PAPER AND WOOD PULP.

WOODRUFF, EDWIN HAMLIN (1862–). An American lawyer and educator, born in Ithaca, N. Y., and educated at Cornell University and its law department. He was admitted to the bar in 1888, and was instructor in English at Cornell from 1888 to 1890, and librarian at the Fiske Library in Florence, Italy, in 1890–91. From 1893 to 1896, he was on the law faculty of Stanford University and from the latter date professor of law at Cornell University (emeritus since 1927). From 1914 to 1921, he was dean of the College of Law at Cornell. He wrote several books in legal subjects.

WOODRUFF, HELEN S. (1880–). An American author, born at Selma, Ala., and educated privately. She first became known by her book, *The Lady of the Lighthouse,* which was a "best seller" in 1913. She gave all the royalties from this story to the New York Association for the Blind; the proceeds from all her books went to charity. She wrote several plays, among them: *Hurrah for the Girls* (1918), produced at the Forty-fourth Street Roof Garden, New York City; *Kitty, Kitty, Kitty* (1919); *By Love's Speedometer* (1919). Her stories include: *Mis' Beauty* (1912); *Really-Truly Nature Stories* (1913); *The Little House* (1914); *Really-Truly Fairy Stories* (1915); *Mr. Doctor-Man* (1915).

WOODRUFF, LORANDE LOSS (1879–). An American biologist, born in New York City, and educated at Columbia University. He was assistant in biology (1903–04) and instructor (1904–07) at Williams College; and instructor (1907–09), assistant professor (1909–15), and professor of biology (1915–22) at Yale University. Since 1922 he has been professor of protozoölogy at Yale. He is the author of *Foundations of Biology* (1922; 3d ed., 1927), and published, in collaboration, *Origin and Evolution of the Earth and Its Inhabitants* (1918); *Development of the Sciences* (1923); *Organic Adaptation to Environment* (1924).

WOODS, ALBERT FRED (1866–). An American university president (see VOL. XXIII). From 1917 to 1920, he was executive officer of the Maryland State Board of Agriculture and president of the Maryland State College of Agriculture. He was president of the University of Maryland from 1920 to 1926 and since the latter date has been director of scientific work in the U. S. Department of Agriculture.

WOODS, CYRUS E. (1861–). An American diplomat, born at Clearfield, Pa., and educated at Lafayette College. He began the practice of law in Philadelphia in 1889. He was president of the Pennsylvania State Senate (1905–09), Minister to Portugal (1912–15), and Secretary of the State of Pennsylvania (1915–23), but resigned in June, 1921, on nomination by President Harding as Ambassador to Spain. On Mar. 4, 1923, he was appointed Ambassador to Japan, and was in charge of American Red Cross relief work there following the earthquake disaster of Sept. 1, 1923. He resigned in July, 1924.

WOODWARD, SIR ARTHUR SMITH (1864–). A British geologist (see VOL. XXIII). Until 1924 he was keeper of the Geological Department, British Museum. He was president of the Geological Society from 1914 to 1916 and of the Linnæan Society (1919–23). In the World War, he served in Macedonia and Bulgaria with the British Saloniki force from 1915 to 1919. He was knighted in 1924.

WOODWARD, FREDERIC (CAMPBELL) (1874–). An American lawyer and educator, born at Middletown, N. Y., and educated in law at Cornell University. In 1895 he began the practice of law in New York City. From 1898 to 1902, he was professor of law at Dickinson College, and from the latter date to 1907, he filled the same chair in Northwestern University. From 1907 to 1916, he was professor of law and dean (1908–16) of the law school of Leland Stanford University. In the latter year, he became professor of law at the University of Chicago, where he has been vice president and dean of the faculties since 1926. He was the author of several books on legal subjects. During the World War, he served as major and judge advocate general in the U. S. Army.

WOODWORTH, ROBERT SESSIONS (1869–). An American psychologist (see VOL. XXIII). His books published after 1914 show an attempt to profit by the emphasis of the behavioristic school on external observation, without, however, accepting their metaphysical position. These works include *Dynamic Psychology* (1917); *Psychology, a Study of Mental Life* (1921).

WOOLEN AND WORSTED. See TEXTILE MANUFACTURING.

WOOLF, VIRGINIA (?–). A British novelist. Her works include *The Voyage Out* (1915); *Night and Day* (1919); *Jacob's Room* (1922); *Mrs. Dalloway* (1925); *To the Lighthouse* (1927); and *Orlando, A Biography* (1928). She also published *Monday or Tuesday,* short stores (1921); *Tolstoi's Love Letters,* which she and S. S. Koteliansky translated (1923); and *The Common Reader,* essays (1925).

WOOLLCOTT, ALEXANDER (1887–). An American dramatic critic, born at Phalanx, N. J., and educated at Hamilton College and Columbia University. He joined the staff of the *New York Times* in 1909, becoming dramatic critic in 1914. He was also on the editorial staff of *The Home Sector.* He enlisted in the U. S. Army in 1917 and served in France till May 1, 1919. He was a member of the editorial council of *The Stars and Stripes* and correspondent for that paper at the American front and with the Army of Occupation in Germany. From 1922 to 1925, he was dramatic critic of the New York *Herald,* and since 1925 of the New York *World.* His writings include: *Mrs. Fiske—Her Views on Acting, Actors, and the Problems of the Stage* (1917); *The Command Is Forward* (1919); *Mr. Dickens Goes to the Play* (1923); *Enchanted Aisles* (1924); *The Story of Irving Berlin* (1925); *Going to Pieces* (1928); *Two Gentlemen and a Lady* (1928); and articles in magazines.

WOOLLEY, C. LEONARD (1880–). A British archæologist. He attended New College, Oxford. In 1905–06 he excavated at Corbridge on the Roman Wall. He was attached to the Eckley B. Coxe, Jr., Expedition to Nubia for the University of Pennsylvania (1907–11) and the Oxford Expedition to Nubia (1911), and took part in the survey of Sinai for the Palestine Exploration Fund in 1914. In the World War, he was in the British Intelligence Service in Egypt (1914–16), was a prisoner in Turkey (1916–18), and a political officer in Northern Syria (1919). After the War, he continued excavations at Carchemish, Tell el Amarna (1922) and, from 1922 to 1928, led the joint expedition of the University of Pennsylvania Museum and the British Museum in excavating on the site of Ur of the Chaldees. He is the author of *Dead Towns and Living Men* (1920) and *The Sumerians* (1929).

WOOSTER, THE COLLEGE OF. A coeducational institution founded at Wooster, Ohio, in 1870. The student body increased in number from 398 in 1918 to 862 in 1927–28, the faculty from 33 to 57 members in the autumn of 1928, and the library from 41,900 to 57,000 volumes. The endowment was increased from $1,174,780 in 1913 to $2,843,376 in 1927–28, and the income from $104,335 to $432,700. Between 1914 and 1928, a girl's dormitory was erected; Galpin Park was added at the north side of the campus; a large concrete stadium and grandstand were added to the equipment of the athletic field; a college hospital was completed in 1927; a new residence for the president was constructed in 1928; and the conservatory of music was made a department of the college. President, Charles F. Wishart, D.D., LL.D.

WORCESTER, wus'tẽr. A manufacturing city of Massachusetts and the third largest city of New England. The population increased from 145,986 in 1910, to 179,754 in 1920, to 190,757 in 1925 (State census) and to 197,600 in 1928, by estimate of the U. S. Bureau of the Census. A new reinforced concrete bridge was built between 1916 and 1919 over Lake Quinsigamond at a cost of $325,000. The city's park system was expanded until in 1928 the total park area was 1126 acres. In 1925 the installation of a new sewage-treatment plant was completed at a cost of $3,500,000; the Union Station was modernized in 1926; and in 1927 the municipal airport, Whittall Field, was established at North Grafton. In 1927, 30,377 persons were employed by approximately 500 industrial establishments and received $41,403,603 in wages; the value of products manufactured was $194,221,808. Bank clearings in 1928 amounted to $187,941,000. The assessed valuation of property in 1928 was $346,913,700; the net debt was $10,826,450.

WORCESTER MUSIC FESTIVAL. See MUSIC, *Festivals*.

WORCESTER POLYTECHNIC INSTITUTE. A nonsectarian institution at Worcester, Mass., for the education of men in the professions of engineering and chemistry, founded in 1865. The student enrollment in 1915 was 543, as compared with 602 in 1928; the faculty numbered 54 in the former year, as compared with 68 in the latter. In the same period, the library was increased from 14,544 to 23,000 volumes, and the productive funds from $900,000 to $2,734,000. A gymnasium was opened in 1916 and courses in business were offered in 1922. In 1926 a hydraulic laboratory, given by George L. Alden, new athlete facilities and a swimming pool, given by Henry J. Fuller, were provided. Sanford Riley Hall, a freshman dormitory, was completed in 1927. President, Ralph Earle, D.Sc., D.Eng., Captain, U. S. Navy (ret.).

WORK, HUBERT (1860–). An American public official, born at Marion Centre, Pa., and educated at the University of Pennsylvania. He began the practice of medicine at Greeley, Colo., in 1885, and in 1896 founded the Woodcroft Hospital for mental and nervous diseases. In 1912 he was chairman of the Colorado Republican State Central Committee and Colorado member of the Republican National Committee. During 1921–22 he was first Assistant Postmaster General of the United States, and in March, 1922, he became Postmaster Genreal. From Mar. 5, 1923, to July, 1928, he was Secretary of the Interior, resigning to become chairman of the Republican National Committee in the presidential campaign that resulted in the election of Herbert Hoover. He resigned this latter post in 1929. He received the appointment of lieutenant colonel in the Medical Corps of the U. S. Army during the World War.

WORKERS' PARTY. See COMMUNISM.

WORKMEN'S COMPENSATION. One of the most significant forms of welfare legislation developed in the United States in the last two decades has been the protection of workmen injured during the course of employment. Undoubtedly, the operations of workmen's compensation laws have been the chief influence in the checking of dependency and in lightening the load placed upon private philanthropy by the laissez-faire principle of our modern industrial society. It is true that American public authority has not matched the progress made by European countries, notably Great Britain, France, Germany, and Russia, in guaranteeing the worker against the insecurities of illness, unemployment, invalidity, and old age. The difficulties of our Federal system, by which such actions are almost entirely relegated to individual State initiative, have stood in the way of uniform progress with the result that in some States the position of the working populations is much less secure than in others; but the outlook is not a hopeless one, for the weakness of the Federal system is its chief strength. We have in the forty-eight States in the Federal Union, in effect, so many laboratories for experimentation with social legislation and the proved success of an idea assures its ultimate adoption in almost every State of the Union. This, certainly, has been the history of workmen's compensation legislation in this country, as it also has been the histories of mothers' assistance acts and old-age pensions. It is entirely within the bounds of reason to expect that, shortly, protection of the workers against unemployment will have its initial trial in one of these social laboratories with the result that another couple of decades will probably see the American working population protected against the most vicious aspect of our modern economic life.

The advances of workmen's-compensation legislation have been rapid. The first law was enacted in 1908; one law was enacted in 1909; one in 1910; ten in 1911; four in 1912; seven in 1913; two in 1914; nine in 1915; one in 1916; five in 1917; one in 1918; four in 1919; one in 1920; two in 1927; one in 1928; one in 1929. There were, at the end of 1929, laws on the statute books of 44 States, the Territories of Alaska and the Philippines, Hawaii and Porto Rico, and by Congressional enactment laws for the protection of the civil employees of the Federal government, workers in the District of Columbia, and men engaged on harbors and wharves. The only States not to enact workmen's-compensation legislation were the following Southern States: Arkansas, Florida, Mississippi, and South Carolina. The last measures to be passed were the Longshoremen's and Harbor-worker's Compensation Act, enacted by Congress, July 1, 1927; the Workmen's-compensation Act of the Philippine Islands, of the same year; the Congressional Act of July 1, 1928, applying to private employees in the District of Columbia; and the act passed by the legislature of North Dakota during its sessions of 1929. Most European countries likewise have adopted the principle of workmen's compensation, in addition to the social-insurance measures above referred to. None of the American laws undertakes to cover all types of employment. The most important exceptions are those of agriculture and domestic service. Interstate commerce is exempt because it is subject to the action of Congress. It is to be noted that in 12 States coverage applies only to hazardous employments. Also, the laws of 23 States exempt the employers whose plants employ less than a stipulated number of employees. The exclusion of agricultural workers is universal in the compensation laws of the United States, with the exception of Hawaii and New Jersey. Domestic service, too, is excluded, except in New Jersey. Exclusion of employees receiving above a designated wage is provided in a few States.

NUMBER OF COMPENSATED ACCIDENTS. COMPENSATION PAID, AND TIME LOST, IN NEW YORK STATE, YEAR ENDING JUNE 30, 1927, BY CAUSE

	Number of cases	Time loss (weeks)	Average w'ks lost per case	Compensation paid	Average am't paid per case
Handling objects	27,692	322,648	11.7	$4,643,260	$167.68
Falls	18,092	535,411	29.6	6,515,137	360.11
Machinery	13,026	289,001	22.2	4,411,144	338.64
Vehicles	8,897	362,902	40.8	3,809,666	428.20
Handtools	7,500	107,809	14.4	1,624,835	216.64
Falling objects	6,241	162,795	26.1	1,875,312	300.48
Stepping on or striking against objects	4,923	38,975	7.9	521,487	105.93
Explosions; electricity, heat, etc.	3,777	165,775	43.9	1,435,749	380.13
Hoisting and conveying apparatus	2,959	175,899	59.4	1,817,187	614.12
Miscellaneous	2,591	67,929	26.2	794,284	306.55
Harmful substances	1,338	32,816	24.5	358,826	268.18
Indefinite history of accidents	1,257	18,040	14.4	171,952	136.80
Animals	691	18,492	26.8	207,164	299.80
Total	98,984	2,298,492	23.2	28,186,003	284.75

The following were the leading characteristics of workmen's-compensation legislation in the United States: *Waiting time.* All States but Oregon and South Dakota prescribed a period of waiting time before compensation was payable. In five States and in the two Federal acts, the waiting time was less than one week; in 29 States, it was 7 days; in 3 States, it was 10 days; in 4 States, it was 14 days. *Temporary disability.* In 14 States and under the two Federal acts, the worker was allowed 66⅔ per cent of his wages while laid up; in 7 States, the allowance was 65 per cent; in 6 States and Hawaii, the allowance was 60 per cent; in 3 States, it was 55 per cent; in the remaining States, the allowance was 50 per cent. Arizona, Oregon, and Washington set up minimums for allowances for temporary disability, but the other States did not. The minimum allowances ranged from $3 to $8 weekly and the maximums ranged from $12 to $25 weekly. In 34 States, there was fixed a maximum number of weeks during which payments were allowed. These maximums ranged from 200 to 500 weeks. In Wisconsin, the maximum was 1000 weeks. *Permanent total disability.* For this type of injury, in 15 States and under two Federal acts, the worker is to receive a fractional wage every week. In the other States, the limits for compensation are between 260 and 550 weeks, though in Wisconsin, the limit is 1000 weeks. Money compensation ranges from between $3000 to $19,500. *Permanent partial disability.* Special arrangements are made for the loss of a finger, eye, etc. In 10 States and under the Federal Longshoremen's Act, payment for extra disability (second eye, e.g.) is to be made out of a special fund. *Death.* In all but 9 of the States, in addition to compensation, funeral expenses are paid. In 7 States and under the two Federal statutes, the maximum for funeral expenses is $200. In 21 other States, it is $150. The widow, in most of the States, gets 35 per cent of the weekly wages until death or remarriage and, for each child under 15 years, there is an allowance of 15 per cent or more. In Alabama, Hawaii, New Mexico, and South Dakota, all alien nonresident dependents are excluded from this type of compensation. *Rehabilitation.* In 1918 the State of Massachusetts made provision for the industrial rehabilitation of injured workmen through surgery, reëducation, etc. In 1919, 9 other States followed suit. In 1920 Congress voted to match dollar for dollar all sums appropriated by the States for this type of work. A total of 41 States was coöperating in 1929.

Occupational diseases. The first American law for the compulsory reporting of occupational diseases was enacted in California in 1911 and by 1916, 16 other States had adopted similar legislation. The original laws called for reports on cases of anthrax, compressed-air illness, and poisoning from lead, phosphorus, arsenic, mercury, brass, and wood alcohol. In recent years, States have begun to write on their statute books laws making injuries from occupational diseases compensable. In 5 States, California, Connecticut Massachusetts, North Dakota, and Wisconsin, and in Hawaii, as well as under the two Federal acts, all injuries thus sustained, regardless of the disease, are compensable. In another group of States, only listed diseases are considered under the compensation laws. These so-called "specific schedules" are to be found in New York, Illinois, Minnesota, New Jersey, Ohio, and Porto Rico. The 1929 New York Legislature refused to pass a general coverage law, but contented itself with adding four more diseases to its specific schedule. *Insurance.* Insurance of the employer's liability to pay compensation is recognized as an essential feature of the workmen's-compensation statute in most of the States. Self-insurance, insurance through private companies, or by insurance in State funds (exclusive or competitive) is required. Compensation insurance is compulsory in all but 17 States. State fund insurance systems exist in 19 of the States and in seven of these the State funds are monopolistic. These seven States are the following: Nevada, North Dakota, Ohio, Oregon, Washington, West Virginia, and Wyoming. The following are the twelve States where State insurance funds compete with private carriers, usually at a considerably lower rate: Arizona, California, Colorado, Idaho, Massachusetts, Michigan, Montana, New York, Pennsylvania, Porto Rico, Tennessee, and Utah. The example of the State of Ohio may be cited to indicate the scale of the operations of these State insurance funds. In 1927 the State fund reported assets of $55,235,467 of which $46,515,351 was being held as a claim reserve. During the year, the receipts of the fund made up of earned premiums and interest on the claim reserve totaled $15,457,321 and the disbursements were $13,358,270. It is interesting to note that this State fund uses a system for giving merit ratings, with savings in premiums to employers, based on the number of accidents occurring in their plants. In New York, in the calendar 1927, the State fund wrote premiums to the total of $7,088,628, an increase of $138,856 over the previous year. For 1927 the number of policy-holders totaled 21,047, an increase of 3586. Since 1922, the State funds earned premiums have shown greater increases proportionately than the movement of factory pay rolls for the same period. Unfortunately, State funds are limited in their possibilities of expansion because the most profitable risks, i.e., those of the large establishments, are being covered by self-insurance or what is the same thing, mutual companies. The risks of the small employers of labor are comparatively unprofitable with the result that private companies seek to eliminate these risks wherever possible. In the final resort, State funds, where they operate, are compelled to assume these unprofitable risks. In New York State, for example, in 1924 and 1925, among the group of small plants paying between the $25 and $50 premiums, the losses were 89.8 per cent of the earned premiums, while, for the plants paying $30,000 and over in insurance premiums, the percentage of premiums earned was 52.4 per cent. An outstanding authority in the field, Mr. Ethelbert Stewart, United States Commissioner of Labor Statistics, views the situation with concern and feels that unless action is taken the result will be that the State funds will be handling only the small and unprofitable risks and that in time the State funds may have to be supported from general taxation.

Administration. The administration of the laws has been recognized as a technical matter and, in most of the States, agencies have been established. In only Alabama, Alaska, Louisiana, New Hampshire, New Mexico, Tennessee, and Wyoming are the laws administered by the courts. These administrative officials, as early as 1914, banded themselves together into a permanent organization for the discussion of their common problems, and when Canadian provinces began to pass workmen's-compensation laws, they, too, were included. The name of this organization is the International Association of Industrial Accident Boards and Commissions and it meets once a year for the purpose of standardizing practices, ways of cutting down accidents, methods of computing industrial accident- and sickness-insurance costs, statistical reporting, and the like.

The table on page 1714 indicates the nature of the accidents, the total number of persons affected, and the amounts paid out for a single year in but one State (New York, for the fiscal year ending June 30, 1927). It must be apparent that despite the fact that compensation protection places such a high charge upon the operating costs of industry, the reduction of industrial accidents has made but little headway. It was estimated in 1928 that industrial accidents were costing the manufacturers five billion dollars annually. Experts of the National Safety Council declared that 85 per cent of all industrial accidents was preventable if proper safety rules were enforced, and that another 10 per cent was due to improper physical conditions in the plants. It was estimated that annually there was being paid out in the neighborhood of $150,000,000 by American States for workmen's compensation.

In Great Britain, despite compensation laws, the toll of industrial accidents has been mounting, also. In the following seven important key industries, viz., mines, quarries, docks, railways, construction work, factories, shipping, the total number of accidents rose from 368,469 in 1919 to 458,419 in 1927. Fatal accidents in the earlier year totaled 3293 and in the later year 2567. Despite the smaller group of industrial workers in the country and the lower real wages, the amounts paid out in compensation are staggering, even by American standards. In 1919 compensation awards totaled £4,616,723; in 1927, they totaled £6,315,803. In compensation for occupational diseases, which the English law covers, there was paid out in 1927 £5278 for 25 fatal cases and £548,492 for 17,079 cases of disablement.

WORLD COURT. The popular designation for the Permanent Court of International Justice, a permanent tribunal for the judicial settlement of international disputes, which sits at The Hague. The Court was formally opened Feb. 15, 1922. It was established by the League of Nations under a mandate contained in Article XIV of the Covenant of the League, the enabling statute having been approved by the Assembly of the League on Dec. 13, 1920. See LEAGUE OF NATIONS.

History. The principle of the arbitration of international controversies as a substitute for war was practiced by the Greeks and, in the modern era, as early as 1794, when the Jay Treaty provided for the arbitration of three important disputes between the United States and Great Britain. The Permanent Court of International Justice may be characterized as an important step in the development of an accepted principle, rather than a new departure in international relations. The resort to international arbitration was frequent during the nineteenth century, especially after the settlement of the Alabama Claims dispute between the United States and Great Britain by a tribunal at Geneva in 1872. Growing sentiment in support of the arbitral principle led to the adoption of the Convention for the Pacific Settlement of International Disputes by The Hague Conference of 1899. The convention established the Permanent Court of Arbitration, still functioning at The Hague, regulated the employment of mediation, and provided for the employment of international commissions of inquiry to investigate and report on controverted facts.

The Permanent Court of Arbitration, although it proved valuable in the settlement of a number of important controversies, failed to meet the expectations of many and a demand grew for an international tribunal to which nations would be forced to submit their disputes for settlement in accordance with judicial principles. The United States presented to the Second Peace Conference at The Hague in 1907 a proposal for the establishment of a permanent "Court of Arbitral Justice," to remain continuously in session, but no action was taken because of difficulty in providing a method for the selection of judges. The World War strengthened the demand for an international trial court and, in Article XIV of the League of Nations Covenant, the Council was instructed to prepare "plans for the establishment of a Permanent Court of International Justice."

An international committee, known as the Advisory Council of Jurists and including the American statesman, Elihu Root, was appointed by the Council to fulfill this mandate. The committee met at The Hague, in June and July, 1920, and submitted to the Council a proposal for a court having compulsory jurisdiction over all members of the League similar to that the Permanent Court now exercises over States which have accepted the optional clause. The proposal was rejected by the Council, the ground being that, in effect, the compulsory jurisdiction provision amended Article XIV of the Covenant, which provided disputants with the alternatives of laying their controversy before the Court, some other international tribunal, or the Council itself. The statute for the establishment of the Permanent Court, therefore, stipulated that the jurisdiction of the Court comprised "all cases which the parties refer to it and all matters specially provided for in treaties and conventions in force." As a compromise, however, the statute also provided that any power might *ipso facto* accept the compulsory jurisdiction of the Court in any or all of the four classes of legal disputes previously enumerated. It was further provided that such acceptance might be conditional upon reciprocity, or unconditional, or for a certain period of time.

Organization of the World Court. The Court held its organization meeting at The Hague on Jan. 30, 1922. B. C. J. Loder of The Hague, was elected president; Charles André Weiss of France, vice president, and A. Hammarskjöld of Sweden, registar. Formal opening of the Court took place in the Peace Palace of The Hague on Feb. 15, 1922, after which the Court formulated its rules of procedure. Some of the more important problems involved the extent to which the records of the Court should be open to inspection, the giving of advisory opinions, and the position and functions of the deputy judges.

Constitution and Jurisdiction. The constitution, organization, jurisdiction, and procedure of the World Court are determined: first, by the statute approved by the Assembly and put into a separate treaty, which previous to October, 1929, had been ratified by 42 of the 54 signatory States; second, by a body of "rules of Court" prepared by the Court under authority of the statute; third, by a number of resolutions of the Council and the Assembly of the League which complete the statute; and fourth, by numerous treaties, conventions, and other international agreements conferring jurisdiction on the Court. In September, 1929, the original statute was amended in some respects by the Council and Assembly of the League. The protocol of the revised statute was signed by representatives of 48 nations during the sessions of the Tenth Assembly.

Previous to September, 1929, the Court consisted of eleven judges and four deputy judges, who served in the absence of judges. The Tenth Assembly of the League of Nations, however, amended the statute, increasing the number of judges from eleven to fifteen abolishing the deputy judgeships. Judges are elected by the concurrent votes of absolute majorities of the Council and the Assembly of the League, sitting and voting independently, from a list of candidates nominated by the various national groups in the Permanent Court of Arbitration. The term of office is nine years and members are reeligible. A Judge is irremovable, except by unanimous agreement among the other members of the court that he has ceased to fulfill the required conditions. Where a person is chosen to fill a vacancy, he holds office only for the remainder of the unexpired term. Consequently, there must be an election of the whole Court every nine years. Judges are not permitted to exercise any administrative or political function.

The Court, as a whole, is intended to represent the main forms of civilization and the principal legal systems of the world. Judges are elected regardless of nationality, under the statute, but the election of more than one judge of any particular nationality is forbidden. If one of the judges sitting in a particular case is of the same nationality as one of the litigants, the other litigant has the right to representation in the Court by a judge of his nationality.

The full Court is required to sit except in the following three classes of cases, provided in the statute: (1) cases falling under the Labor Clauses of the Treaty of Versailles (Part XIII) and of the other peace treaties, (2) cases relating to transit and communications, particularly under Part XII of the Treaty of Versailles, and (3) cases which the disputants request be disposed of by summary procedure. To dispose of the first two classes of cases the Court is required to appoint every three years a special chamber of five judges. In all labor cases, whether determined by the full Court or the special chamber, the judges are assisted by four technical assessors, who sit in an advisory capacity but do not vote. With the consent of the parties, the special chambers may sit elsewhere than at The Hague. For the third class of cases, the Court forms annually a chamber of three judges to dispose of disputes by summary procedure.

The one responsible official of the Court is the registrar, who is assisted by a secretariat called the "registry." Both president and registrar must reside at the seat of the Court. Though the Court draws up its own budget, its expenses are met by the constituent states through the League of Nations. In 1924 they amounted to 580,127 Dutch florins (about $233,000). Each judge receives an annual salary of 15,000 florins ($6030), in addition to traveling expenses, living expenses while at The Hague, and an allowance of 100 florins a day while on duty. The official languages of the Court are French and English. The tribunal formerly met at least once a year, commencing June 15, and continued in session until the cases on the list were disposed of. This procedure was also changed in September, 1929, and continuous sessions provided for, with the judges acting in rotation.

The Court is competent to hear all cases which states or members of the League of Nations, as contrasted with individuals, may present to it and all matters specially provided for in international treaties and conventions in force. Generally, the legal disputes in which it exercises jurisdiction concern (1) the interpretation of a treaty, (2) any question of international law, (3) the existence of any fact, which, if established, would constitute a breach of international obligation, (4) the nature or extent of the reparation to be made for the breach of an international obligation. The Court's jurisdiction in the above classes of disputes is compulsory only with regard to states signing the so-called optional clause of the statute, which recognizes the right of one party to summon another before the Court.

The states which in November, 1929, were bound by the optional clause were Abyssinia, Austria, Belgium, Bulgaria, China, Denmark, Estonia, Finland, Germany, Greece, Haiti, Lithuania, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and Uruguay. States which had signed the optional clause but had not ratified it (October, 1929) were Brazil, Costa Rica, Dominican Repúblic, France, Guatemala, Hungary, Latvia, Liberia, Luxemburg, Panama, Salvador, Australia, Canada, Czechoslovakia, Great Britain, India, Irish Free State, Italy, New Zealand, Nicaragua, Peru, Siam, and South Africa. In the cases of Brazil, China, Costa Rica, Estonia, Haiti, Lithuania, the Netherlands, Panama, Salvador, Spain, and Sweden, ratifications were not specified as necessary to give the signatures force and were not actually deposited. Costa Rica, Panama, and Salvador signed without condition as to ratification, but had not in October, 1929, ratified the protocol of signature of the statute. Various reservations as to the application of the optional clause were made by some of the states which ratified.

Compulsory jurisdiction is also conferred upon the Court by certain clauses of the peace treaties which ended the World War, by the Locarno Agreements, and by a number of arbitral and other conventions concluded between states since the establishment of the Court.

In disputes affecting states which have not accepted the optional clause, or which are not parties to the above treaties and conventions, the Court makes awards only when a case is voluntarily submitted by both parties involved.

Under Article XIV of the Covenant, the Council or the Assembly of the League of Nations may ask the Court for an advisory opinion on disputes with which they are concerned. Advisory opinions rendered by the Court on such occasions have in practice been confined to the juridicial aspect of the dispute. While the Court ordinarily employs strictly judicial procedure, it may also, if requested by the parties, adopt a special procedure *ex æquo et bono.*

The statute provides that the Court, in arriving at its decisions, shall apply (1) international conventions, whether general or particular, establishing rules expressly recognized by the contesting states, (2) international custom, as evidence of a general practice accepted as law, (3) the general principle of law recognized by civilized nations, (4) judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.

The procedure followed in the adjudication of disputes has been altered somewhat from time to time as the experience of the Court dictated. When any case properly coming before the Court is submitted, it is at once circulated to all the states of the world and time limits are fixed for the filing of documents and the opening of the oral proceedings. The same action is taken with regard to requests for advisory opinions, and in addition international organizations considered to be concerned are notified, and time limits fixed for the filing of written or oral information, if they request permission to do so. When documents have been filed and the cases of the disputants presented orally before a public session of the Court by their respective "agents," the judges meet in private to formulate their decision or opinion. An informal exchange of views on the salient features of the case follows, after which a time limit is fixed within which each judge must file anonymously with the president a note containing his opinion on the case as a whole. The president then circulates to his colleagues a summary of the various opinions, arranged somewhat in the form of a questionnaire.

The Court then determines by lengthy discussion and by successive preliminary votes the majority's solution of each point at issue and the statement of reasons to be given in support of each conclusion. A committee composed of the president, the registrar, and of two judges elected for this specific duty then drafts the decision. The draft is distributed to members of the Court, a time limit being fixed for the presentation of amendments. The committee may or may not revise the draft in accordance with amendments suggested and then submits a final report which is discussed by the full Court, first generally and then paragraph by paragraph. Further revision is sometimes necessary before the report is adopted by a final vote and becomes the judgment or opinion of the Court. If not unanimous, dissenting judges are entitled to deliver separate opinions. The Court construes its judgments, at the request of any party. It may refuse a request for an advisory opinion, as it did in the so-called Eastern Carelian question, when it feels that it has no jurisdiction.

Judges of the Court in 1929 were Dionisio Anzilotti (Italian), president; Max Huber (Swiss), vice president; B. C. J. Loder (Dutch), Sir Cecil Hurst (British), Henri Fromageot (French), D. J. Nyholm (Danish), Antonio S. de Bustamante (Cuban), Rafael Altamira (Spanish), Yorozu Oda (Japanese), Epitacio Da Silva Pessoa (Brazilian), Charles E. Hughes (American), Michailo Yovanovitch (Jugoslavian), F. V. N. Beichmann (Norwegian), Demetre Negulesco (Rumanian), and Chung-Hui Wang (Chinese).

Decisions of the World Court. The first case before the Court was a request for an advisory opinion as to the legality of the appointment by the Netherlands government of what was called its Workers' Delegate to the Second International Labor Conference. The opinion, rendered on Aug. 10, 1922, sustained the action of the conference in seating the delegate. It was considered important in that it involved the legal standing of the labor conference under the Versailles Treaty. In a second advisory opinion the same year, the Court overruled the contention of the French government that the International Labor Office was incompetent in matters affecting agriculture under the terms of the Versailles Treaty.

Among other questions submitted to the court for advisory opinions during the first two years of its existence was a dispute between France and Great Britain as to the validity, in an international sense, of decrees issued by the French government in Tunis and in the French zone in

Morocco affecting the nationality of resident foreigners. An opinion rendered on the so-called Eastern Carelian case was an important precedent which later was freely mentioned in the debates in the United States Senate, held in connection with the proposal for American adherence to the Court. The dispute arose over the interpretation of the treaty of peace between Russia and Finland in its application to Eastern Carelia. Finland brought the matter before the Council of the League of Nations. Russia, not being a member of the League, declined to accept its interposition and the Council finally submitted the dispute to the World Court with a request for an advisory opinion. This the Court declined to render, after Russia had again refused to submit its case, on the ground that without the consent of both parties the Court had no jurisdiction.

The number of disputes submitted to the Court for judicial decision increased as the years passed. Judgments were announced in a dispute between Greece and Bulgaria over the interpretation of the Reparation Clause in the Treaty of Neuilly (1924) and between Germany and Poland over German interests in Upper Silesia. An important advisory opinion in 1926 concerned the interpretation of that section of the Treaty of Lausanne delimiting the Mosul boundary between Turkey and Iraq.

The later important judgments included the case of the *Lotus*, a French ship, which after colliding with a Turkish vessel at sea in 1927, made its way to Constantinople where the authorities arrested the officer of the watch. By a majority of one, the Court rejected a French suit for damages, holding that the laws of a nation may apply beyond its limits unless there is a rule of international law to oppose it. In 1927 three important advisory opinions regarding the powers and jurisdiction of the European Commission of the Danube were issued. A judgment rendered April 26, 1928, dealt with difficult issues concerning the admission of children to the German minority schools in Polish Upper Silesia. During the same year, the Court issued an order denouncing the treaty between China and Belgium of Nov. 2, 1865, and delivered advisory opinions concerning the jurisdiction of the courts of Danzig and interpreting the Greco-Turkish Agreement of Dec. 1, 1926.

Up to 1929, the Court had delivered thirteen judgments and sixteen advisory opinions upon international controversies.

In 1926, 31 of the 75 articles composing the constitution of the Court were revised, the bulk of them dealing with procedure. Among the new rules was a provision that the Court should sit in private when deliberating upon an advisory opinion. In 1927 the rules governing advisory decisions were amended to provide that advisory opinions should be given after deliberation of the full court and that if the opinion sought relates to a dispute between two or more states, each of the parties, if it has no national among the judges of the Court, may appoint one of its nationals to sit as judge *ad hoc*.

A committee of international jurists, appointed by the League of Nations to consider the revision of the statute of the World Court, met in March, 1929. Besides approving the Root formula intended to facilitate the adherence of the United States to the Court, the committee recommended that the number of judges should be increased from 11 to 15, that the four deputy judgeships be abolished, and that the Court should sit in continuous session, the judges acting in rotation, rather than in annual sessions as now.

The report of the committee of jurists, embodying these recommendations, was accepted by the Council of the League in July, 1929, and by the Tenth Assembly, which met from Sept. 2 to 25, 1929. Forty-eight nations signed the new protocol during the meeting of the Assembly. At the same meeting, the optional clause for the acceptance of the Court's compulsory jurisdiction was signed, with various reservations, by 15 powers, among them Great Britain, France, Italy, Czechoslovakia, and the several British Dominions. With the exception of France, which signed for the second time, and Germany, the great powers had hitherto consistently declined to sign the clause.

An extraordinary session of the Court was held in June, 1929, to consider the so-called gold-franc cases between France and Brazil and France and Jugoslavia, and the Franco-Swiss zone dispute. Charles Evans Hughes, the new American member elected to succeed John Bassett Moore, took his seat for the first time.

The United States and the World Court. The question of America's adhesion to the World Court protocol has remained an important public issue since the receipt on Aug. 15, 1921, by the Secretary of State of a certified copy of the protocal and accompanying statute from the Secretary General of the League of Nations. President Harding, on Feb. 24, 1923, submitted both protocol and statute to the Senate with a request for its consent to American adhesion with four "conditions and understandings" explained in an attached letter from Secretary of State Hughes. The committee on foreign relations reported the proposal favorably to the Senate on May 26, 1924, but with radical amendments. Before the debate began in the Senate on Dec. 17, 1925, the Court had been endorsed by both party platforms in 1924, and by the House of Representatives on Mar. 3, 1925 (vote of 303 to 28), and America's entrance into the Court had been repeatedly urged by President Harding previous to his death and later by President Coolidge.

On Jan. 27, 1926, the Senate accepted the resolution (76 to 17) approving adherence to the protocol, but with five reservations. The first four of these disavowed the assumption of any obligations under the Treaty of Versailles, gave the United States the right to withdraw, stipulated that the Senate must consent to agreements submitting cases to the Court, and reserved the policies of Washington's Farewell Address and the Monroe Doctrine. The fifth reservation read as follows:

"That the Court shall not render any advisory opinion except publicly after due notice to all States adhering to the Court and to all interested States and after public hearing or opportunity for hearing given to any State concerned; nor shall it, without the consent of the United States, entertain any request for an advisory opinion touching any dispute or question in which the United States has or claims an interest."

Copies of the resolution were forwarded to all signatories of the protocol on March 2, the resolution also having stipulated that the United States should not sign the protocol until all signatory powers had indicated their acceptance of the reservations through an exchange of notes. The reservations proved unacceptable as drawn, however, and on March 18, the Council of the League adopted the suggestion of Sir Austen Chamberlain, the British representative, which pointed out the various difficulties raised by the United States reservations, and called a meeting of representatives of all signatory states and of the United States at Geneva to arrange a new agreement satisfactory to all concerned. Secretary of State Kellogg declined the invitation, but 40 of the League members accepted and the conference was held from Sept. 1 to 23, 1926. The conference found no great objection to the first four reservations and the first half of the fifth.

Interpretations placed upon the last half of the fifth reservation varied considerably but fell into three general lines. The first was that the United States wished equality with members of the Council in controlling requests for advisory opinions. This the resolution would ensure in case the Council could only make such requests by unanimous vote. But the constitutional law of the League on this point had not been definitely settled and it was felt that this must be decided before an answer could be given to the United States. In some cases, a majority vote of the Council sufficed to authorize a request for an advisory opinion. The point was raised that in such cases the reservation gave the United States a power greater than that possessed by any member of the Council.

The second point raised in objection to the reservation was that even if the United States formally claimed only the same powers as a member of the Council, it was in substance claiming much more because of its freedom from League responsibilities and League participation. It was further pointed out that in addressing the reservation to the Court rather than to the Council, the United States sought to reserve the power to forbid the Court to give an opinion after the Council had requested it, thereby asking a power equal to that of the Council as a whole.

The third interpretation viewed the reservation as a legitimate insistence upon the recognized principle of mutual consent in the submission of disputes to arbitration or a court, except for the inclusion of the phrase "claims an interest." Taken literally, it was pointed out, this meant that the mere declaration by the United States that it had an interest in a dispute would compel the Court to declare itself incompetent without considering whether the claim was justified.

The general conclusion arrived at was that the reservation carried such grave possibilities of weakening the whole institution of advisory opinions that it could not be accepted without some safeguard. The safeguard agreed upon was that with regard to advisory opinions in which the United States claimed an interest but did not, in the opinion of the court, have one, the intervention of the United States would not necessarily prevent the Court from issuing an advisory opinion but would have the same effect as the adverse vote by a member of the Council or Assembly. A counter-reservation was also adopted permitting each signatory to withdraw its acceptance of the Senate's fourth and fifth reservations, if such action was taken by two-thirds of the parties other than the United States within a year.

The next move was to secure the consent of the United States to this amendment to the fifth reservation and to the counter-reservation proposed by the conference. Efforts in this direction were halted, however, when President Coolidge on Nov. 11, 1926, announced that he did not feel warranted in asking the Senate to modify its position and that he saw no prospect of America's adhering to the Court without full acceptance of the Senate reservations.

Secretary of State Kellogg, in a circular letter to signatories of the World Court protocol sent out in March, 1929, suggested a renewal of negotiations for an agreement upon the matter of advisory opinions. His letter was referred to the second international committee of jurists, then about to consider amendments to the World Court protocol. The committee included Elihu Root who submitted a formula through which he hoped the signatories of the protocol would find it possible to accept the Senate's fifth reservation. The formula, with some modification, was accepted by the committee of jurists on March 11, and by the Tenth Assembly of the League of Nations in September after Secretary of State Stimson had announced that "it would effectively meet the objections represented in the reservations of the United States Senate and would constitute a satisfactory basis for the adherence of the United States."

The text of the protocol adjoined to the revised statute of the Court pledges the signatories of the protocol of Dec. 16, 1920, to accept the Senate's five reservations, and grants the United States equality with all members of the Council and Assembly in the election of judges or deputy judges of the Court. It further provides that the Court shall render advisory opinions under the same conditions as before. However, to insure that the Court shall not render an advisory opinion touching any dispute in which the United States has or claims an interest without its consent, the following procedure is provided:

The United States is to be informed of every request for an advisory opinion. If that country so desires there will be an exchange of views regarding it. An objection of the United States will be given the same weight as that of any member of the League. If no agreement is reached and the League decides that the Court must be asked to deliver the opinion, the United States may then withdraw from the Court "without any imputation of unfriendliness or unwillingness to coöperate generally for peace and good will." The protocol further provides that the United States may withdraw from the League at any time. Also, that the acceptance of the United States reservations by the other signatory states may be withdrawn if two-thirds or more of the signatories signify within a year from the receipt of the first notification that they so desire.

Before Mr. Root submitted his formula to the committee of jurists, it received the approval of President Coolidge and of leading Senators. President Hoover, in his Armistice Day address of Nov. 11, 1929, strongly urged America's adhesion to the Court in accordance with the terms of the new protocol. The original World Court statute of 1920, the Root protocol, and the protocol containing the above amendments to the original statute were signed on behalf of the United States government at Geneva Dec. 9, 1929, by Jay Pierrepont Moffat, American chargé d'affaires at Berne. Three steps remained to be taken before the participation of the United States in the work of the Court became effective:

(1) the signature of the Root protocol by Abyssinia, Albania, and Lithuania, the only three of the 53 members of the Court who had not yet signed it, (2) ratification by the United States Senate of all three protocols, and (3) ratification of the Root protocol by all 53 members of the Court.

Indications were that the matter of ratification would not come before the United States Senate until after the congressional elections of 1930. Senator Borah and other leading members of the Foreign Relations Committee announced that the Root protocol did not meet their objections to American participation and that they would oppose ratification. Nevertheless, it was anticipated that the resolution to ratify would secure the necessary two-thirds vote. Little difficulty was expected with regard to the other two steps.

The United States was the fifty-fourth state to sign the original statute, the fifty-first to sign the Root Protocol, and the forty-ninth to sign the amended statute.

Bibliography. The more notable and useful works on the World Court include Antonio Sanchez de Bustamante, *The World Court* (Eng. trans., New York, 1925); Alexander P. Fachiri, *The Permanent Court of International Justice* (1925); David Jayne Hill, *The Problem of a World Court* (New York, 1927); Manley O. Hudson, *The Permanent Court of International Justice and the Question of American Participation* (Cambridge, 1925); Frances Kellor and Antonia Hatvany, *The United States Senate and the International Court* (New York, 1925); John Bassett Moore, *International Law and Some Current Illusions* (New York, 1924); James Brown Scott, *The Project of a Permanent Court of International Justice and Resolutions of the Advisory Committee of Jurists* (Washington, 1920).

WORK-PLAY-STUDY SCHOOL. See EDUCATION IN THE UNITED STATES.

WORLD LEAGUE AGAINST ALCOHOLISM. An international organization whose object is to attain by means of education and legislation the total suppression of alcoholism throughout the world; founded in 1916 at a conference of the Anti-Saloon League of America at Columbus, Ohio. Meetings are held triennially, an important one having taken place in 1927 at Winona Lake, Ind. The membership in 1927 was comprised of 56 national temperance organizations from 33 leading countries. Dr. Ernest H. Cherrington was general secretary in 1929. Headquarters are at Westerville, Ohio, with branch offices in London, England, Lausanne, Switzerland, Oslo, Norway and Toronto, Canada. See PROHIBITION.

WORLD WAR. On June 28, 1914, the Austrian heir apparent, Archduke Francis Ferdinand (see VOL. IX), and his wife were assassinated at Serajevo, the capital of Bosnia. This set in motion a train of events which culminated in the terrible catastrophe of the World War. It is clear, however, that this crime was not the real cause of the tremendous struggle which many of the statesmen and diplomats of Europe had anticipated and which all had feared for many years. The underlying causes of this tremendous struggle reach far back into the past and cannot be reduced to any simple formula. Some knowledge of the important political and economic forces shaping the history of Europe during the past century is necessary. Among the many and complex influences suggested as causes of the War, three forces appear to have contributed most directly to the critical situation of Europe in 1914. These were (1) the clashing of national interests and ideals, (2) the maintenance of a system of military alliances, and (3) the economic rivalry among the nations of Europe.

National Antagonisms. Viewed broadly, the political history of Europe in the nineteenth century divides into two movements inherited from the French Revolution and Napoleonic era: (1) the growth of democracy, and (2) the realization of national liberty. When the diplomats of the great Powers met at the Congress of Vienna, 1814–15, to readjust the map of Europe, many expressed the hope that the Congress would be guided in its work by these two principles. Unfortunately, they were ignored whenever it was necessary to do so in order to satisfy the dynastic and personal influences which dominated the Congress. In the first place, these principles were anathema to the reactionaries, and in the second place, Metternich, the ultraconservative Austrian Chancellor who dominated the Congress, realized that encouragement of the national principle would endanger the heterogeneous Austrian dominions. Consequently, the work of the Congress of Vienna was an effort to establish the status quo ante bellum. As a result of its endeavors, there were many violations of the principle of nationality.

Revolutionary periods, following one another during the nineteenth century, endeavored to undo the work of the Congress. Some of these were successful. For example, Belgium was separated from Holland, and Venetia and other Italian-speaking sections were taken away from Austria and joined to the newly-created Italian kingdom. At the close of the nineteenth century, however, several situations remained which clearly violated the principle of national sovereignty. Alsace and Lorraine, although not an inheritance of the French Revolution, clearly represented a violation of the above-mentioned principle. The newly-created German Empire annexed these provinces for reasons partly economic and partly political. French aggression following the battle of Jena, and the rich coal and iron mines in the region, were the fundamental reasons for annexation. The French people were constantly aware of the challenge to regain these lost provinces, and Bismarck used the French attitude as justification of his programme of huge military armaments in Germany.

Nowhere else in Europe was the problem of nationality so acute during the nineteenth and early twentieth centuries as in Austria-Hungary. The very existence of the Austro-Hungarian monarchy was a constant challenge to the principle of nationality. Logically carried out, this principle would mean the disappearance of Austria-Hungary and the distribution of its territories among the surrounding nations, or the creation of new ones. The appreciation of this fact made the Austrian authorities apprehensive of all nationalist movements and especially of that of the southern Slavs, in Serbia, Montenegro, Bosnia, etc. As will be seen, it was the outgrowth of one of these movements that led to the outbreak of the War. The Balkan states presented a peculiarly vexing problem in the realization of the principle of nationality. The intricate mixture of racial groups in this region made it an almost hopeless task to arrange geographical boundaries to correspond with national lines. The problem was complicated, moreover, by the clashing of the interests of the great European powers, especially Austria and Russia, in this territory. The condition of chronic disorder and strife in this region during the nineteenth century was a source of almost constant concern to the diplomats of the great European states. While the triumph of the ideal of nationality did much to advance European civilization, it was not an unmixed blessing. Too often national patriotism became a fetish. Love of one's country meant a lack of appreciation or a contempt for the people of other countries, a feeling that the *Kultur* of one's country was not only different from but distinctly superior to that of any other country. From this it naturally followed that it was a laudable ambition to wish to impose one's superior civilization on an inferior people. From this developed the inevitable antagonism of national interests which dominated European politics during the nineteenth century. In its extreme form this national spirit found expression in movements to unite various related ethnic and racial groups into one political group. Such movements were more or less prominent in Germany, Russia, and the Balkan states, under the names of Pan-Germanism, Pan-Slavism, Pan-Serbianism, etc. It is doubtful whether any of these movements had passed beyond the state of vague aspirations held by a comparatively small group of people. As contributing causes of the War, the Pan-Slavic and Pan-Serbian movements were of some importance. The growth of such propaganda was a source of concern to Austria-Hungary, with its large Slavic population. In Germany, although the movement was limited to a comparatively small group, it was very active. Prominent historians, scientists, and philosophers expounded its views, while numerous societies were formed to advance German ideas of culture and civilization throughout the civilized world.

Military Alliances. One of the chief results of the prevalent spirit of intense nationalism was the feeling that it was necessary to defend it with huge armaments. Everywhere the doctrine of military preparedness was advocated, and it bore fruit in the tremendous standing armies and huge navies of the different European countries. It led also to the grouping of the great European powers into two hostile military alliances. The rise of Germany and Italy between 1860 and 1870 seriously disturbed the old European Concert formed at the Congress of Vienna. Bismarck was the guiding spirit in the formation of the first alliance. In order to isolate France he strove to unite Austria, Russia, and Germany. Russia soon withdrew because of inability to get along with Austria. Bismarck then bound Germany and Austria closer together, and in 1882 Italy joined the agreement, thereby forming the Triple Alliance. This was an unnatural alliance for Italy, inasmuch as her interests and Austria's were almost diametrically opposed both in Italia Irredenta and in the Balkans. France had checkmated Italy in Tunis, however, and this, with her support of the temporal power of the Pope, during the period of the Italian struggle for unity, led Italy to make this unnatural and, as later events proved, impossible alliance. It was not to be expected that the other powers of Europe would view this Triple Alliance without concern. France and Russia formed a Dual Alliance (1895), and finally Great Britain, aroused by the threatening naval policy of Germany, abandoned her policy of "splendid isolation" and joined with France and Russia to form a second diplomatic group known as the Triple Entente. Largely through the efforts of Sir Edward Grey, misunderstandings among these three were cleared up and a "diplomatic group" established. The precise nature of this understanding was indefinite; no treaty agreement specified its scope. The formation of these two rival groups created a situation in Europe where every disturbance of the political or military status quo brought on a crisis. After 1905, Europe passed through several such crises, each one increasing the tension among the great powers and making the maintenance of peace more difficult.

The first crisis came in 1905, over the situation in Morocco. France in her negotiations with England had been granted a free hand in Morocco, and was engaged at this time in penetrating the country economically and politically. Germany considered this an opportune moment to assert herself and get a "place in the sun." She had definitely abandoned the Bismarck policy of indifference to colonial expansion and had determined to acquire colonies either in unclaimed territory or by taking those already under the sovereignty of another power. On Mar. 21, 1905, the German Emperor, while on a voyage to Constantinople, disembarked at Tangier and encouraged the Sultan to reject the scheme of reforms proposed by France. He also succeeded in forcing France to submit the whole Moroccan question to a conference of the powers held at Algeciras in January, 1906. France won a distinct diplomatic victory when England strongly supported her and Italy refused to support her ally. One phase of Germany's policy of colonial and commercial expansion contemplated the extension of Teutonic commercial and political interests in the Balkans and Turkey. In this *Drang nach Osten*, Germany, in conjunction with Austria, hoped to create a great economic if not political sphere of influence, extending through the Balkans to Constantinople and thence through Turkey in Asia to the Persian Gulf. German engineers and German capitalists began to develop Turkish resources. German military officials trained the Turkish forces. In July, 1908, a revolution led by the Young Turks broke out in Constantinople. Taking advantage of this situation, Bulgaria annexed eastern Rumelia and declared her complete independence of Turkey. Austria annexed Bosnia and Herzegovina. Although Italy and Serbia were aroused by this action, Germany stood by her ally, and Russia was too weakened by the Russo-Japanese War to do more than protest feebly. The Teutonic allies had scored a distinct diplomatic success and another European crisis was passed. In 1911, a second Moroccan crisis brought war dangerously near. This was the so-called Agadir incident. It resulted in a compromise by which Germany recognized France's predominant interest in Morocco in return for 100,000 square miles of territory in the French Congo. The same year witnessed the Turco-Italian War, during which Germany was compelled to stand by and permit her protégé, Turkey, to be despoiled by her ally, Italy.

The Turco-Italian War was followed by a widespread upheaval in the Balkans. The Greeks, Bulgarians, Montenegrins, and Serbs, strongly resenting the attempt of the Young Turks to Ottomanize them, patched up their differences and organized the Balkan League. Despite the desire of the large powers to maintain the status quo in the Balkans, the League declared war on Turkey in October, 1912, and defeated her. A second Balkan war followed a dispute over the division of the spoils. Serbia, Greece, and Montenegro combined against Bulgaria and Rumania, and Turkey sided with them. The intervention of the great powers resulted in the establishment of an autonomous Albania under the kingship of Prince William of Wied. Germany and Austria were keenly disappointed as a result of the Balkan wars. Turkey had been practically driven from Europe, and the strengthening of the Balkan states and Russian influence in the peninsula checked the plans of Austria to reach the Ægean Sea at Saloniki. Germany's answer to her virtual defeat in the Balkans was the introduction of the Army Bill of 1913, which added 136,000 men and officers to the peace footing of the army. France replied by increasing her military service from two to three years. Russia, Austria-Hungary, and even the smaller nations of Europe caught the contagious army fever and either increased the peace footing of their armies or spent huge sums in further military preparations. Germany constructed strategic railways leading up to the Belgian frontier, and Russia projected construction of railways that would facilitate mobilization against Germany. A veritable panic was created in the spring of 1914 by the charges and countercharges appearing in the press of the various interested countries.

Economic Causes. At the close of the eighteenth century there occurred in Europe a complete transformation of industrial conditions, known as the industrial revolution. England was the first country to feel the effects of this change. In time, the industrial revolution reached other countries: France in the period after 1830, the United States in the period after the Civil War, and Germany after 1880. The great industrial interests in these countries began to compete with those of England for the control of the markets of the world. England had the advantage of having vast colonial possessions which might serve both as a market for her manufactured products and as a field for the investment of surplus capital in the development of their natural resources. France and the United States, to a lesser degree, also enjoyed this advantage. Germany, on the other hand, because of her later appearance as a world power, was practically without colonial possessions of any potential power. She felt that her industrial development was being hampered through no fault of her own but simply because the best parts of the world had been appropriated by others. Despite this unfavorable position in colonial affairs. Germany prospered commercially and industrially to a marvelous degree. By German apologists for the War, Great Britain was bitterly accused of envying German prosperity and of welcoming the War as an opportunity to crush German industrial and commercial activity. On the other hand, Germany was accused of waging war for economic aggrandizement. Two factors worked together to weld the many petty German states into a united nation. One was the army and the other the industrial capitalists. After the Franco-Prussian War, these two groups demanded a protective tariff. The army class, composed almost entirely of landholding aristocrats, demanded a high tariff on farm products and a protective tariff on manufactured articles. Both groups desired to stifle competition in the home market. The tariff adopted in 1879 had far-reaching results. It led to distrust on the part of Russia and Germany for each other. In 1904, a 10-year reciprocity agreement was signed, whereby each country made certain reductions in its tariff duties. The Russians felt that the Germans had got the best of the bargain. In 1914, as the date approached for the renewal or modification of the treaty, fear was expressed in the German press lest Russia's improved army would enable her to demand more favorable terms. In this fashion the desire of each nation to tax foreign imports and at the same time to obtain free admission of its own products into foreign countries stimulated militarism and provoked war-like sentiments among the powers. The United Kingdom adhered to its free trade policy and with few exceptions admitted the products of all lands on equal footing. The British self-governing colonies, however, had adopted protection.

Whether because of the protective tariff wall or because of other causes, the business interests of the Empire prospered mightily. By 1912, British foreign commerce excelled the German by about $1,300,000,000; but German commerce had trebled itself since 1883, while British commerce had not quite doubled. The German government derived rich revenues from the customs duties on an expanding commerce, and viewed with satisfaction the prodigious increase in wealth and population (population increased from 41,000,000 to 66,000,000 between 1871 and 1912) which furnished men and money for an ever-growing army. The landowning and industrial classes considered the army a protection and insurance for their interests. In one respect, however, the German business community was dissatisfied. The German merchant marine, although it had rapidly expanded, was still four times outweighed by British shipping. Great Britain's superiority was ascribed to her earlier economic development, to the fact that Germany had very little Atlantic seacoast and to the superiority of the British navy. Germany, therefore, set herself to overcome these handicaps. Undoubtedly many German businessmen desired the overthrow of the British naval power and the acquisition of an Atlantic seaport such as Ostend in Belgium. Desires just as strong were urging Russia on to Constantinople and the southern Baltic, Serbia on to the Adriatic, and Austria-Hungary on to Saloniki.

In the carving out of a colonial empire, the interests of the industrial and commercial classes also clashed. In the last quarter of the nineteenth century certain groups of businessmen awoke to the opportunities which the vast uncivilized areas of Africa and Oceania offered for the sale of cheap cotton goods, cheap liquors, and other manufactures, for the highly remunerative investment of money in the construction of railways, the development of mines and the traffic in rubber, ivory and oil. King Leopold of Belgium, one of the first to realize the opportunity, acquired control of the Congo region in the heart of Africa. France carved out a mighty colonial empire, and Great Britain added to hers. Germany, a belated arrival in the field, was permitted, even encouraged by the British government, to acquire territories in Africa; but when Germany challenged the French in Morocco and appeared envious of the British and French possessions, the prospect of a war for world empire began to fill Europe with uneasy forebodings. Concessions as well as colonies were contended for by German, French and British capitalists. For example, when, in 1914, Bulgaria, in return for a loan, arranged to concede to German capitalists valuable railway and mining privileges in Bulgaria, a rival bid was unsuccessfully made by the French. The financing of the Bagdad railroad occasioned considerable rivalry among France, Germany and Great Britain until an agreement was reached. Each nation raised an envious outcry when a competing nation secured for itself some new economic plum. In 1914, German interests maintained that they were being outstripped by the other powers; that the English were greedily helping themselves to the oil product of Persia and striving to secure the oil fields of Latin America; that the French capitalists were securing new railway contracts in China, in Russia, and in Greece.

Of all economic interests inimical to peace, the most dangerous was the arms-manufacturing business. In Germany, the Krupps were accused of stirring up hostility between France and Germany in order to obtain larger orders for arms. Every army bill, every dreadnought, meant profits for the armament firms. The Balkan wars were fought with weapons forged in Germany and France. English firms—Armstrong and Vickers and Whitworth—were engaged to build an ordnance factory in Russia and to construct battleships for Spain, for Brazil, for Turkey. For the armament manufacturers of all nations, the War was a golden opportunity.

Finally a word may be added regarding the banking interests and the War. The panic and consternation in financial circles at the outbreak of the War have been cited as conclusive proof that capital did not want the War. While there is doubtless much truth in this reasoning, the fact must not be overlooked that in panics large fortunes are won as well as lost. The huge war loans, moreover, offered unexampled opportunities for financial speculation.

OUTBREAK OF THE WAR AND NEUTRAL NATIONS

The assassination of the Archduke Francis Ferdinand on June 28, 1914, was followed, on July 23, by the presentation of a note to Serbia by Count Berchtold, the Austro-Hungarian Foreign Minister. The note began by recalling the declaration made by Serbia on Mar. 31, 1909, wherein Serbia recognized the *fait accompli* regarding Bosnia and agreed to renounce any attitude of protest or opposition to the annexation of Bosnia to Austria. The Austrian note then went on to complain that Serbia had not lived up to this undertaking, and had made it necessary for Austria to take action to protect herself against the Pan-Serbian propaganda. Austria insisted that Serbia should make an official and public condemnation of this propaganda and express regret at its consequences. The note then submitted 10 specific demands and required an answer from Serbia within 48 hours of the presentation of the note. These demands required that Serbia should suppress every publication that excited hatred of the Dual Monarchy; that the Serbian government dissolve certain societies accused of fomenting the propaganda hostile to Austria; that teachers guilty of instigating hatred of Austria be dismissed and that objectionable matter in the textbooks be eliminated; that Serbia dismiss from her army and governmental employ all officers and officials found taking part in the propaganda; that Serbia accept the collaboration of agents of the Austro-Hungarian government in suppression of the subversive movement against Austria; that Austro-Hungarian representatives be allowed to take part in the investigation of persons in Serbia accused of complicity in the murder of the Archduke; that Serbia take action against two specified officials who were accused of complicity in the crime at Serajevo; that Serbia take effective measures to stop the smuggling of arms and ammunition across her border; and, finally, that Serbia give explanation of the expressions of hostility toward Austria-Hungary on the part of certain high Serbian officials.

The publication of this note immediately aroused great apprehension in the chancelleries of the European powers. It was clear that Europe was confronted by another serious crisis. The first move of Sir Edward Grey, the British Foreign Minister, was to urge on Austria-Hungary the necessity of extending the time limit of the ultimatum. M. Sazonov, the Russian Foreign Minister, strongly supported him in this. Austria flatly refused any extension of time and they then turned their efforts toward the persuasion of Serbia to accept, as far as possible, the demands made by Austria.

The Serbian Reply. The Serbian reply was handed to the Austrian minister on July 25, only two minutes before the expiration of the time limit. Most of the Austrian demands were granted with slight verbal changes. There were two points, however, with which Serbia did not comply: (1) To the demand that Serbia accept the collaboration of agents of the Austrian government in the suppression of the subversive movement directed against the territorial integrity of the Dual Monarchy, Serbia replied that she did not understand exactly the meaning of the demand but that she was ready to accept such collaboration as should conform to the principles of international law and criminal procedure. (The Austrian rejoinder stated that it was not a question of international law but of the exercise of police powers which could be settled by agreement between the parties concerned.) (2) The demand made by Austria that Austrian officials be permitted to take part in the investigation relating to the judicial proceeding in Serbia against persons involved in the Serajevo crime, the Serbian government would not concede, on the ground that such action would violate the Serbian constitution. (The Austrian rejoinder accused the Serbian government of deliberately misrepresenting the Austrian demand, which contemplated simply a participation in the preliminary investigation to the judicial proceedings.) Finally, the Serbian government agreed, in case the Austrian government should find the reply unsatisfactory, to submit the disputed questions to The Hague tribunal or the Great Powers for decision. Austria considered Serbia's reply entirely unsatisfactory. This meant war unless some unforeseen action of the Great Powers checked it.

The Russian Ambassador to Vienna stated on July 24 that "any action taken by Austria to humiliate Serbia could not leave Russia indifferent." Russia felt that the crushing of Serbia would reduce her to a vassal state of Austria, and that this would imperil the balance of power in the Balkans. In view of this situation the Russian Foreign Minister stated that Russia would mobilize against Austria on the day that the Austrian army crossed the Serbian frontier. This determined attitude rendered futile any efforts the other powers might make to localize the struggle. Germany's position was fairly well defined by repeated statements that it was Austria's affair but, if any other power interfered, her interests were vitally affected. On July 26, Sir Edward Grey suggested a conference of the representatives of the four powers, England, France, Germany and Italy, for the purpose of discovering an issue which would prevent complications between Austria and Russia. To this suggestion France and Italy agreed; Germany, however, declined to fall in with this plan. The German Foreign Minister stated that "a conference such as Sir Edward Grey suggested would amount to a court of arbitration and could not, in his opinion, be called together except at the request of Austria and Russia," and furthermore, that he did not think it (the conference) would be effective, because such a conference would, in his opinion, have had the appearance of an Areopagus consisting of two powers of each group sitting in judgment upon the two remaining powers.

Direct negotiations between Russia and Austria were unsuccessful, Austria refusing to consider a modification of her ultimatum to Serbia. Further efforts on the part of England to have Germany propose some formula which would be acceptable proved unavailing, and on July 28, 1914, Austria declared war on Serbia. This action on the part of Austria appears explicable on one of two grounds. Either she was convinced that Russia was bluffing and would back down, as she did in 1908, or else Austria was prepared, deliberately, to precipitate a European war.

Germany and Russia. Russia had continuously maintained that the fate of Serbia was of great concern to herself, and as a result of the Serbian note she declared partial mobilization against Austria. These military preparations caused frantic efforts on the part of the various governments to prevent a general European conflagration. On July 29, Sir Edward Grey urged that "the German government should suggest any method by which the influence of the four powers could be used to prevent war between Austria and Russia." Italy and France agreed. Germany agreed to the extent of urging Austria to renew her negotiations with Russia. At the same time, Russia was to prepare a formula that would be satisfactory to herself. This was done, but it was entirely unsatisfactory to Austria and Germany. Sir Edward Grey brought additional pressure to bear upon Germany. Germany, on her part, brought pressure to bear on Austria to agree to discuss with Russia the terms of the Austrian ultimatum, and at the last moment, on July 31, Austria agreed to do so. This slender hope of avoiding a world-wide catastrophe was nullified by the demand made by Germany that Russia should cease her military preparations and demobilize her army. Russia made no reply to this ultimatum and at 5 P.M. on August 1, the Russian government was notified that Germany considered a state of war existed between the two countries.

Germany and France. At the same time that Germany presented the ultimatum to Russia, a communication was sent to France informing her of Germany's action and asking what attitude France would take in the event of war between Germany and Russia. An answer was demanded within 18 hours. To this demand the French Premier replied on August 1 that "France would take such action as her interests might require." Despite this unsatisfactory answer the German Ambassador did not leave Paris until August 3. In the meantime, charges and countercharges were made by the French and German authorities that warlike moves had been made on the frontier.

Great Britain and Germany. From the first it was evident that the question of England's attitude in the face of the great European crisis was of the most vital importance. Russia and France continually urged upon her the necessity of coming out definitely and stating that she would firmly support her allies. Sir Edward Grey refused to do this, arguing that he could accomplish more as a mediator. Germany fully appreciated the importance of keeping Great Britain neutral if possible. The German Chancellor requested that Sir Edward Grey formulate conditions on which Great Britain would remain neutral. This was declined with the statement, "We must keep our hands free." The British government, therefore, up to the very last day of European peace, refused either to bind herself to come to the aid of France and Russia or to remain neutral. Great Britain's complete entrance into the war came about as a result of the violation of Belgian neutrality, although partial intervention was brought about when, on August 2, Sir Edward Grey informed the French government that the British fleet would protect the northern coast of France from any attack by the German fleet. On July 31, Grey telegraphed the British ambassadors at Paris and Berlin to request the French and German governments to state whether they were prepared to respect the neutrality of Belgium so long as no other power violated it. France replied affirmatively but Germany evaded a direct answer. On August 2, the German Minister presented to the Belgian Foreign Minister an ultimatum which stated that Germany had "reliable information . . . of the intention of France to march through Belgian territory," that it was "an imperative duty for the preservation of Germany to forestall this attack." Germany agreed to evacuate Belgian territory as soon as the war was over and to indemnify Belgium for all damages if she would maintain an attitude of "friendly neutrality." In case of refusal, Germany stated, Belgium would be considered as an enemy and the question would be left "to a decision of arms." Belgium refused and called upon the signatories of the Treaty of 1839 to carry out the guarantee of Belgian neutrality. In response to this request, Sir Edward Grey, on Aug. 4, 1914, sent an ultimatum to Germany demanding a satisfactory reply to the request that Belgian neutrality be respected and requiring an answer by midnight of the same day.

Upon Germany's refusal to give such a guarantee, Great Britain declared war on Germany. Despite Germany's efforts to justify the invasion of Belgium on other grounds, to the impartial observer it would appear that Germany's justification must rest entirely on the ground of military necessity. Notes taken by the German Ambassador to London during this period, Prince Lichnowsky, were published in 1918 and caused a sensation by their revelation of the friendly attitude of England and her desire to maintain peace in the period preceding the War. His *Heading for the Abyss* was published in London shortly after Lichnowsky's death in 1928.

Italy's Position. At the outbreak of the War, Italy found herself in a most trying position. To Germany and Austria she was bound by the defensive treaty of the Triple Alliance. Her position as a member of this alliance had, from the beginning, been unnatural, largely because of her aspirations in Trieste, the Trentino and the Balkans. In practically all the crises of the twentieth century, Italy stood aloof from her allies. When war broke out in 1914, Italy declared that she would remain neutral. During the next 10 months a struggle went on throughout the entire country between the neutralists and the interventionists. Despite efforts on the part of Germany and Austria to satisfy Italy's demands on the Adriatic, Italy declared war against her former allies on May 24, 1915. See ITALY, *History*.

Japan's Position. Japan's entrance into the War was due to her treaty of alliance with Great Britain. This treaty (1902) largely came about as the result of the loss of the fruits of the Chinese-Japanese War at the hands of Germany, France and Russia. Actuated by motives of revenge for this humiliation as well as by a determination to carry out her obligations to Great Britain, Japan declared war on Germany on Aug. 23, 1914. See JAPAN, *History*.

Turkey. Germanic influence had for a number of years prior to the outbreak of the War been predominant in Turkey. It was natural, therefore, that Turkish sympathies should be with the Teutonic allies. Turkey hesitated, at first, to make common cause with Germany, because of her exposed position and the fact that the two Balkan wars had left her exhausted, but events soon forced her to show her hand, and when, on October 29, the *Breslau*, a German warship which had taken refuge in Turkish waters, bombarded the Russian Black Sea port of Theodosia, Russia broke off diplomatic relations. This action was followed by France and England's declaring war on Turkey on Nov. 5, 1914. See TURKEY, *History*.

Balkan States. Serbia and Montenegro were involved in the War from the first, the latter coming to the aid of the former within two weeks after Austria's declaration of war. The Triple Alliance and the Triple Entente were keenly desirous of obtaining the aid of Bulgaria, Greece and Rumania. In October, 1915, Bulgaria threw in her lot with the Teutonic Allies, frankly stating that the proposals made by them were more alluring than others and expressing the belief that they were going to win the war. (See BULGARIA, *History*.) In Greece, conflicting influences and interests complicated the situation. The King (Constantine) was pro-German, while the Premier, Venizelos, was pro-Ally. The King was strong enough, in the beginning, to thwart the attempts of the Entente to have Greece enter the War on the Allied side. In June, 1917, he was compelled to abdicate and turn the government over to his second son, Alexander. Shortly after this (July 2) the Greek government declared war against Bulgaria and Germany. For the rapidly changing vicissitudes of the Greek government during this period see GREECE, *History*. In Rumania the situation was very similar to that in Bulgaria. The reigning house was pro-German while the majority of the people were pro-French and Italian. The Premier, Bratianu, advocated a policy of waiting, with the intention of entering the war at the proper time, when the greatest reward could be obtained by the least fighting. This policy was continued until Apr. 28, 1916, when the Rumanian Minister at Vienna presented a note to the Austro-Hungarian Foreign Minister which said that Rumania considered herself at war with Austria-Hungary since 9 o'clock the previous evening. See RUMANIA, *History*.

Portugal. Portugal was bound by a treaty of alliance with Great Britain, and, at the outbreak of the War, said she was willing to live up to her obligations whenever Great Britain saw fit. In February, 1916, she seized some German vessels in her harbors, and on Mar. 8, 1916, Germany declared war on her, giving this seizure as the cause. See PORTUGAL, *History*.

The United States. As the largest and most important of the neutral powers at the outbreak of the War, the United States was sure to be vitally affected. As the champion of smaller neutral nations and as the source of vast quantities of war supplies, it was only natural that the attempt to maintain strict neutrality was a trying one. The problem was made more difficult by the attitude of groups of persons in this country whose sympathies were with one or the other of the belligerents in Europe. From time to time, the American government was involved in important discussions with the European powers. The more important of these were, Blockade and Neutral Trade, Interference with Mail, the Sinking of the *Lusitania*, the Mexico Note, and Submarine Warfare and the War Zone. Chiefly as a result of the controversy with Germany over this last subject, the United States declared war against her on Apr. 6, 1917. Shortly after the United States declared war, the following states either severed diplomatic relations with Germany or declared war on her: Cuba, Panama, Costa Rica, Guatemala, Nicaragua, Honduras, Haiti, Brazil, Liberia, Siam and China (qq.v.). For the relations to the war of countries not mentioned in this section, see section *History*, in the articles treating those countries. For convenience, the following dates for the declarations of war are given:

CENTRAL POWERS

Austria against Serbia—July 28, 1914.
Austria against Russia—Aug. 6, 1914.
Austria against Montenegro—Aug. 9, 1914.
Austria against Japan—Aug. 27, 1914.
Austria against Belgium—Aug. 28, 1914.
Bulgaria against Serbia—Oct. 14, 1915.
Germany against Russia—Aug. 1, 1914.
Germany against France—Aug. 3, 1914.
Germany against Belgium—Aug. 4, 1914.
Germany against Portugal—Mar. 9, 1916.
Germany against Rumania—Sept. 14, 1916.
Turkey against the Allies—Nov. 23, 1914.
Turkey against Rumania—Aug. 29, 1916.

ENTENTE ALLIES

Brazil against Germany—Oct. 26, 1917.
China against Austria and Germany—Aug. 14, 1917.

Costa Rica against Germany—May 24, 1918.
Cuba against Germany—Apr. 7, 1917.
France against Germany—Aug. 3, 1914.
France against Austria—Aug. 13, 1914.
France against Turkey—Nov. 5, 1914.
France against Bulgaria—Oct. 16, 1915.
Great Britain against Germany—Aug. 4, 1914.
Great Britain against Austria—Aug. 13, 1914.
Great Britain against Turkey—Nov. 5, 1914.
Great Britain against Bulgaria—Oct. 15, 1914.
Greece (provisional government) against Germany and Bulgaria—Nov. 28, 1916.
Greece (Alexander's government) against Germany and Bulgaria—July 2, 1917.
Guatemala against Germany—Apr. 23, 1918.
Haiti against Germany—July 15, 1918.
Honduras against Germany—July 19, 1918.
Italy against Austria—May 24, 1915.
Italy against Turkey—Aug. 21, 1915.
Italy against Bulgaria—Oct. 19, 1915.
Italy against Germany—Aug. 28, 1916.
Japan against Germany—Aug. 23, 1914.
Liberia against Germany—Aug. 4, 1917.
Montenegro against Germany—Aug. 9, 1914.
Nicaragua against Germany—May 7, 1918.
Panama against Germany—Apr. 7, 1917.
Panama against Austria—Dec. 10, 1917.
Portugal against Germany—Nov. 23, 1914.
(Passed resolutions authorizing military intervention as treaty ally of Great Britain.)
Portugal against Germany—May 19, 1915.
(Military aid granted.)
Rumania against Austria—Aug. 27, 1916.
(Allies of Austria also considered it a declaration against them.)
Russia against Turkey—Nov. 3, 1914.
Russia against Bulgaria—Oct. 19, 1915.
San Marino against Austria—May 24, 1915.
Serbia against Germany—Aug. 6, 1914.
Serbia against Turkey—Dec. 2, 1914.
Serbia against Bulgaria—Oct. 19, 1915.
Siam against Germany and Austria—July 22, 1917.
The Hedjaz (Arabia) against Central Powers—June 9, 1916.
United States against Germany—Apr. 6, 1917.
United States against Austria—Dec. 7. 1917.

Later Evidence Concerning the Outbreak of the War. The overthrow of the governments of Russia, Germany, and Austria-Hungary, and the seizure of documents from the archives of Belgium by the invading Germans, gave many important documents to a waiting world long before they would have appeared in the course of normal events. Added to these have been numerous memoirs and autobiographies which are, of course, of relative value only, but yet shed some light on the diplomatic exchanges just preceding the world conflagration. When the archives of France, Great Britain, Italy, and the United States are made public in their entirety, a true history of the month or so preceding the War may be written.

Various interpretations have been placed upon these later documents, although it is generally agreed that they do not alter the fundamental causes of the War. According to the "revisionist" school, led by Professors Harry Elmer Barnes and Sidney B. Fay, these documents render untenable the dictum of the Versailles Treaty that Germany and her allies were solely responsible for the outbreak of the struggle. The other school, which includes Herbert Adams Gibbons, contends that they do not absolve Germany and Austria of responsibility for precipitating the War. Professor Barnes assessed the blame in a graduated manner upon the following countries: Austria, Russia, France, Germany, and England. He completely exonerated Belgium, held that Italy was only slightly responsible, and asserted that the United States was duped into entering a struggle concerning which she knew little, if anything. Professor Fay, in *The Origins of the World War* (2 vols., 1928), held that while none of the Powers wanted a European war, all were responsible for its outbreak to a greater or less degree, and that the documents made public since the Peace Conference have effectively repudiated the "war guilt" clause of the Versailles Treaty. He found it impossible, however, to fix a mathematical responsibility, as Professor Barnes attempted to do. In 1927–28 three volumes of a ten-volume series of *British Documents on the Origins of the War, 1898–1914*, were published in London under the editorship of the historians, George Peabody Gooch and Harold Temperley.

MILITARY OPERATIONS

General Considerations. The War that broke out in July, 1914, involved three continents and the seven seas. Beginning with the declaration of war on Serbia by the Austro-Hungarian Empire, in a few days it spread to involve Germany, France and Russia. With the announced invasion of Belgium by the German armies, Belgium and Great Britain took up arms. Military operations began on three European fronts—the Western or Franco-Belgian, the Eastern or Russian, and the Southern or Serbian. Turkey next entered the War toward the close of 1914. In May, 1915, Italy joined the Allies and a new front of operations opened on the Austro-Italian frontier. In November of that year Bulgaria joined the Central Powers, the Serbians were driven from their country and a new front of operations was established on the Greek frontier north of Saloniki. In August, 1916, Rumania joined the Allies and a new front was established on the Rumano-Hungarian-Bulgarian frontier. The conquest of the German colonies in China, South Africa, and the islands of the sea began soon after the outbreak of War. In 1916, Portugal joined the Allies and sent a corps to the Western front. In 1917, Greece and the United States joined the Allies; the troops of the former being employed on the Salonikan front and those of the latter mainly on the Western front.

In this War, every known resource of mechanical ingenuity was drawn upon; old and forgotten methods of warfare were brought into play side by side with the most powerful modern artillery, while aëronautics and poisonous gases for the first time had occasion to show their worth. The edifice of international law so painfully built up after centuries of struggle was toppled over as a thing of no account. Again it was demonstrated that, in a long war, the side with appreciatively greater resources in men and materials of war will win if the people, their governments and military commanders have sufficient courage to endure temporary defeats and discouragements.

In the space available, nothing but a statement of the principal facts can be attempted, but the nature of the struggle on the Western front calls for a word or two. When both forces simultaneously reached the Channel after the battle of the Marne, there began a siege over the whole front that gave the struggle in this theatre a character unique in military history. At certain places in the "line," 32 or more parallel lines of German trenches were constructed. Similar defenses existed on the Allied side. Frontal attacks became a necessity since flanks there were none, and yet these attacks for years proved failures because the experiences gained under the new conditions had not as yet led to such disposition of resources as would carry them to a decision. The most desperate efforts were made first by one side and then by the other to raise the siege, so to speak, by a concentration at some selected point and thus break through to open warfare and end a situation that only a few years before would have seemed intolerable. It was not until the summer of 1918, after the Germans had made their last and greatest attempt and the Allies had been reinforced by the American troops, that a break-through was effected and the War brought to a close. On some of the other fronts, the phenomena of what might be called old fashioned warfare were more or less produced but in general there was a marked tendency to approximate to the conditions on the Western front.

A marked feature of this War was the so-called mobilization of industries. So great was the draft made on the industrial resources of the countries involved that the struggle, other conditions being equal, may be said to have resolved itself into a competition, each side striving to outstrip the other in supplies and munitions.

General Strategy. In a description of a war in which many fronts are involved, it is necessary to treat the operations on each front separately; but as these were parts of a general whole and as all were more or less related, it seems best to preface these descriptions by a short description of the operations as related to each other in time and in strategy.

Plans for a possible war between the Triple and Double Alliances were prepared long before the War by the coördinating staffs of the armies. These plans were revised from year to year to conform to new conditions. On both sides the plans contemplated offensive campaigns. That of the Triple Alliance provided for an invasion of France in which about nine-tenths of the German forces were to be employed, assisted by corps of the Italian army not required for the defense of the Franco-Italian frontier. A small fraction of the German army with the entire Austro-Hungarian army was to be employed on the Russian frontier. In order to avoid the delay that would be occasioned by a frontal attack on the French frontier fortresses that formed two strong barriers, Verdun-Toul and Epinal-Belfort, it was proposed to make the main thrust to the north through Belgium and Luxemburg and force the French to fight in the open country which forms the basins of the Oise, Marne and Seine rivers and their tributaries. It was assumed that the French, at the beginning of operations, would invade Lorraine from Epinal and Toul, a line along that frontier was therefore selected to be organized for defense and a part of the German force in the west was assigned to its defense. It was thought that this French force would soon be withdrawn to meet the attack from the north. The invasion of Belgium would probably cause Belgium and Great Britain to declare war, but the Belgian army was not a strong one and Great Britain had only a small force that could be used in the first operations. It was hoped that in France such a decisive victory would be won as would compel France to sue for peace, in which case it was thought that the war would end. Should Russia continue the war, practically the whole German army would be available on that front. In August, 1914, however, it was known that Italy would not take part in the operations and Austria was already engaged in a war with Serbia, and could not at once employ her whole army against Russia. Confident that their plans for a decision in the west could be secured before Russia could appear in force in the east, the Germans declared war. It was not many days after the beginning of operations that the Germans realized that operations were not going as anticipated, in spite of their first victories, and that their flanking operations on both flanks had failed. Their western armies were weakened, (1) by the necessity of detaching troops to watch the Belgian army, which had wisely avoided risks in the open field and retired to the fortress of Antwerp, ready to attack the German communications; (2) by the necessity of detaching troops to invest a number of French fortifications which with their garrisons were left in their rear; and (3) by the necessity of sending troops from the West front to East Prussia where the Russians had invaded that province sooner than had been expected. The German plan was completely shattered by the unexpected battle of the Marne. From then to the close of the year, the Germans made a number of attempts to outflank the French line, but without success; and at the close of the year, the two armies lay behind intrenched lines extending from the Channel to Switzerland and open warfare was no longer possible for either side until the opposing line was penetrated on a very wide front.

The Franco-Russian plan proposed a simultaneous advance of the entire French army in the west and the Russian in the east to compel the Germans to divide their army into fractions each of which would be smaller than the Allied army opposing it. Long before the War, it had been noticed that the Germans were building detraining stations along the Belgian frontier. This indicated a German movement through Belgium, though it might be only a ruse. After the formation of the Triple Entente, in view of a possible German movement through Belgium which would probably cause Great Britain to declare war, the coördinating staffs of France, Belgium and Great Britain made plans to meet this situation. However, the French military authorities could not count on the German invasion of Belgium, since it was possible that the Germans would advance directly over the Franco-German frontier. Their plan was, therefore, at the outbreak of the war, to move their troops to the Franco-German frontier but also to provide an alternative to meet the changed conditions caused by the German invasion of Belgium. The shifting of troops to meet the invasion of Belgium would necessarily delay the French offensive but it would be compensated for by its reinforcement by the Belgian and British armies. There was much discussion in France of this German invasion of Belgium, and opinion was divided as to whether the Germans would advance through southern Belgium only, avoiding the fortresses of Liége and Namur, or advance across the Meuse also on either side of Liége and attack the two fortresses. The French plans contemplated only an advance through southern Belgium and trusted that the two fortresses would hold out long enough to permit the French and British to go to the assistance of the Belgian army. In any case, the Belgian army was to avoid the risk of capture in the open field and take refuge in the fortress of Antwerp.

The Germans announced their intention of moving through Belgium immediately after declaring war on France and two days later were at war also with Great Britain and Belgium. The French troops, therefore, were deployed along the frontier, according to the second plan. As soon as the troops were in position the French offensive began along the entire front but was shattered on the entire line except in upper Alsace, which was an unimportant front. The Belgian army took refuge in Antwerp and the British and French began a retreat from Belgium across the frontier in order to permit troops to be withdrawn from the French right, which was strong, to the left, which was weak, in order to resume the offensive. This favorable opportunity for resuming the offensive along the entire front did not occur until the armies were south of the Marne with the flanks resting on the fortresses of Verdun and Paris, when the battle of the Marne took place and the German armies were compelled to retreat. At first it was believed that the German armies would retire to the frontier but in a few days it was found that they had taken a strong position on the Aisne, which was extended eastward to the Meuse north of Verdun and could not be dislodged. Then began the flanking operations that closed when the western flanks rested on the Channel. On the Eastern front, just as the German armies were marching into Belgium, the great Russian offensive began and two strong armies advanced into East Prussia and four into Austria. The small German force could not resist the advance and advised German Headquarters that it might be necessary to withdraw from East Prussia. However, under a new commander, in the battle of Tannenberg one of the Russian armies was decisively defeated with great loss and with the assistance of the corps sent from the west, the other was driven back across the frontier. In the Austrian province of Galicia the four Russian armies advanced slowly and steadily, overcoming all resistance; their crushing operations were likened by the press to those of a steam roller. Their cavalry was already threading its way through the passes of the Carpathians into Hungary when German Headquarters sent from the intrenched fronts in the west troops to assist the Austrians. The Russians had to cease their advance against the Austrians to meet the German advance in centre Poland. Here the lines swayed back and forth between the frontier and the Vistula River to the close of the year, when, as in the west, both armies were intrenched for the winter. On the Southern front the Austrians undertook two punitive expeditions into Serbia, both of which ended disastrously for the Austrians. The Serbians made no attempt to cross the frontier and thus operations on this front died out.

The first year had brought no decision. Both sides had experienced severe losses and had used up most of their reserve supplies of munitions; at its close the munitions problem assumed great importance. It was a particularly serious one to Great Britain, who was faced by the necessity of raising and maintaining an army equal to that of France. The advantages of the interior position occupied by the Central Powers became apparent as soon as the lines were intrenched. Under cover of the intrenchments, reserves could be shifted rapidly from the Western to the Eastern frontier due to the fine railway system of Germany.

At the beginning of 1915, the Allies still had hopes that success could be secured through the great Russian armies and operations on the Western front were confined mostly to attacks here and there to prevent the Germans from sending troops from the west to the east. Only once did they make an attack with the hope of breaking through on a wide front. On the Eastern front the Germans found the situation far from satisfactory as the Austrian armies were greatly demoralized. To restore confidence, it was necessary to dislodge the Russians from their threatening position so that if necessary some of the troops could be returned to the Western front. In May, therefore, began the great drive in the east. The Russian line was broken in the south and the Russian armies in Austrian Galicia were in full retreat. To check this disaster and draw troops from this front, the Allied Powers persuaded Italy, who had been listening to the diplomats of both sides, to declare war against the Central Powers. War was declared on May 23 and the Italian armies were deployed on the Austro-Italian frontier. The Italian declaration of war did not have as great an effect as the Allies hoped. Although the Austrians were compelled to detach troops to go to the new front, that front was already well intrenched and the drive against the Russians had gained such a momentum that it still went on. The Russians were driven back across the frontier and lost all their frontier fortresses on the Niemen, Narew, Vistula, and Bug Rivers. When the drive ceased about the middle of September, near the Baltic the Russians were behind the Duna River between Riga and Dunaburg. From Dunaburg the line ran straight south to the Dniester River. As soon as the armies ceased active operations, the line was intrenched. The Russians had experienced tremendous losses in men and munitions of war; the former could be readily replaced but not the latter because of the isolated position of Russia. The Russian army could again resume the offensive under favorable conditions but all hope that it would be the decisive factor in the War on the side of the Allies had to be abandoned. On the Italian front nothing worthy of note occurred during the year.

War between Turkey and the Allied powers was declared in November, 1914, and soon developed on four fronts. In Armenia, the Russian Caucasian army invaded Turkey in November to capture Erzerum. In December, it was defeated between Erzerum and the frontier and retired pursued by the Turkish eastern army. The Turks in turn were defeated in January and operations on this front ceased, as neither the Russians nor the Turks could spare forces from other fronts to reinforce these armies. In Mesopotamia, in November, 1914, the British Indian government landed a force near the mouth of the Tigris River primarily to protect the oil fields in southwestern Persia. This force was gradually increased and slowly made its way up the Tigris River, meeting with slight resistance. In the latter part of September, it captured and occupied Kut. Bagdad was now only 100 miles distant and the temptation to effect its capture proved too much for the commanding officers of the Tigris Expeditionary Force. With a little more than a division, the attempt was made in November, but before the force reached Bagdad it was attacked by a superior Turkish force and in a few days found itself back in Kut invested by the Turks. In the west in January, 1915, the Turks assembled a small army in southern Palestine for the purpose of crossing the Sinai Desert and the Suez Canal, possibly in the hope of raising an insurrection in Egypt. That it ever got across the desert is a marvel in itself and would have been impossible except for the favorable condition of the desert wells. A few boatloads of troops actually got across the canal. The army was unable to maintain itself along the canal and retired leaving detachments to guard the scattered wells.

The most important operations in Turkey in 1915 were those connected with the ill-fated Gallipoli Expedition. The opening of the Turkish straits to secure communication with Russia and the destruction of the Turkish Black Sea fleet must have appeared as important strategic objectives as soon as Turkey entered the War. Whether this could be best effected by an attack of the defenses of the Dardanelles directly or obtained as a result of operations from a point on the Turkish coast farther south was not so clear. There were also some who argued that a decision on the Western front was impossible for some time, as it would take time to solve the munitions problem and in the meantime it would be better to attack the Turkish armies and compel Turkey to make peace. Owing to the requests of both British and French commanders on the Western front for more troops, it was difficult to find troops for any new expedition. In Egypt, however, were the Australian and New Zealand troops being trained for war, a division of Territorials from England and some troops from India. After the defeat of the Turkish desert expedition, these became available but as they were untried troops it was desirable to have at least one division of regulars. This was slated for France but, after the first great offensive of the British failed at Neuve Chapelle, it was decided to send the division to Turkey. The Dardanelles operations began with a naval attack to force the entrance, which failed. It was followed some time after by the landing of British and French forces (April 24) to capture the Gallipoli Peninsula. In the meantime the Turks had been warned and met both the landing of troops and the subsequent operations to capture the peninsula with such obstinate resistance that in November it was decided to abandon the project and withdraw the troops. Most of the British troops returned to Egypt and were later sent to other fronts. The Allies had hoped that the Greek army would assist in the Gallipoli operations, but in this they were disappointed.

As soon as Turkey entered the War, Bulgaria occupied a very strategic position; it became even more important when the Allies landed at Gallipoli. If she joined the Allies and threatened Constantinople it would cause the Turks to reinforce that front and weaken their resistance at Gallipoli. It would cut Turkey from all communication with her two allies and might cause her prompt surrender. On the other hand, if she joined the Central Powers it would enable them to open direct communication through Serbia and Bulgaria with Turkey and give them the advantage of interior lines to all fronts. The diplomats of both sides therefore began a contest to win Bulgaria but in this contest the Allies were handicapped by the enmity between the Bulgarians and Serbians as a result of the Balkan War and by the successful campaign of the Central Powers in Russia. Bulgaria probably entered into a secret agreement to join the Central Powers in September, 1915, as the Germans and Austrians both withdrew troops from other fronts and in the latter part of that month each concentrated an army on the Serbian frontier. The two armies invaded Serbia early in October and were soon joined by the Bulgarians. It was all the Serbian commander could do to save his armies, which he did by crossing the mountains in winter and reaching the Adriatic with sorely depleted ranks. On the island of Corfu the Serbian army was reorganized.

To protect the Serbian retreat, which it was hoped could be effected in the direction of Saloniki, both British and French landed forces at that point where they began the construction of a great intrenched camp. The armies of the Central Powers did not cross the Greek frontier and shortly thereafter most of the German and Austrian divisions were withdrawn from Bulgaria. The international railway through Serbia to Constantinople was put in operation.

The operations of 1915 had increased the number of fronts and the number of countries engaged in the War but had brought no important decision on any front. During 1915, the British force on the Western front was greatly increased and was able to relieve the French on a much wider front. At the close of the year the British had three armies on this front, each composed of three corps, each stronger than a French corps. This permitted the French to withdraw some of their armies and place them in reserve.

The Allied plan for the Western, Eastern and Italian fronts for 1916 was to remain on the defensive until the Russian army could be reorganized and then assume the offensive simultaneously on all fronts. Rumania had until now remained neutral but in this year promised to declare war on Austria and invade Hungary as soon as her armies were ready. Before she acted, however, the Allies were to begin an offensive from Saloniki and thus keep the Bulgarian forces on that front. In this offensive the Allies again counted on securing the assistance of the Greek army. In Turkey the Russians promised to renew the invasion of Armenia and thus assist the British in their operations to rescue the British force invested in Kut. Some of these plans had to be modified, as the Central Powers took the initiative this year.

The Germans planned to remain on the defensive on the Eastern front and again assume the offensive in the west. Their drive this time was against the fortress of Verdun whose capture would have an important effect on the morale of the French nation. The Austrians were requested to remain on the defensive on both the Russian and the Italian fronts, but they would not consent to this and planned an offensive campaign against the Italians from the Trent region. In Turkey the principal operation planned was the capture of the British force in Kut. On other fronts the Turks were to remain on the defensive.

The Verdun offensive, which developed into a great offensive on both sides of the Meuse and from first to last employed a very large fraction of both the German and French forces in the west, failed in its purpose although the Germans almost reached the town. It lasted from the middle of February until the middle of July.

While it was in progress, a fourth British army took its position in line to enable French troops to go to Verdun. In May the Austrian offensive in Italy took place and the Austrians advanced from the Trentino and almost reached their objective, which was the Italian plain in the rear of the Italian armies on the Isonzo. Knowing that to raise this attacking force the Austrians must have withdrawn troops from the Russian front, the Allies requested Russia to attack the Austrians on their front. The Russians attacked on a broad front and the Austrian line immediately gave way, and the Russian advanced about 40 miles on a front 80 miles. To check the Russian advance, German and even Turkish troops were sent to the Austrian front and the Austrians were obliged to send back troops from the Trentino.

It was while the Russians were still advancing that the British and French made their great offensive in the west—the Somme drive—to relieve the pressure on Verdun, assist the Russians and Italians, and also prepare for the entrance of Rumania into the War by keeping the German forces employed. This great offensive began July 1 and lasted into November. It enabled the French to make counterattacks in the Verdun sector in October and December and recover a part of the territory captured by the Germans in the first half of the year. The Russian offensive enabled the Italians to advance along the Isonzo and capture the town of Goritza in August.

In the intrenched camp of Saloniki, there were assembled the reorganized Serbian army, a number of British and French divisions, and a Russian division. This force was placed under a French commander, Sarrail, and about August 1 he began the offensive which was to precede the declaration of war by Rumania. Again the Allies requested the assistance of the Greek government, which was refused; and lest the Greek army should prove a menace in their rear, the Allies forced the Greek government to demobilize its army. The fact that the Allied armies at Saloniki were in Greek territory and Greece was still neutral made a complicated situation. The offensive began August 1 and continued until November. The Rumanians expected the advance to be into Bulgaria but in this direction the Allies made no headway. They did, however, penetrate Serbia and recapture Monastir.

Rumania declared war August 27; at this time the Western front was ablaze with the Somme drive in the north and the Italian offensive in the south and the Central Powers could withdraw no troops from those fronts. On the other hand, the operations on the Russian front had subsided and the Saloniki drive had made no appreciable effect on that front. The Central Powers, therefore, were able to assemble two armies under German commanders to meet the new offensive; one formed of German, Bulgarian and Turkish troops was assembled in Bulgaria and another of German and Austrian troops in Hungary. At first the Rumanians swept over the mountains into Transylvania but they had to be recalled when the hostile army penetrated Rumania south of the Danube River from Bulgaria. The other hostile army then penetrated the mountains and reached the Rumanian plain from the north and the two armies united in front of the Rumanian capital, Bucharest. The Central Powers were able to drive the Rumanians out of southern Rumania but aided by Russian troops the Rumanians were able to hold eastern Rumania. Operations in Rumania ceased at the end of the year.

In Armenia the Russian armies crossed the frontier and in succession captured Erzerum, Trebizond and Erzingan; a further advance into a mountainous country without railways proved impossible and the advance stopped about the middle of the year. At this time the Turks were busily engaged farther south with the British forces on the Tigris. After the fall of Kut in the last of April, active operations on the Tigris ceased until the close of the year, which enabled the Turks to turn their attention to the Russians, whom they compelled to evacuate a part of the territory in their possession. The British government was dissatisfied with the conduct of affairs on the Tigris by the Indian government and they were transferred to the Imperial General Staff. Troops were sent to this section from Egypt and efforts were made to rescue the British troops in Kut. All attempts made during the first part of 1916 failed and on April 29 the garrison surrendered. British prestige could not allow the situation to end in this manner, so during the remainder of the year preparations were made for an advance on Bagdad as soon as winter came and the weather was favorable. On the desert front, the British troops occupied posts on the east bank of the Suez Canal and began the construction of a railway along the coast in preparation for an invasion of Palestine. The Turks made several futile attempts to interfere with railway construction but the work went steadily on and at the close of the year was within 15 miles of El Arish, the Turkish frontier post.

In 1916, in spite of elaborate preparations and combinations there had been no decision on any front. The Allies had been reinforced by Rumania and Portugal but only one corps of the latter country was sent to the Western front, where it was attached to a British army. For the Allies the situation in the east was very unsatisfactory and French officers were sent to reorganize the Rumanian army. In June, 1916, Lord Kitchener started for Russia to study the situation there but was lost at sea. Of the Central Powers, Turkey had about reached the end of her resources and Austria was rapidly approaching the same state. In all the Central states there was a feeling of depression due to the length of the War and to the realization of the superiority of the Allies in men, wealth and resources. The blockade was daily becoming more oppressive. No longer confident of winning on land, German Headquarters decided to win at sea by an unrestricted war by its U-boats on all vessels, hostile and neutral bringing supplies to Allied ports. On land the operations were to be defensive primarily.

In 1916, the British army reached its maximum strength and now the Allies were superior both in artillery and aircraft. The condition of the Turkish and Austrian armies was known and the Allies confidently expected to end the war in 1917 although it was known that no great effort could be expected from Russia or Rumania. On all other fronts a vigorous offensive was planned. To forestall the Germans and take advantage of the wedge driven in the German line by the Somme drive, an attack was to begin early in the year. This salient was to be the centre of attack, which was to be extended far north by the British and to the east as far as Reims by the French. It was confidently believed a break-through would result. As in 1916, the Germans secured the initiative, not, however, by an attack but by a retreat. About the middle of March, on the entire front from the vicinity of Arras to that of Soissons, they fell back to a new line selected and intrenched that winter, which at one point was 25 miles behind their original line. As they retreated they destroyed everything of military value to the Allies and blocked all the roads. This retreat strengthened the German position by shortening the line to be held. As it would take some time for the Allied armies on the front that had been evacuated to make preparations for a new attack, it was decided to make a British attack to the north and a French attack to the east. The British attack met with considerable success but was not a break-through; the French attack was repulsed. The French commander had been so confident of success and had promised so much that his repulse had a serious effect on the morale of the French army. The morale was restored by two successful attacks under a new commander in August and September on small fronts. During the remainder of the year, the British engaged in two other offensives, one east of Ypres and the other at Cambrai, in which ground was gained but no decision was secured.

In Russia, conditions both in the government and the army were becoming more chaotic. The Czar abdicated and the Kerensky government came into power. Of the armies, only the southern group remained a fairly disciplined army and with these the Russians assumed the offensive in July; at first successful, under counterattacks they quickly crumbled and for the first time in the War retired behind the border on that front. In the north the Germans captured Riga. When the Kerensky government fell in November an armistice was declared on that front.

The Italians fought with great vigor and with considerable success until the end of September, when, due to heavy losses, offensive operations closed. From the point of view of the Central Powers the situation seemed so desperate that a German army was sent to this front. With this army as the spear point a counteroffensive was begun in October, the Italian line was pierced and the Italians were compelled to retreat until they reached the Piave River far in the rear. Here they were reinforced by French and British troops and the retreat was stopped.

Practically nothing was done on the Saloniki front during the year. In June, the Allies compelled the King of Greece to leave the country; the government was reorganized and in July declared war on the Central Powers. The remainder of the year was spent in reorganizing the Greek Army and bringing it to the Salonikan front.

Practically nothing was accomplished on the Rumanian front and when in December the Russians agreed to an armistice with the Central Powers the Rumanian government was obliged to do the same.

The greatest Allied successes of the year were gained by the British in Turkey. The campaign in Mesopotamia began in December, 1916, and in the latter part of February the Turks were manœuvred out of Kut with its strong defenses and retired on Bagdad. The British followed and entered Bagdad, March 11. The British now consolidated their hold by occupying the country for a considerable distance around Bagdad. On the desert front, the British reached Rafa with their railroad and troops early in 1917. Their objective now was the Turkish frontier position of Gaza, upon which they made two unsuccessful attacks in March and April. The advance was then postponed until the end of October. The Turks were now manœuvred out of this position and retreated rapidly northward followed by the British. Jaffa was evacuated by the Turks on November 15 and Jerusalem on December 9. In Turkey, resistance was practically broken and the end was in sight.

Although there had been no decisive events on any front save that of Turkey, the War was nearer its end than any one anticipated—the U-boat warfare failed to secure decisive results, but had caused the United States to declare war. The entrance of the United States in the War produced immediately a tremendous effect on all the countries engaged in it. With the enormous resources of this country in men and materials added to their own, the Allies were sure to win. The only question in doubt was when the Americans would be ready.

For the year 1918, the Allies proposed to remain on the defensive on the Western front until the Americans were ready to take the field in sufficient force. On the Italian front it was necessary to remain on the defensive until the Italian Army was reorganized. On the Salonikan front and in Palestine the offensive was to be resumed as soon as practicable.

The Central Powers could not remain on the defensive. Failing to win the war by U-boat operations, they were obliged to again try it on land. Little could be expected of the Bulgarians or Turks, who were necessarily on the defensive, but as the Russians and Rumanians were no longer at war the troops on these fronts could be greatly reduced and thus a striking force could be assembled by the Germans and Austrians on the Western and Italian fronts.

The Germans had been preparing for this last offensive during the winter as they wished to launch it as early in the year as possible. They attacked on the Western front and in succession three great wedges were driven in the Allied lines, but the lines were not actually broken. All attempts to connect or extend the areas gained in these attacks failed. The successive attacks lasted from the middle of March to the middle of July. Then began the Allied counterattacks and by the middle of September the Germans were practically back in their original lines with greatly shattered forces. The final campaign began towards the end of the month and ended with the Armistice, November 11.

The Austrians made their great attack on the Piave May 15–22 and met with a repulse. After this they were completely discouraged and when the Italians made a counterattack on October 24 they offered little resistance, as they realized that the War was practically over; Bulgaria had surrendered and the German armies were in retreat.

The advance from Saloniki began September 14 and here too the Bulgarians offered little resistance as they realized that with the Germans in retreat the War was practically lost. On September 30, war was over on this front.

In Turkey, the British Palestine army was not able to undertake offensive operations until the latter part of September because during the first months of the year it was necessary to develop the railways and secure supplies. Then in April, to meet the German attacks in the west, a large number of troops were withdrawn from this front and sent to reinforce the British armies in France; they were replaced by Indian troops from Mesopotamia and other points. The advance was begun in the latter part of September and in a few days the Turkish armies in front were either captured or dispersed. The Turkish armistice was signed October 30.

For technical discussions of the conduct of the War, see the following articles: ARTILLERY; ORDNANCE; TRENCH WARFARE MATERIAL; SMALL ARMS AND MACHINE GUNS; EXPLOSIVES; STRATEGY AND TACTICS; ARMIES AND ARMY ORGANIZATION; CHEMICAL WARFARE. See also the articles AFRICA; ARABIA; PERSIA; etc., for accounts of special phases of the War.

THE WESTERN FRONT

Mobilization and Concentration. For operations on the Western front, Germany mobilized 35 active and reserve army corps, 4 cavalry corps and 25 Landwehr brigades for field service besides a number of divisions assigned to the defense of her western fortresses. The field troops were organized into seven armies, all of whom were to be on her western frontier on August 16 ready for active operations.

	Army corps	Landwehr brigades
I Army—von Kluck	7	3
II Army—von Bülow	6	2
III Army—von Hausen	4	1
IV Army—Crown Prince Würtemberg	5	1
V Army—Crown Prince Germany	5	5
VI Army—Crown Prince Bavaria	5	6
VII Army—von Heeringen	3	7

During the preliminary operations, the four cavalry corps were under German Headquarters but later were assigned to the armies: 1st to II army, 2d to I army, 3d to VI army and 4th to V army.

The I and II armies were to invade Belgium and cross the Meuse River between the Holland frontier and Namur. The III, IV and V armies were to cross southern Belgium and Luxemburg and reach the Meuse River between Namur and Verdun. The VI and VII armies were to occupy an intrenched position along the French frontier south of Metz to meet any French advance into Lorraine. To the II army was assigned the task of capturing the fortress of Liége and to the II and III armies that of Namur. To the I army was assigned the task of dealing with the Belgian army and outflanking the French and British armies.

Belgium mobilized her six divisions and sent one to defend Liége and another to defend Namur. From the others she formed a small field army.

France mobilized her 21 active corps, a colonial corps, 25 reserve divisions, 10 cavalry divisions, and several Territorial divisions. The active corps were organized into five armies:

	Army corps	Cavalry divisions
I Army—Dubail	5	2
II Army—Castelnau	5	2
III Army—Ruffey	4	1
IV Army—Langle de Cary	5	1
V Army—Lanrezac	3	1

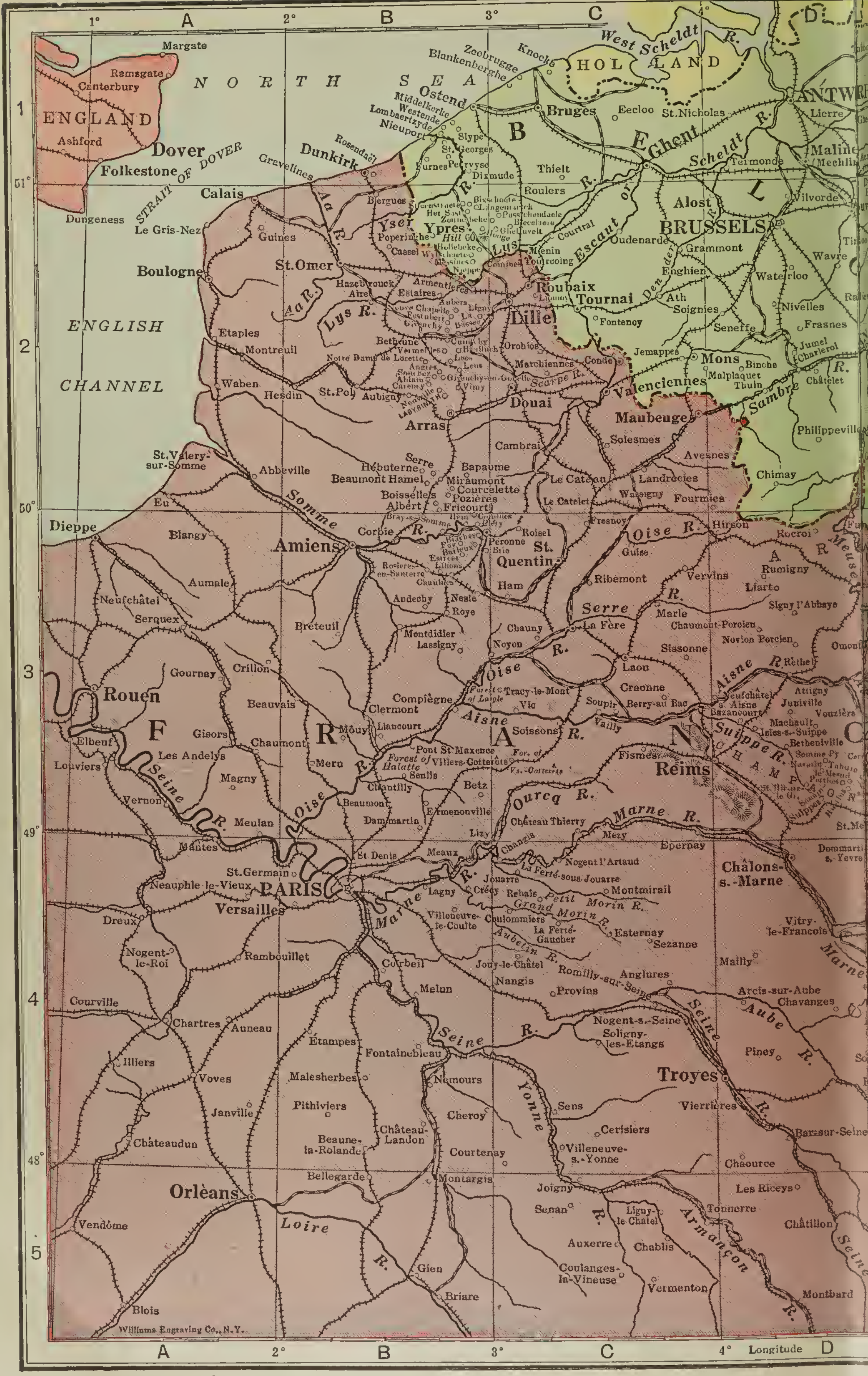
Three cavalry divisions were formed into a separate corps—Sordet—subject to the orders of the French commander-in-chief, Joffre. Some of the reserve divisions were assigned to the armies and the others to the frontier fortresses and to the defense of Paris.

The I army covered the frontier from Belfort to the north of Epinal; four of its corps were on the left ready to invade Lorraine with the II army. The II army had four corps in front of Nancy and one in reserve. The III army was in front of Verdun ready to advance into Lorraine north of Metz. Between the II and III armies was a so-called VI army—Manoury—consisting of three or four reserve divisions designed to invest the fortress of Metz. The V army was on the Meuse River between Mézières and Verdun, guarding the flank of the III and ready to support it. The IV army formed a general reserve behind Verdun ready to support either the II or III army. The position of the armies was based on the possible concentration of the German armies on the Franco-German frontier. Should the Germans violate the neutrality of Belgium the plan provided for the movement of the V army northward into the angle between the Sambre and Meuse Rivers; the IV army was then to replace the V army on the Meuse between Mézières and Verdun.

Battles of the Frontier. It was Joffre's plan to assume the offensive as soon as his armies were in position. The I and II armies were ready on August 15, and having organized a VII army—Pau—from the corps and reserve divisions around Belfort, he ordered the VII, I and II armies to advance. The VII army met with slight resistance and advanced until recalled by the defeat of the I and II. These two armies advanced and on August 20 encountered an equal force of the VI and VII German armies occupying a strong position near the frontier. The French attack being repulsed, the French armies retired slowly and took an equally strong position on the Meurthe and Mortagne Rivers guarding the Charmes gap between Nancy and the Vosges Mountains. The Germans were unable to break the line and each army was practically engaged in holding the other until the battle of the Marne was over. The Germans then retired to an intrenched line near the frontier in order to release some of the corps. The battle was known as that of Lorraine or Charmes.

As soon as the IV French army was in position and had received further reinforcements, the III and IV armies were directed to cross the frontier into Luxemburg and southern Belgium and break up the German troops moving through that area. In the forest of Ardennes they encountered an equal force of the IV and V German armies, August 22, and here, too, the French were compelled to withdraw. This battle was known as that of Ardennes.

The V French army moved up in the angle of the Meuse and Sambre Rivers and posted one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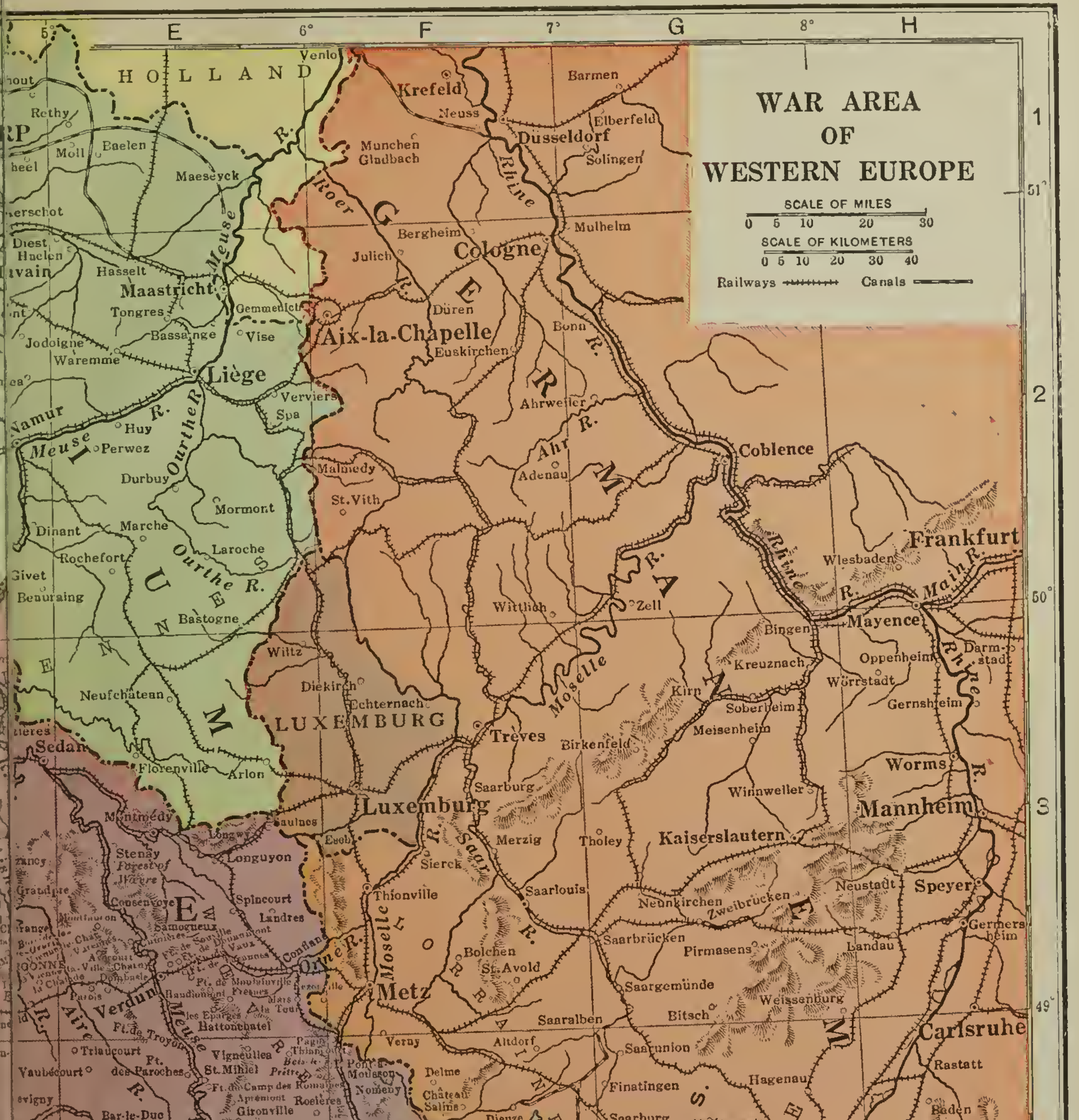
Margate
Ramsgate
Canterbury
ENGLAND
Ashford
Dover
Folkestone
STRAIT OF DOVER
Dungeness
N O R T H   S E A
Calais
Le Gris-Nez
Gravelines
Dunkirk
Rosendaël
Zeebrugge
Blankenberghe
Knocke
HOLLAND
West Scheldt R.
Ostend
Middelkerke
Westende
Lombaertzyde
Nieuport
Slype
St.Georges
Furnes
Pervyse
Dixmude
Bruges
Eecloo
St.Nicholas
ANTWERP
Lierre
Thielt
Roulers
Ghent
Scheldt R.
Termonde
Malines (Mechlin)
B
E
L
Alost
Vilvorde
BRUSSELS
Bergues
Yser
Ypres
Hill 60
Poperinghe
Cassel
Lys
Menin
Courtrai
Escaut or Scheldt R.
Oudenarde
Grammont
Dender R.
Wavre
Tourcoing
Roubaix
Tournai
Enghien
Waterloo
Ath
Soignies
Nivelles
Frasnes
Fontenoy
Seneffe
Guines
Boulogne
St.Omer
Aa R.
Hazebrouck
Aire
Estaires
Armentières
Aubers
Neuve Chapelle
Festubert
Givenchy
La Bassée
Lille
Lys R.
ENGLISH CHANNEL
Etaples
Montreuil
Bethune
Orchies
Marchiennes
Condé
Jemappes
Mons
Binche
Charleroi
Jumet
Notre Dame de Lorette
Angres
Souchez
Ablain
Carency
Lens
Givenchy-en-Gohelle
Vimy
Scarpe R.
Valenciennes
Malplaquet
Thuin
Sambre R.
Châtelet
Waben
Hesdin
St.Pol
Aubigny
Neuville
LABYRINTH
Arras
Douai
Maubeuge
Philippeville
Cambrai
Solesmes
Avesnes
St.Valery-sur-Somme
Abbeville
Serre
Hébuterne
Beaumont Hamel
Bapaume
Miraumont
Courcelette
Pozières
Boisselles
Albert
Fricourt
Le Cateau
Landrecies
Le Catelet
Wassigny
Fourmies
Chimay
Eu
Somme R.
Dieppe
Blangy
Amiens
Corbie
Bray-s-Somme
Hem
Combles
Clery
Frise
Barleux
Fresnoy
Hirson
Rocroi
Péronne
Brie
Roisel
St. Quentin
Oise R.
Guise
Meuse R.
Estrées
Lihons
Rosières-en-Santerre
Chaulnes
Rumigny
Aumale
Ham
Ribemont
Vervins
Liart
Neufchâtel
Andechy
Nesle
Roye
Signy l'Abbaye
Serquex
Breteuil
Montdidier
Lassigny
Serre R.
La Fère
Marle
Chaumont-Porcien
Chauny
Noyon
Novion Porcien
Sissonne
Oise
Laon
Aisne R.
Rethel
Gournay
Crillon
Rouen
Compiègne
Forest of Laigle
Tracy-le-Mont
Vic
Craonne
Berry-au-Bac
Attigny
Juniville
Vouziers
F
Beauvais
Clermont
Soupir
Neufchâtel-s-Aisne
Bazancourt
Machault
Isles-s-Suippe
Bétheniville
Somme Py
Tahure
Navarin
Le Mesnil
Perthes
St.Hilaire-le-Gd.
Souain
Suippes
CHAMPAGNE
Elbeuf
Gisors
Chaumont
R
Mouy
Liancourt
Aisne
A
Soissons
Vailly
N
Suippe R.
Les Andelys
Pont St.Maxence
Forest of Halatte
Villers-Cotterêts
For. of Vs.-Cotterets
Fismes
Reims
Louviers
Seine R.
Meru
Senlis
Magny
Chantilly
Betz
Ourcq R.
Vernon
Beaumont
Ermenonville
Meulan
Dammartin
Château Thierry
Marne R.
Mezy
St.Me
Mantes
Lizy
Epernay
St.Denis
Meaux
Changis
Nogent l'Artaud
Dommartin-s.-Yevre
St.Germain
Neauphle-le-Vieux
PARIS
Lagny
Jouarre
La Ferté-sous-Jouarre
Crécy
Rebais
Montmirail
Châlons-s.-Marne
Versailles
Petit Morin R.
Grand Morin R.
Dreux
Villeneuve-le-Comte
Coulommiers
La Ferté-Gaucher
Esternay
Sézanne
Vitry-le-François
Nogent-le-Roi
Rambouillet
Aubetin R.
Corbeil
Jouy-le-Châtel
Romilly-sur-Seine
Anglures
Mailly
Nangis
Provins
Melun
Arcis-sur-Aube
Chavanges
Courville
Chartres
Auneau
Nogent-s.-Seine
Soligny-les-Etangs
Aube R.
Étampes
Fontainebleau
Piney
Illiers
Voves
Malesherbes
Nemours
Troyes
Yonne R.
Janville
Pithiviers
Sens
Cheroy
Vierrières
Bar-sur-Seine
Beaune-la-Rolande
Château-Landon
Cerisiers
Châteaudun
Courtenay
Villeneuve-s.-Yonne
Chaource
Bellegarde
Montargis
Orléans
Joigny
Les Riceys
Senan
Ligny-le-Châtel
Tonnerre
Vendôme
Loire R.
Armançon R.
Châtillon
Auxerre
Chablis
Coulanges-la-Vineuse
Gien
Vermenton
Briare
Montbard
Blois
Longitude

Williams Engraving Co., N.Y.



WAR AREA OF WESTERN EUROPE

SCALE OF MILES
0 5 10 20 30
SCALE OF KILOMETERS
0 5 10 20 30 40
Railways
Canals
E
F
G
H
5°
6°
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8°
5° from Greenwich 6°
1
2
3
4
5
51°
50°
49°
48°
HOLLAND
Venlo
Rethy
Moll
Eaelen
Maeseyck
Diest
Haelen
Hasselt
Maastricht
Tongres
Gemmenich
Bassange
Vise
Jodoigne
Waremme
Liège
Verviers
Spa
Namur
Huy
Meuse R.
Perwez
Ourthe R.
Durbuy
Mormont
Malmedy
St.Vith
Dinant
Marche
Laroche
Rochefort
Givet
Beauraing
Bastogne
Wiltz
Diekirch
Echternach
LUXEMBURG
Neufchateau
Sedan
Florenville
Arlon
BELGIUM
Krefeld
Barmen
Neuss
Elberfeld
Dusseldorf
Solingen
Munchen Gladbach
Roer R.
Rhine R.
Bergheim
Mulheim
Julich
Cologne
Düren
Aix-la-Chapelle
Euskirchen
Bonn
Ahrweiler
Ahr R.
Adenau
Coblence
GERMANY
Wiesbaden
Frankfurt
Main R.
Zell
Wittlich
Moselle
Bingen
Mayence
Darmstadt
Kreuznach
Oppenheim
Wörrstadt
Kirn
Sobernheim
Gernsheim
Meisenheim
Treves
Birkenfeld
Worms
Saarburg
Winnweiler
Mannheim
Luxemburg
Montmédy
Longwy
Esch
Merzig
Tholey
Kaiserslautern
Sierck
Saar R.
Stenay
Forest of Woevre
Longuyon
Thionville
Neustadt
Speyer
Saarlouis
Neunkirchen
Zweibrucken
Spincourt
Landres
Germersheim
Conflans
Saarbrucken
Orne R.
Bolchen
Pirmasens
Landau
St.Avold
LORRAINE
Verdun
Metz
Saargemünde
Weissenburg
Saaralben
Bitsch
Carlsruhe
Verny
Altdorf
Saarunion
Rastatt
Triaucourt
Vigneulles
St.Mihiel
Pont-à-Mousson
Delme
Vaubécourt
Nomeny
Château Salins
Finatingen
Hagenau
Baden
Bar-le-Duc
Gironville
Dieuze
Saarburg
Zabern
Commercy
Champenoux
Sermaize
Menil
Nancy
Plateau de Amance
Void
Forest of Vaucouleurs
Toul
St.Dizier
Ligny
Strassburg
Kehl
Rosières
Einbermenil
Cirey
Lunéville
Doron
Badonviller
Grandfontaine
Kniebis
Celles
Joinville
Boyen
Gerbéviller
Senones
St.Blaise
Vircourt
Baccarat
Raon l'Etape
Charmes
Rambervillers
St.Michel
St.Die
Schlettstadt
Lahr
Neufchâteau
Dommartin
Mirecourt
Col du Ste.Marie
Châtenois
Bruyères
Markirch
Fraize
Andelot
Épinal
Col du Bonhomme
Schnierlach
Ill R.
Alt Breisach
Bourmont
Gérardmer
Colmar
Freiburg
Chaumont
Remiremont
Neu Breisach
Monthureux
Bains les Bains
Sondernach
Semoutiers
Nogent-en-Bassigny
Bourbonne les Bains
Kruth
Gebweiler
Varennes
St.Loup
Le Thillot
Langres
Bize
Senoncourt
Thann
Luxeuil
Sennheim (Cernay)
Waldshut
Longeau
Jussey
Aumance
Conflans
Aspach
Burnhaupt
Mulhausen
Chassigny
Sceu-s.-Saône
Lure
Lorrach
Selongey
Altkirch
Champlitte
Vesoul
Belfort
Seppois
Saône
Basel
SWITZERLAND
Rhine R.
VOSGES MTS.
ALSACE
BLACK FOREST

corps along the Meuse and the other two along the Sambre. In this section the French cavalry corps had endeavored to ascertain the German forces east of the Meuse but was unable to penetrate the cavalry screen formed of the 1st and 4th German cavalry corps. The V army was reinforced by this cavalry corps, a corps from the II army, two divisions from Algiers and three reserve divisions. As soon as it received its reinforcements and the British army arrived on its left, it was to cross the Sambre River and attack the Germans there.

The British mobilized their so-called Expeditionary Force consisting of six divisions and a division of cavalry. Four of these divisions, the 1st and 2d army corps, with the cavalry were at once sent to France and detrained in the vicinity of the fortress of Maubeuge.

On this front the Germans secured the initiative and made the attack. Early in August troops of the II German army attempted to capture Liége by surprise. They did succeed in taking the town with its bridges but were obliged to reduce the surrounding forts with heavy artillery. The last fort fell on the day the armies were ready to advance. On the 17th, the I and II armies moved out and on the 20th were on the line Brussels-Namur; the III army started for the Meuse south of Namur. One corps each of the II and III armies was assigned the task of investing this fortress while it was being reduced by artillery. The I and II armies were preceded by the 2d cavalry corps and the III army by the 1st cavalry corps. When the III reached the Meuse the 1st cavalry corps was to move around Namur and join the II army. The Belgian army offered no resistance to the advance but retired to Antwerp.

Before the V French army had received its reinforcements it was attacked by the II German army on August 22, and lost the line of the Sambre River; on the following day it was again attacked by the II and its rear threatened by the III which succeeded in forcing the Meuse in its rear. There was nought to do but retreat, which began on the 24th. This battle is known as Charleroi.

While the II German army was advancing to the Sambre, the I army with its cavalry division was seeking the British army whose position was unknown. While moving in a southwesterly direction from Brussels, British forces were discovered in the vicinity of Mons on August 22 but it was thought they were only outposts. As a matter of fact, however, the British army had come in position that day between the Scheldt and Sambre Rivers along the Condé-Mons canal. On the 23d, therefore, two of the German corps unexpectedly ran on the British main position and the battle of Mons began about noon. The British resisted stubbornly but were obliged to yield the canal near Mons and fall back to another position. That evening a third German corps appeared in their front.

Not wishing to be outflanked, that night the British commander, French, ordered his army to retire next day to a line running west from Maubeuge. On the 24th the Germans hoped for a decisive victory but the British successfully withdrew their army.

Joffre's Second Plan. On the night of August 24, Joffre realized that he had met defeat in the battles on the frontier and that he must retreat in order to save his armies of the left and centre. The British army was in danger of being outflanked and a dangerous gap was being opened between the V and IV armies due to the withdrawal of the V from the Meuse.

To renew the offensive a new army was needed on his left and this he proposed to form on the Somme River between Amiens and Péronne from troops drawn from the east. It was to be under the command of Manoury, who was to bring two of his divisions with him; the other troops were to be taken from the VII and III armies. The immediate problem was to delay the advance of the I German army until this new VI army could be formed. West of the British he had formed the VIII army—D'Amade—of four Territorial divisions of little value and to this army he now sent two reserve divisions from Paris. The British V, IV, and III armies were directed to fall back slowly to the line Péronne-Verdun. The 1st cavalry corps was detached from the V army and ordered to cover the left flank of the British army.

On the 25th, the British continued their retreat but due to the topographical features of the country the two corps were compelled to follow divergent lines and that night were widely separated. As the French cavalry had not yet reached his left, the British commander ordered both corps to continue the retreat the next day. The 1st corps—Haig—did so but the commander of the 2d corps—Smith Dorrien—decided to rest his corps as his rear guard reached camp late at night. He now had three divisions, as a fifth division of the Expeditionary Force joined him that day. As the I German army was pursuing rapidly there resulted the battle of Le Cateau. The British held their own for some time but as the German force was constantly increasing the British were ordered to retreat in the afternoon. To break off the engagement was a difficult operation attended with considerable loss and the British retreated in great confusion, but the Germans did not pursue as they too were worn out and their cavalry corps was held in check by the French cavalry corps that gained the flank of the British that afternoon. The British army next day continued its retreat until it crossed the Oise between La Fère and Noyon, where it was reorganized.

At this time German Headquarters at Coblenz made certain decisions that had a disastrous effect on the German operations on the Western front. Influenced probably by the optimistic reports of its army commanders in the west, it decided to send two corps from the west to East Prussia. As the two corps engaged in the investment of Namur, which was occupied on August 25, had not yet rejoined their armies, they were ordered to withdraw and entrain. A corps from the V army was also ordered back to Metz to be ready. As two corps had been left by the I army to observe the Belgians, the original invading force of 27 corps was reduced to 22. Of these 22, on August 27 the II army had to detach one and one-half corps to besiege Maubeuge, where the French had left a garrison of some 35,000 troops and the III army had to leave a division to invest Givet. Of these besieging troops only a half division rejoined before the battle of the Marne. A second decision was to give the commander of the I German army, who had been under the orders of the commander of the II army, an independent command. On the morning after the battle of Le Cateau, therefore, the I army broke away from the II army and started in the direction of Péronne. By this move it prevented Joffre from forming his new VI army on the Somme but it prevented the I army from participating in force in a battle a few days later.

When the I army moved off it left the II army, now reduced to seven divisions and the 1st cavalry corps, to continue the pursuit of the V French and British armies although the V French army alone had 12 divisions. The retreat of the British army had been contrary to Joffre's plan and he now decided to make a counterattack with the V army to gain time and allow the British to recover. On the 27th, the V French army crossed the Oise and was ordered to halt and prepare for battle. The battle of St. Quentin-Guise was fought on the 29th and morning of the 30th. Although a drawn battle, the German II army barely escaped defeat and suffered severe losses. The German commander was obliged to call a division from his investing force at Maubeuge and for assistance from the nearest corps of the I army.

Meeting with no great resistance in his march to the Somme, von Kluck began to doubt the wisdom of his movement when on August 28 he received a new order from Headquarters. Joffre's retreat had deceived the German Headquarters and it was believed that the French left and centre had met with decisive defeat and were retreating on Paris. The II army was therefore directed to move on Paris and the I toward the Seine west of Paris. Von Kluck, therefore, continued for two days more in that direction, meeting detachments of the new French army which avoided serious engagements but retired before him. On the 29th he learned of the battle of St. Quentin-Guise and on the 30th was informed that the French had retired and to gain decisive results it was desirable that the I army should act on their flank as the II needed a day's rest. Von Kluck now started to move in a southeasterly direction and informed German Headquarters, which gave its approval. He crossed the Oise and found the British still north of the Marne. He made preparations to attack them but they escaped across the river. Next he found that the V French army was just reaching the Marne and he attempted to interfere with its crossing.

At this time he had no intention of crossing the Marne but on the night of September 2 he received a message from German Headquarters to the following effect:

> Desire of Supreme Command to force French in a southeasterly direction away from Paris. I army will follow II army en échelon and will protect the flank.

As he was now at least a day's march in advance of the II army which was at least a day's march in rear of the V French army, his army was the only one that could act on the flank of the French but if he did so act he must disobey the order to follow the II army and also risk exposing the flank of the armies to an attack from Paris. On the following morning he learned that one of his corps had crossed the Marne at Château-Thierry and was engaged in battle. He had now to decide whether to withdraw the corps or go to its assistance. His flying corps reported the British retreating south of the Marne and no evidence of activity on the Paris front, so he decided to support his corps and crossed the Marne with four of his five corps and two of his three cavalry divisions.

Joffre's Third Plan. After the battle of St. Quentin-Guise, Joffre was satisfied that his armies must retire still farther south before the offensive could be resumed. The limit was to be the Seine for the British and V French army and for the IV and III the Aube and Ornain with the flank resting on the fortified ridge east of the Meuse.

In retreating the IV French army had offered such resistance that the IV German army was compelled to call to its assistance the III German army, which prevented that army from assisting the II in the battle of St. Quentin-Guise. On the appearance of the III German army Joffre detached the left wing of the IV army and placed it under the command of Foch as the Foch Detachment; it later became the IX army. In its retreat the front of the III army was shortened, which enabled Joffre to order one of its corps to Paris and a division to Foch. Joffre also withdrew some of the cavalry divisions with the I and II armies and formed the 2d cavalry corps—de Mitry—between the V and British armies. The V army retreated to the Seine at Nogent, Foch toward the Aube, and the IV to the Ornain and the III between the Ornain and the Meuse.

On the morning of September 5, von Kluck, who was still north of the Marne, received the following message from Headquarters:

> I and II armies will remain opposite the east front of Paris; the I army between the Oise and Marne, the II between the Marne and Seine.

At that time four of his corps were on the south side of the Marne and would reach the Grand Morin between Coulommiers and Esternay that night. In their front were the 1st and 2d German cavalry corps. The British and V French armies were apparently retreating along their front. As there seemed to be no reason to break up the plans for the day, he decided to let the movements go on but to issue orders for the withdrawal of his army to the north side of the Marne the next day. In the evening a staff officer from Headquarters came to see him and explained the general situation. The III, IV, and V German armies were making slow progress southward and the I and II armies were to remain stationary until these armies advanced far enough to threaten the rear of the I and II French armies, cause them to retreat and thus permit the VI and VII German armies to advance. That night neither von Kluck, who had crossed the Marne that day, nor the German Headquarters had the slightest suspicion of a French counterattack, although it had already begun north of the Marne.

When the French armies began their retreat to the Marne, Galliéni was made military governor of Paris and the VI army was finally organized east of Paris. Galliéni kept himself informed of the movement of the I German army and communicated his knowledge to Joffre at his headquarters at Bar-sur-Aube, where the movements of the armies were carefully plotted. At 6 P.M. on the 4th of September it was known that von Kluck had crossed the Marne and reached the Petit Morin with three of his corps and that only one with a cavalry division was left in front of Paris. If he continued the advance on the morrow he would reach the Grand

Morin and his front would be stretched to nearly 50 miles. At last a favorable opportunity for a counterstroke had arrived. On the night of the 4th and morning of the 5th all the armies received their orders. They were briefly that the VI and British armies on either side of the Seine were to attack von Kluck's army from the west while the V army attacked it from the south. The IX army was to hold the II German army in check and protect the flank of the V army. The IV and III armies were to attack the IV and V German armies, the III striking their flank. September 5 was to be spent in preparation and the attack was to be on the morning of the 6th. With his orders Joffre issued a stirring appeal to his troops:

> "At the moment the battle begins upon which the safety of the country depends each one must make up his mind no longer to gaze to the rear. Every effort must be centred on attacking the enemy and forcing him back. An organization that finds itself unable to advance must hold the captured ground cost what it may and allow itself to be annihilated rather than retreat. Under the circumstances no weakness can be tolerated."

The orders were received with delight by officers and men who were tired of retreating before an enemy they felt they could face.

Battle of the Marne. Although not contemplated, the battle of the Marne really began on the afternoon of September 5, when the VI French army was moving into position and two of its reserve divisions unexpectedly encountered the corps that von Kluck had left in front of Paris. The reserves were repulsed but, the German cavalry discovering other troops advancing, the German corps retired during the night and took up a more favorable position some miles in the rear. Von Kluck was informed of this during the night but still did not anticipate a battle; however, he warned the nearest corps to go to the threatened front as soon as possible. The battle of the Marne thus begun was fought continuously until the afternoon of the 9th, when the I, II and III German armies began their retreat. In front of the IV and V German armies it lasted some days longer. On the Paris front, in the battle of the Ourcq, between the VI French and I German armies, the lines swayed back and forward as new troops were thrown into the line on one side or the other. It was not until the 9th that von Kluck was able to bring up his last corps which had been fighting daily south of the Marne from the 3d to the 6th with the V French army and then had to march 50 miles to reach its place in line. It was in this battle that Galliéni used the Paris taxis to take newly arrived troops to a threatened position in the line.

The II German army found in its front the IX French army and on the right the V army. It called to its assistance a part of the III army and succeeded in forcing back the right wing of the IX army but its own right wing was forced back by the advance of the left of the V army. On the first day of the battle there was nothing in front of the British army except the 2d German cavalry corps; on the second day there was nothing in front of the left of the V French army and the 2d French cavalry corps but the 1st German cavalry corps. On the afternoon of the 8th, the advance of the V army forced the commander of the II German army to withdraw his right wing in order to rest his flank on the Marne. On the morning of the 9th, the British were seen advancing to the Marne between the two German armies and the commander of the II German army decided that the time had come to retreat in order to close the gap. This opinion he imparted to the staff officer from Headquarters who had remained with the armies. The II and III armies were authorized by the latter to begin the retreat that afternoon and he personally delivered the order to retreat to the chief of staff of the I army. Von Kluck was loath to retreat as he had just started an attack which was progressing satisfactorily but he could not continue if the II was retreating so he gave orders for the withdrawal. No decision was reached in the fight between the IV and V German armies and the III and IV French but the former were compelled to fall back when the II and III recrossed the Marne.

The battle of the Marne must be regarded as a significant defeat for the German armies as it completely shattered the plan on which the War was based. Flushed with success, having the initiative, opposed by troops supposedly dispirited by defeat after defeat during a long and exhausting retreat, the Germans found this check as unexpected as the French found it welcome. On the French side moral forces were developed, the intensity of which continued undiminished. The Germans, although not disabled, were compelled to meet an entirely unforeseen situation.

Battle of the Aisne. After the retreat from the Marne, the German armies ultimately halted and intrenched on a line which began south of Noyon on the Oise, followed the ridge north of the Aisne to the Reims-Laon road where it crossed the Argonne Forest and reached the Meuse north of Verdun. On Sept. 10, 1914, Joffre issued an order for a coördinated pursuit of the retreating Germans. He believed that they planned to retire to the Meuse, but when the Aisne was reached every indication pointed to a halt on that river. The French and British crossed the Aisne west and east of Soissons respectively, but were unable to break the German line, which had been reinforced by a corps from Belgium and the besieging corps from Maubeuge which fell September 7.

First Battle of the Somme. When it became clear that the Germans could not be successfully dislodged from the Aisne, Joffre planned to outflank the Germans from the left bank of the Oise and force them to retreat from the Aisne. The greatest part of de Castelnau's II army was sent to the north of Paris to assist the left wing in carrying out this objective. The Germans, on their side, were determined to do the very thing the French were planning to do. They gathered reserve forces and, about September 20, a series of battles began around Lassigny and Roye, which were extended northward west of Péronne and ended with the left of Castelnau's army at Albert on the Ancre River. These battles lasted about 10 days, then the lines were stabilized. Bapaume, Noyon, Lassigny, Péronne and Chaulnes remained in the hands of the Germans but Castelnau succeeded in turning the continuation of the Aisne line northward instead of west along the Somme and therefore accomplished his object to some extent. The withdrawal of Castelnau's II army from Lorraine permitted the Germans to advance across the Moselle and capture the St. Mihiel salient, which they held until they were dislodged by the Americans in 1918.

Battle of Arras. Castelnau's failure to outflank the Germans determined Joffre to make one more effort. This time he planned an advance through the valley of the Scarpe on either side of Arras in the direction of Douai. A new X army under General Maud'huy was organized for this purpose. General Foch was given the command of the group of French armies between the Oise and the English Channel. In the first week of October, Maud'huy's army advanced from Amiens and reached Arras, but found the Germans in front of it. He was unable to advance past this city. The French line was extended northward to the west of Lens, to the Lys River northwest of Lille. The Germans also extended their lines northward and occupied Lens and Lille. The lines became stabilized here and the second attempt to outflank the Germans failed.

British Operations South of the Lys River. In the latter part of September and early October, the British army was carefully removed from the vicinity of Soissons and railed up to the neighborhood of the English Channel where it would be closer to its base of supplies. After receiving reinforcements, including an Indian corps, the British, on Oct. 13, 1914, began to advance south of the Lys River. The advance stopped at Auber ridge about midway between Béthune and Lille. Another British corps advanced north of the Lys River and drove the German cavalry across the river. The British advanced as far as Armentières. The right was unable to advance on Lille and the left was unable to cross the Lys. Although severe fighting occurred in this region until the close of active operations for the year the lines were virtually stabilized by the 20th of October.

Battle of Flanders. The failure of the Allies to outflank the Germans was followed by an attempt on the part of the Germans to again outflank the Allies, and to secure if possible the Channel ports of Dunkirk and Calais. As a preliminary operation, it was decided to capture Antwerp. The siege began September 28; at first the Allies decided to attempt to hold it and British naval brigades were sent to reinforce the garrison; it was to be further reinforced by other British and French troops. In a few days, however, it became evident that it could not be held and preparations were made to withdraw the Belgian army to the west. The fortress fell on October 10 but the Belgian army retired in safety, its retreat being covered by a British division sent to Ghent from England. After the fall of Antwerp, German reserves were rushed to the Belgian front and established themselves on the Ostend-Courtrai line. The battle of Flanders was fought over such a long front that it really consisted of several detached battles rather than one large one. These several battles have been called the battle of the Yser, Dixmude, North of Ypres and South of Ypres.

The Battle of the Yser was largely fought by the Belgians. It started on the 18th of October when the 3d German reserve corps advanced to cross the river. The Belgians were strongly intrenched on the east bank of the river and their front was flanked by British monitors. The Germans did not reach the river until the 20th. On the night of the 21st, the Germans succeeded in bridging the river and by the 25th had two divisions across the river. The Belgians retired two miles to a railroad embankment where they were reinforced by a French division. On the 30th the Germans captured Ramscappelle on the railroad but were soon forced to withdraw when the Belgians flooded the terrain between the railroad and the river.

Dixmude was attacked by the Germans on the 20th of October but the attack was repulsed. On November 10, after a fierce bombardment of artillery and trench mortars the Germans finally captured the town. Its capture was of little importance, however, since the battle of Flanders was practically over.

North of Ypres, on October 19, the Germans fought their way across the Thourout-Roulers road checked by French cavalry until the main line held by French infantry was reached. Heavy fighting ensued up to November 10 but the Germans were unable to make any appreciable gain.

South of Ypres, the Germans advanced steadily but slowly until the 24th, when they were checked by the British. The attack was renewed on October 30 and November 1. These were critical days for the British army. It was attacked in force between the Menin road and the Lys River. The Messines and Wytschaete ridge was the objective of the German attacks. Messines was taken on October 31 and Wytschaete on November 1. The Germans felt that they had broken through the Allied lines. Strong French reinforcements were hastily brought up, however, and the final German attack on November 10 and 11 was repulsed all along the line with the exception of Dixmude, which fell into German hands. Minor operations continued until November 20, when the lines were consolidated for the winter. The battle of Flanders was now over and was the third serious check for the Germans on the Western front in 1914, the other two being the battles of Lorraine and the Marne.

Beginning of Trench Warfare. The conclusion of the battles of Flanders, Nov. 11, 1914, marks the beginning of what we may call the long siege of the armies over the whole line from the sea to the Swiss frontier. It was a time of ceaseless watching, of hardship and trial, of continuous fighting with neither side able to advance at the expense of the other. Local advantages gained first by one and then by the other adversary in no way affected the issue and indeed, as measured by the ground gained, would not be represented on an ordinary map. A word is perhaps not out of place in respect to the nature of the contest that now became the rule over the entire Western front. Trench warfare took the place of what now may be called old-fashioned operations in the open. Mining and countermining became the rule: the lines in reality were areas of parrallel trenches protected by networks of barbed wire so thickly interlaid and interwoven that only long sustained artillery fire could break them down in clearing the way for assault. The troops lived in and under the ground so that shrapnel, the ideal man-killing projectile against troops in the open, proved nearly useless and was replaced by the high-explosive shell, able to pierce overhead shelter and overwhelm the occupants. Operations degenerated into a struggle of wear and tear, attrition. So close did the lines draw to each other that antiquated methods and weapons sprang into new life; hand grenades, knives, and even clubs, for close work. Trench mortars came into existence. Asphyxiating gases, in violation of The Hague Convention, were used. Artillery took a position of first importance, as was but natural in a state of siege warfare. The reason of this state of affairs is to be found, in part at least, in the air service, which made surprise well-nigh impossible and allowed time for the threatened side to make ample preparations to resist any impending movement, and which also increased the efficiency of artillery by enabling batteries to correct their fire, and by discovering and assigning targets invisible from the batteries themselves.

Operation of 1915. The year of 1915 on the Western front was spent by the Allies in testing the German line at various points, in an endeavor to break through and prevent German troops from being withdrawn from the Western front to reinforce the armies operating against Russia. The Germans remained on the defensive, making but a single attack.

The British attacked with two corps at Neuve Chapelle with a view of reaching the town of Lille. This attack was made in the month of March but resulted only in taking the German advance line with heavy loss to the attacking troops. This was followed in April by the German attack on Ypres, where clouds of chlorine gas were first employed. It was only a partial success as the Germans were unable to reach Ypres, which was held by the British. The attack thus initiated lasted a month but without further German success.

In May, there occurred a combined attack by the British and French along the front between Neuve Chapelle and Arras. The British attack was made by three corps at Festubert and resulted in an advance of 600 yards over a front of four miles. The French attack was made by seven corps on a 10-mile front north of Arras; at one point the French troops advanced two and a half miles but a break-through was not secured. The struggle on this front continued on through June. These attacks occurred shortly after the Germans began their great advance against Russia.

In September, there were simultaneous attacks by the French and British on widely separated fronts. In the north the British attacked with three corps in combination with the French on the front where the French had attacked in May. The British objective was the mining town of Lens. The British almost attained their objective but were unable to hold it; they secured the neighboring town of Loos. The French on their right attacked with about seven corps, their objective being the ridge overlooking Lens, the Vimy ridge. They were, however, held up in the valley in front and succeeded only in taking the town of Souchez.

The great French attack in September, however, was made on a front of 15 miles in Champagne between Reims and the Argonne Forest. Here two armies were employed and the attack was preceded by a three days' bombardment by as heavy a force of artillery as the French could assemble. Under this fire the intricate system of trenches and wire entanglements became a perfect labyrinth through which it was impossible to advance in good order. As a result, the French were held up at the German second line some miles in rear where fresh troops had just arrived from the Russian front.

During the year, the French made various attempts to force the Germans to evacuate the St. Mihiel salient but they met with little success. Minor operations also took place in the Argonne Forest and along the Vosges front. On the whole, it may be said that the lines established at the close of 1914 remained practically unchanged during 1915.

In 1915, the British forces on the Western front were greatly increased and at the close of the year the British front extended from the Belgian front north of Ypres almost down to Arras. The British were also prepared to place a third army in line early in 1916. This enabled the French to increase their reserve troops.

1916. Verdun. The offensives of 1915 were completely overshadowed by the battle of Verdun, which began in February, 1916. Von Falkenhayn, the German chief-of-staff, who succeeded von Moltke after the battle of the Marne, was greatly disturbed by the Allied offensives in September, 1915, which came so close to succeeding, and determined to forestall another Allied offensive by a German effort on a grand scale. After careful consideration Verdun was decided upon as the place of operations. For dynastic and political reasons the command of the attacking forces was given to the German Crown Prince.

Verdun was an entirely different place from the Verdun of the beginning of the War. Having profited by the fate of Liége and Namur, the forts at Verdun were held by light garrisons only and the French line was established about 10 miles to the north and east. Intermediate lines and positions covered the area between the fortress and the outer line of defense. The Verdun position was a salient about 45 miles wide across the neck which extended from St. Mihiel to the Argonne. Most of the salient was on the eastern side of the Meuse. Along the east bank of the Meuse there is a ridge—Côte de Meuse—five miles wide and about 400 feet high. To the east of the ridge and extending to the south is the plain of the Woevre, which in the spring is too soft for any operations. The French line crossed the ridge from the Meuse River and extended about five miles into the plain of the Woevre. The two trunk lines, which supplied Verdun before the War, Paris-Verdun and Paris-Verdun via Commercy, were under the observation and fire of the Germans in the Argonne and at St. Mihiel. A single-track narrow-gauge road from Bar-le-Duc via Souilly was the only railway means of supplying troops to Verdun.

The Crown Prince planned his main attack along the ridge from the north. If this were successful, the French would be obliged to evacuate their line in the Woevre to prevent capture and a secondary attack could be made along that point. Von Falkenhayn believed that an attack on Verdun would succeed because its inferior rail communications and the limited number of bridges across the Meuse would interfere with its reinforcement. The operation, which he estimated would take eight days, was to have its right flank protected by a later advance on the west side of the Meuse, which would protect operations on the east from French artillery on the west bank. The German Crown Prince had at his disposal nearly one-half million men, many of whom were completely rested and others of whom were picked "shock" troops. Besides these, many other divisions were held in reserve along other parts of the Western front in readiness for immediate transportation. Tremendous amounts of heavy artillery were concentrated with an unlimited ammunition allowance. Every request for labor and equipment was complied with.

The artillery preparation for the attack was begun at 7 A.M. on Feb. 21, 1916. It continued until 4 P.M., when the infantry moved out on a front of about 4 miles southward along the ridge. During the first period of the battle (February 22–March 4), the Germans, in a slow advance, covered by extremely heavy artillery fire, captured the 1st, 2nd and 3rd positions east of the Meuse and Fort Douaumont, the most advanced of the Verdun forts, five miles from the city. Joffre immediately sent troops of the II army then in reserve, and selected its commander Pétain to command at Verdun. These were to be followed by the X army from the Arras section where they were to be replaced by the IV British army.

General Pétain arrived at Verdun on February 26, and ordered a counterattack at once along the entire line. He divided the front into corps zones and assigned the artillery, which was arriving in great numbers, to the zones. The occupied ground was to be organized and held, and the forts to be reoccupied and rearmed. The number of bridges between Verdun and St. Mihiel was to be increased from 7 to 41. Pétain also organized a truck line of communication from Bar-le-Duc to Verdun, over which 3000 auto trucks passed every day. This saved the supply situation, and the French call the road "the Sacred Way." On March 4 the French were holding their fourth position, a series of ridges between Douaumont and Verdun.

During the second period of the battle (March 5–22) the Germans were unsuccessful in their attempts to advance their right wing west of the Meuse to Hill 304 and Dead Man's Hill, and their left wing from the Woevre plains, which had been evacuated by the French who established a new line on the east crest of the ridge around Fort Vaux. During the third period (March 22–April 30), the German Crown Prince suffered such losses that, by March 22, fresh troops were required. On April 9–10 he ordered a general attack along the whole line and captured the crest of Dead Man's Hill. This was recaptured by the French on April 20. Many local battles were fought during this period. During the fourth period (May and June) General Nivelle, who on May 2, had succeeded General Pétain in command of the Second Army and of the defense of Verdun when the latter was promoted to command an army group, carried out Pétain's policy of counterattacking on every possible occasion. The violence of the German attacks and the stubbornness of the French defense may be judged by the fact that although the Germans attacked Hill 304 from May 4 to 7, with more than 100 batteries of heavy artillery, they captured only the north part of the hill. Douaumont was recaptured by the French on May 22–23. On the latter date, the Crown Prince captured Dead Man's Hill and retook Douaumont. In June, he concentrated on the attempt to capture Forts Vaux and Souville. Fort Vaux was completely destroyed in the first week of June, and the struggle for Souville, which was really the key to Verdun, became most desperate. Joffre forbade any retreat. The crisis of the attack came on June 22 and 23 when, after an unparalleled bombardment, the Germans reached the edge of Souville. On the next day Nivelle began counterattacks on a grand scale and by June 30 had driven the Germans beyond Fleury a mile to north. The next day, Joffre and Haig launched the battle of the Somme, with such force that von Falkenhayn was forced to withdraw troops from Verdun for the Somme, and to abandon the idea of an immediate capture of Verdun.

The struggle now became a deadlock. This continued until the latter part of October, when the French regained in three hours what it had taken the Germans months of effort to attain. This and subsequent actions are usually referred to as the Second Battle of Verdun. This three-hour action was the most brilliant action of the whole Verdun campaign. General Nivelle's artillery preparations were brief but of exceedingly great intensity; then came the infantry attack on October 24. The Germans were driven back and what remained of the forts Douaumont and Vaux was again in the possession of the French. During the next six weeks there were scarcely any infantry engagements and the artillery actions that occurred were of minor importance. On December 15, however, despite wintry conditions, Nivelle executed another great coup. He attacked on a front of six miles after a three-day artillery preparation. He succeeded in penetrating the German front for a distance of nearly two miles. The immediate general in command was Mangin.

After this advance the Verdun front once again became quiet, each adversary watching the other and being content to remain on the defensive. After 10 months of heavy fighting the Verdun struggle was virtually over. The total loss, including prisoners, dead, sick and wounded, was exceedingly great on both sides. In the last analysis, it was a great French victory. The moral effects on the French troops and French nation can scarcely be overestimated. The Verdun slogan "They shall not pass" was taken up as a battle cry all along the front and behind the lines. As a reward for his heroic work at Verdun, General Nivelle was made commander-in-chief of all the French armies, succeeding General Joffre.

First Battle of the Somme (Picardy). In his reports on this battle, Haig made the following statements:

> "The principle of an offensive compaign during the summer of 1916 had already been decided by the Allies. The various possible alternatives on the Western front had been studied and discussed by General Joffre and myself and we were in complete agreement as to the front to be attacked by the combined French and British armies. Preparations for one offensive had made considerable progress; but as the date at which the attack should begin was dependent upon many doubtful factors, final decision on that point was deferred until the general situation should become clearer.
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> "Subject to the necessity of commencing operations before the summer was too far advanced, and with due regard to the general situation, I desired to postpone an attack as long as possible. The British armies were growing in numbers and the supply of ammunition was steadily increasing.
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> "By the end of May the pressure of the enemy on the Italian front had assumed such proportions that the Russian campaign was opened early in June, and the brilliant successes gained by our allies against the Austrians at once caused a movement of German troops from the Western to the Eastern front. This, however, did not lessen the pressure on Verdun. The heroic defense of our French allies had already gained many weeks of inestimable value and had caused the

> enemy heavy losses; but the strain continued to increase. In view, therefore, of the situation in the various theatres of war, it was eventually agreed between General Joffre and myself that the combined offensive should not be postponed beyond the end of June."

The Allies proposed to attack on a front of about 30 miles in an air line in order if possible to effect a break through the German lines; this front was about equally divided between the British and French. The VI French army—Fayolle—was astride the Somme with the X French army—Micheler—on its right. Directly in front of the French armies, and five miles away, lay their objective, the town of Péronne on the east bank of the Somme The ground in their front was generally level The IV British army—Rawlinson—was on the left of the French, facing a ridge which rose between the Albert-Péronne and the Péronne-Bapaume roads. On the slope of this ridge, facing the British, the Germans had organized the position consisting of two strong lines about two miles apart; between the two lines were woods, villages, etc., strongly organized for defense. A third and even a fourth line had been begun still farther to the rear. The entire front was held by the II German army but after the attack began it was subdivided into two sectors, the I German army being organized in one of them.

The artillery preparation for the great attack began June 24 and continued for an entire week; the infantry attack was launched July 1. In the opening attack the greatest advance was made by the VI French army which broke through the German first and second lines and at one point advanced three miles by July 5; the British during the same period advanced their whole front about half this distance. Fresh troops were now brought up to reduce the centres of resistance between the two lines on the British front and by the middle of July on both fronts the Allies were ready for a second grand attack by which the VI French army advanced to the Somme River opposite Péronne but was unable to force the crossing; the British on their front broke through the German second line. It was now decided not to attempt any further advance of the VI French army south of the Somme but to move its reserves to the north of the Somme, where they were to be employed on the right of the British. From the middle of July until the middle of September, the British were engaged in the capture of the remainder of the German second line and the villages, woods and other strong points between it and the third line. About the middle of September, after a three days' artillery preparation, the German third line was taken. In this attack the British heavy tank was employed for the first time and met with considerable success. A fourth attack made about the end of September carried the last of the German prepared lines and the entire ridge was in the possession of the Allies. After September the attack died down somewhat but resulted in the straightening of the British front. About the middle of November, the weather conditions made further operations impossible.

According to Haig, who had been in command of the British army in France since the beginning of 1916, the British employed in this attack 45 of their 70 divisions on this front and the Germans reinforced their original 6 divisions by 30 more during the operations The Germans had been driven back over the entire front of 30 miles and on the British front to a depth of about seven miles. Although a break-through had not been secured, it was felt that the morale of the German army had received a severe blow by their failure at Verdun and the advance of the Allies on a front that had been made especially strong. Although the losses incurred in the great attacks on the Western front had been very heavy in all three armies, it was felt that the Germans would feel the losses much more than the Allies.

1917. Retreat of the Germans. After the close of operations on the Western front in 1916, the Allies were quite confident that the War would be ended in 1917. They were now greatly superior to the Germans in artillery, aircraft, and men. In a conference between Joffre and Haig, it was decided to forestall the Germans in 1917 and begin operations as early as possible. To prevent the Germans from shifting their reserves as they had previously done when an attack was delivered on a comparatively narrow front, it was now proposed to attack simultaneously along the entire front from Lens on the north to the Oise River on the south, in combination with a secondary attack by the French between Soissons and Reims. In December, however, Nivelle succeeded Joffre, and he made a new plan which Haig was directed by his government to support. According to this plan the French were to make the main attack between Soissons and Reims, and, to aid in this attack, the VI and X French armies on the Péronne front were to be replaced by British troops. The British, however, were to attack as previously arranged. The change of plan delayed the opening of the attack and enabled the Germans to secure the initiative.

In August, 1916, Falkenhayn was relieved as chief of staff of the German armies by Hindenburg, whose chief assistant was Ludendorff. In the winter of 1916–17, they decided that the Western front was too long for the available troops and decided to evacuate the Roy salient and fall back on a chord of this salient running from Arras on the north to the vicinity of Soissons on the south The new line was carefully selected and fortified during the winter: it was called the Siegfried line but was known to the Allies as the Hindenburg line. The withdrawal of the stores began early in February and in the middle of March the troops began their retreat. To prevent the Allies from making an early attack on the new front, as the troops retired roads were blown up, and everything that could be of use or protection to the troops of the Allies was carefully destroyed.

As a result of this unexpected movement, the plan of the Allies had to be changed, as the new line was in places 25 miles in the rear of the old one. Before any serious attack could be made on the new line it was necessary to construct railways, repair roads, organize munition dumps, etc., all of which would take considerable time. The Allied attacks could no longer be made as planned over the entire front from Lens to Reims but had to be confined to the parts of the old German front that had not been evacuated. It was decided, therefore, to make an attack as soon as possible with the III British army assisted by the I British army on the German line in the vicinity of Arras, while the IV and new V British army organized their position before the new German line farther south. Nivelle was to make his great attack as planned between Soissons and Reims but it was to be extended to the east of Reims. The British and French armies on the front of the Hindenburg line were to coöperate as well as they could, simply to prevent reserves being sent to the fronts to be attacked.

Battle of Arras. One of the reasons for the German withdrawal was to nullify any preparations the Allies had made for a spring offensive. This object failed of realization when scarcely a week later the British began an offensive on a 12-mile front north and south of Arras (April 9). Haig made long and minute preparations for the offensive. A continued aërial offensive gave him the control of the air. He also carried out a three-week wire-cutting artillery fire, interdicted the back areas, and for a few days preceding the attack laid down a terrific destructive fire, accompanied by extensive gas discharges; 4000 cannon were used in this preliminary work. Tanks were assigned to each corps to lead in the assaults. It was prescribed that halts for reorganization would occur only after the capture of each successive position.

On April 9 the British attacked on a 20-mile front. The I army under Horne advanced north of the Scarpe and the III army under Allenby advanced south of the Scarpe. On that day the Canadians stormed Vimy Ridge. The entire first line positions were captured in 40 minutes. The second positions were captured by noon. The third position presented greater obstacles, largely because the wire had not been effectively cut by the artillery. A gap had been made in the German lines but Haig failed to exploit his success and the probability of cutting the enemy's lines of communication was lost. Instead of sending the cavalry through the gap, Haig ordered the gap widened. This hesitation enabled the Germans to bring up the sorely needed reserves and prevented a serious break-through. The British were greatly hampered in their operations which began in a snow storm; this was followed by rain which made the movement of artillery extremely difficult. After the opening attack which ended April 13 the attacking divisions were replaced and the operations were renewed but the original momentum was lost. The attack, however, went on until May 4, in order to prevent reserves from being sent to the French front when Nivelle's attack was going on. By May 5, Haig had advanced five miles on a front of 20 miles and siege conditions again obtained. The Germans had lost 15,000 prisoners and 200 guns. The result was to give the British the Vimy Ridge and its extension southward, which proved of great value when the Germans made their great attack the following year. Checked on this front, the British suddenly shifted their operations to the Ypres sectors.

French Offensive on the Aisne. After the retreat of the Germans to the Hindenburg line, General Nivelle had concentrated a force of 1,200,000 men (V, VI, X and IV armies) and 5000 guns in the Aisne area between the Oise and the Argonne. With this force he planned to attack the German front on a grand scale. The German front ran due south from the Ailette River to the Aisne at the junction of the Vesle and thence along the south bank for a few miles where the Germans had a bridgehead captured in the winter of 1914–15; thence the line crossed the river to the Chemin des Dames Ridge (Ladies' Way, so called because it was built by Louis XV as a promenade for his daughters), between the Ailette and Aisne Rivers and along that ridge to Craonne. From Craonne the line ran southeast to some heights commanding Reims and thence over the Moronvillers ridge between the Suippe and Vesle Rivers to the Suippe. The attack was to be prepared by a long artillery bombardment.

The artillery began its operations on April 9, but the weather conditions were so bad that the infantry attack had to be postponed from the 12th to the 16th. Even then the weather conditions were unfavorable. Besides this, Hindenburg was fully cognizant of the French plans through the medium of captured despatches and had taken adequate means to fend off the French attack. He also withdrew the I army from the Hindenburg line and sent it to the French front. As a result, although the German lines were penetrated at various points along the front, only the first of the German lines could be captured and held on the Chemin des Dames Ridge and to the east. At the close of the first day it was evident that there was to be no break-through. Despite this Nivelle kept up attack until the 21st. In an intermittent battle lasting from April 17 until May 20, the French IV army east of Reims—Anthoine—succeeded in capturing the high ground of Moronvillers. On the night of May 4 the French captured Craonne, a key point on the Chemin des Dames, and by the next day captured the crest of the Chemin des Dames to the west and, to the east, the plateau of Craonne.

The French troops, after the initial defeat of April 16, considered success on the Aisne impossible. Units up to divisions in size, although asserting themselves to be loyal and ready, if necessary, to die for France, refused to continue the attack on the Aisne, on the ground that it was a useless loss of life. Although 20,000 prisoners and a large number of guns had been taken the French casualties amounted to about 120,000 and its general advance west of Reims had been slight. General Nivelle lost the confidence of his government by this gigantic failure and on May 15, Pétain succeeded him in command of the French armies, and Foch, who had been without any important duty since the preceding December became chief of staff at the War Department. Foch had been in command of the northern group of French armies since 1914 but this group was broken up when the VI and X armies were moved to the Aisne front.

British Operations in Flanders. The U-boat campaign had become exceedingly effective and as the principal base of these operations was Zeebrugge, the Channel port of Bruges, the capture of this port became a very important objective. Haig believed that this could be accomplished by land operations from the British front in Flanders operating from the Ypres front in the direction of Bruges. In June, 1917, when operations were begun on this front, the IV German army held most of the front from the Channel to the Lys River. In the north, its line was the east bank of the Yser River except on the coast where the Allies had a bridge-head on the east bank. From the Yser it followed the Ypres Canal almost to that town, which was held by the British. South of Ypres it held the Messines Ridge, which had been captured from the British in

1914. To strengthen its lines it had constructed a large number of concrete machine-gun emplacements called by the British "pill boxes."

Haig was given the I French army—Anthoine—to assist in his campaign and brought up the headquarters staffs of the IV and V British armies whose fronts were taken over by the III army. A new IV army was to operate along the coast and a new V army was to operate with the II army already on this front. While preparations were made to attack north and east of Ypres he directed the II army to capture the Messines Ridge.

This attack opened on June 7, 1917, when there occurred one of the most spectacular events of the entire war. This was the blowing up of the Messines-Wytschaete Ridge. This ridge formed a salient which dominated the entire Ypres sector from the south and which was literally a thorn in the side of the Allies. For over two years British sappers had been burrowing under this ridge and finally succeeded in placing in position, undetected by the Germans, 20 mines containing more than 1,000,000 pounds of ammonite. These were exploded by electricity on the morning of June 7. The whole tops of the hills were blown off and the roar could be heard for a distance of 150 miles. A tremendous shell fire which had been playing on the ridge for two weeks reached its greatest intensity as the mines were exploded. After the explosion the British infantry rushed forward and by the end of the day had wiped out the entire salient. The Germans retaliated for this Allied offensive by a successful attack on the British line at its most northern extremity in Belgium. On July 11, after heavy artillery preparation, the Germans made a strong infantry attack on the British positions east of the Yser River and captured the entire works. The preparations on the front of the main attack were made during the month of July but as the Germans had captured the bridgehead near the Channel the attack was confined to the front from Dixmude to the Lys River. In this opening attack the I French and the V and II British armies were to be employed. After a prolonged artillery preparation the infantry attack was then launched on July 31 and the Allied forces advanced about two miles, capturing the first and second German lines. A heavy rain now set in which lasted several days and made further operations impossible. The field of operations being generally flat, it was converted into an immense swamp over which movement was possible only on the few roads.

Some minor operations were undertaken about the middle of August by the V army that met with so little success that the commander of that army was relieved and the British front placed under the orders of the commander of the II army—Plumer. In the latter part of September the ground was again sufficiently dry to admit of another general advance and on September 20 the Allies again advanced about a mile. Then followed a succession of attacks with limited objectives carried on under very unfavorable weather conditions. The Allied objective was no longer the Belgian coast but only a ridge about five miles east of their original position; this ridge overlooked the ground to the east and in the possession of the Allies would make future offensive operations on this front practically impossible to the Germans. Most of this ridge was secured early in November when the Canadians captured Passchendaele. This closed the operations.

According to Haig, in these operations the British employed two-thirds of their divisions in France one or more times and the Germans 78 divisions, 18 of which were employed a second and a third time after being withdrawn to rest and refit. The casualties on both sides were extremely heavy. As a strategic movement it was not a success but it did produce a great effect on the morale of the German army.

Verdun Again. On Aug. 20, 1917, after nine months of comparative quiet, the French resumed the offensive at Verdun. After a three-day bombardment they advanced on both sides of the Meuse and penetrated a mile and a quarter on an 11-mile front. In the next four days smashing blows were delivered which resulted in a further advance. By the 15th of September the French had recovered 100 square miles of the 120 the Germans had seized in their great offensive. They now held all the dominating positions in the Verdun sector and on the west of the Meuse the Germans were back in the lines from which they advanced in 1916.

Second Battle of the Aisne. On Oct. 23, the French X army—Maistre—launched a successful attack in the Aisne region. The attack was directed at the salient of the German line northeast of Soissons and just south of the Ailette River. The objectives were reached that day and immediately organized. The result of this attack was the abandonment by the Germans of the Chemin des Dames by November 2, and the retirement across the Ailette. This operation which was based on surprise, captured with comparative ease what Nivelle failed to capture with nearly a million and a half men. It worked marvels in the restoration of confidence and the rehabilitation of the French soldiers' morale.

Battle of Cambrai. While the British operations in Flanders were in progress, the commander of the III British army—Byng—had been preparing plans for an attack on new lines. The battle was to be a complete surprise without artillery preparation, a method untried up to this time in the War. The attack was to be led by a lone line of tanks followed by the infantry. Special preparations had been made to enable these tanks to cross the German trenches of the Hindenburg line which were here 15 feet wide and 9 feet deep. After the close of the operations in Flanders, Haig gave his consent to the attack but was unable to send enough divisions to hold the ground won by its unexpected success.

The attack was to be delivered on a front of about 6 miles between the Canal du Nord and the St. Quentin Canal southwest of Cambrai. A strong cavalry force was assembled in rear to be employed if a break-through was secured. On the morning of November 20, preceded by a barrage, 350 fighting tanks moved off followed by the infantry. The main and reserve lines of the German position were taken and on the second day the British were five miles in advance of their own lines fighting for a ridge which in their possession would have commanded Cambrai. Their force was too small to effect its capture and although other divisions were hurried up it was then too late. The cavalry was disappointed as the bridge over which they expected to cross the St. Quentin Canal was broken down and the arrival of a German division from Russia closed this front. While the fighting was still going on in the captured area, the Germans hurried up reserves and on November 30 made a counterattack across the St. Quentin Canal and recovered about half the area they had lost.

The battle of Cambrai established the value of tanks, and preparations were made both by the British and French to employ them on a grand scale in 1918.

Allied Unity. The prime ministers of France, Italy and Great Britain met at Rapallo, Italy, on November 9, and formed the Supreme War Council, which was to coördinate the military powers of the Allies and wage war as a unified group and not as individuals. The members of the Supreme War Staff were to be Generals Cadorna (Italy), Foch (France), and Wilson (British). According to the agreement, "The Supreme War Council has for its mission to watch over the general conduct of the War. It prepares recommendations for the considerations of the governments and keeps itself informed of the execution and reports thereon to the respective governments." General Bliss later became the American representative.

American Expeditionary Force. The first contingents of a United States army to fight in Europe arrived at a French port on June 26 and 27, 1917. They were commanded by Maj.-Gen. William L. Sibert and received a tremendous ovation from the French people. On the way over, the transports had been unsuccessfully attacked twice by submarines. Gen. John J. Pershing, the commander-in-chief of the American force, had been in France for some time preparing for the coming of the "Sammies," as the French characterized the American soldiers. Training camps for the American troops had been located in various parts of France and were ready for occupancy when the soldiers arrived. Infantry, artillery, aviation and medical bases were established. The number of men gradually increased, many of them stopping in England before going over to France. An intensive system of training was entered upon during the latter part of July. American officers were aided by officers and men of the British and French armies. The American transportation service took over transportation on all railways leading to American bases and a section of French forest was turned over to American lumbermen for the needs of the Expeditionary Force.

For the details of the actual raising, training, and equipping of the American army, see UNITED STATES and allied topics.

1918. Last Year of War on Western Front. The months of January and February, 1918, were months of comparative inactivity along the battle line from the North Sea to the Swiss border. The outstanding feature of the War at the close of 1917 was the signing of an armistice between the Central Powers on the one hand and Rumania and the de facto government of Russia on the other. The defection of Russia from the side of the Allies was the signal for a tremendous publicity campaign in Germany, predicting a gigantic blow on the Western front, which would completely crush the British and French armies before the American forces could land in sufficient numbers to give any substantial aid. The depression in Allied countries caused by the abolition of the Eastern front was somewhat overcome by Allenby's victories in Asia Minor and the unexpected rapidity with which the United States rushed men and material to Europe.

The chief cause for the optimistic tone of the Teutonic press was the fact that huge quantities of material and a large number of men could now be transferred from the Eastern front for immediate service on the Western front. The German High Command adopted a policy of careful selection of the men who were to be transported westward. As a skeleton for the new division to be formed they picked out all the soldiers in Russia between the ages of 25 and 35. They realized that it would be impossible to withdraw all the men from Russia inasmuch as the Treaty of Brest-Litovsk provided for the occupation of a considerable amount of Russian territory by German troops. While it was generally known that the personnel and morale of the Germans on the Eastern front were considerably lower than on the Western front, nevertheless the German command hoped to build up from the Eastern material about 59 or 60 divisions of 12,000 men each. This would increase the fighting strength on the Western front by about 700,000 men and would bring the highest total of available men up to approximately 2,340,000. This total would approximately equal the number of men Great Britain and France had available. American, Belgian, and Portuguese troops practically assured the Allies a numerical superiority over the whole front although not necessarily in any one sector.

On the Western front, during the first 10 weeks of the year the fighting consisted of a series of almost unending trench and aërial raids, carried out for the purpose of reconnaissance. Sometimes the trench raids would follow heavy bombardments, but generally speaking they were carried out by small patrols under cover of darkness. The Germans with varying success carried out raids in Flanders, Artois, Picardy, the Verdun sector, Champagne, and Lorraine, with the evident intention of ferreting out the weak points of the Allied line for the much heralded offensive on the Western front. The purpose of the Allied raids was to discover, if possible, the places on the German lines where any unusual concentration was being made. The aërial raids, to a large extent, were carried out over the valleys of the Rhine and Moselle Rivers, where it was known that the troops transported from the Eastern front were being refitted for service on the Western front.

The American troops, which had been pouring into France in an ever-increasing stream, and which had been gradually concentrating in camps in eastern France, were prepared to take over a section of the battle line. Pershing from the first had insisted on a distinctly American unit and had steadfastly refused to brigade the American troops with the British and French. The sector allotted to the 1st American division was about eight miles long and was on the southern side of the St. Mihiel salient, which had been established by the Germans advancing from Metz in 1914, and which had withstood several attempts on the part of the French to "pinch" it. Three French divisions were thus relieved for duty against the impending German attack. The Germans lost no time in trying out the new American forces by means of heavy bombardments of high explosives and gas shells.

Second Battle of Picardy: The Somme Again. Shortly before 5 A. M. on Mar. 21, 1918, came the great blow which the German press and public had been so continually prophesying since the collapse of Russia and Rumania. The German plan was based on sound military strategy. It was to strike the Anglo-French line where the two armies joined, break through and reach the channel ports, and thus either confine the British, Belgian and Portuguese armies in the narrow region between the Somme and the Belgian border or drive them into the sea, and then turn their attention southward to the French armies, and make a direct advance on Paris. The attack was so timed as to offset any increase to the Allied force from the United States. The success of this scheme depended entirely on a complete break-through at the junction point of the British and French armies.

The front chosen for the attack was between the Scarpe and the Oise Rivers, and was held by the III British army under General Byng and by the V British army, under General Gough. The V army section of the battle line was taken over by the British from the French at the beginning of the year. The V army was composed of about 14 divisions, roughly 170,000 men, which had to protect a line about 50 miles long. It is difficult to understand why this particular section of the line was held so lightly. This entire front was attacked by a force composed of between 40 and 50 divisions, amounting to approximately 750,000 men, about 150,000 of which were concentrated between St. Quentin and La Fère. It is scarcely to be wondered at that the V British army was brushed aside by such a superiority of men, and by the dogged determination on the part of the Germans to get through at any cost. The German armies facing the battle line were under the supreme command of the Crown Prince of Bavaria and the individual armies, XVII, II, and IX, under the leadership of Von Bülow, Von der Marwitz, and Von Hutier. The plan of attack was drawn up by the last named general.

The weather favored the Germans to a very large extent. The attack was begun a little before 5 o'clock on the morning of the 21st under the cover of such a heavy fog and mist that it was impossible to see more than 100 feet ahead. It was preceded by a brief but very intense artillery fire which was composed mainly of high explosive and gas shells. Simultaneously a heavy artillery fire broke out in the Champagne and Lorraine sectors with the obvious purpose of preventing the bringing up of reinforcements to the vital places attacked. The Germans also bombarded Paris with a long-range gun placed in the forest of St. Gobain, approximately 75 miles away. This gun killed many civilians and did much material damage in Paris, but instead of causing a panic it seemed to renew the grim determination of the Parisians to carry on.

General Gough, commander of the V British army, knew from documents taken from German prisoners that the assault was impending and had made preparation to meet it, but his preparations were practically nullified by the weather conditions. The first line of defense, i.e. the outpost line, was taken before the British were cognizant of the fact that the attack had begun. The tremendous superiority of numbers forced the resistance line (second line) very quickly and enabled the Germans to rush up to the battle line or last system of defense. Here again the inequality of numbers ultimately told and the II and IX German armies forced their way through where some of Gough's division joined. Apparently the British had made no provisions for a break-through, because there were no defense lines behind the third defense system. The road to Amiens seemed open and only heroic efforts saved it.

The battle line of the German offensive extended from southeast Arras in the direction of Cambrai, as far as La Fère. The first infantry attack broke through the first and second lines of British trenches of the III army on a 16-mile front from Lagnicourt to just south of Gouzeaucourt. The result of this attack was evacuation of the British positions in the salient that remained after the battle of Cambrai at the close of 1917. On the 22nd, the Germans, after more heavy artillery preparation smashed through the entire British position along the whole front. The V British army was now completely cut off from the permanent French position before La Fère and the permanent British position at Arras. Between these two points there was a struggling mass of humanity with practically no organization as far as the Allies were concerned. It seemed certain that the German plan was to succeed and a permanent wedge inserted between the French and British armies. On the 23rd the British were defeated near Monchy, St. Quentin, La Fère, and opposite Cambrai, and the British second positions between Fontaine les Croisselles and Mœuvres were penetrated. The Allies hoped to be able to hold the line of the Somme, but were unable to do so because no adequate defenses had been constructed there. On the 24th the Germans took Péronne, Chauny and Ham, and crossed the Somme River at various points south of the first mentioned place, by means of a pontoon bridge and rafts. The British were unable to completely destroy the bridge because of the haste with which they were withdrawing their artillery.

Continuing to advance on the 25th, the Germans captured Bapaume, Nesle, Etalon, Barleux, Biaches and Guiscard. On this day the French War Office announced that British lines south of St. Quentin and around Noyon had been taken over by a French army, thus showing that at last the Allies were making some successful attempts to stem the tide of invasion. On the 26th, the Germans crossed the old battle line of 1916 in several places and captured Noyon, Roye and Lihon. The 26th was the decisive day of the battle of Picardy. This day saw the closing of the gap caused by the break-through of the 21st. The French came up along the Southern front from the Aisne to the Avre, and west of the Avre, where they united with the British at Moreuil. The 26th also saw the organization of a temporary force under Gen. Sandeman Carey, who had received orders to close a gap made by the Germans. With rare judgment and skill he improvised an army from sappers, laborers, engineers, in fact anybody he could find, and with this cosmopolitan force faced the Germans, fighting over unknown ground, and with officers in charge of men they had never seen before.

A few words should be said here of the

method used by the Germans to relieve men who were exhausted by constant attacking or shot to pieces by the heroic British defense. Reserve divisions were kept directly behind the battle line and when advanced divisions needed replacement, the reserves were passed through the forward divisions and the latter were rested and reformed, and then they became the reserve. By this means the Germans were able to present continually fresh men to the British, who had been fighting without rest or relief since the tremendous offensive began. Another thing to be noticed about this battle was the ease with which the Germans were able to manœuvre their attacking columns. The attack was made with three or four columns of several divisions each, and when they were stopped in one direction they were able to turn without loss of power in another direction. As most of the new ideas worked out in this battle were devised by Von Hutier, this plan of attack became known as the Von Hutier method. Many of its features were later adopted by the Allies.

The 27th saw the first perceptible signs of the slowing up of the German forward movement. The British, now reinforced, checked the Germans, and recaptured Morlancourt and Chipilly north of the Somme and advanced to Proyart south of the Somme. These gains were offset, however, by the capture of Albert and the crossing of the Ancre River north and south of that city, and forcing the French back east of Montdidier. The 28th saw the fall of Montdidier but it also saw the complete repulse of a tremendous German attack on Arras. The artillery preparation was terrific and the Germans' orders were not only to take the city but Vimy Ridge also, at all costs. The Germans used about 20 divisions in the huge effort, and after suffering appalling losses which materially reduced their numbers, were compelled to give up the attempt after an all-day battle which equaled in intensity anything that the War had produced.

The German effort had now almost spent itself and the German High Command found itself caught in a rather difficult position. The Germans had pushed a 35-mile salient towards Amiens, which was quite narrow at its extreme tip. The northern side of the salient was bounded roughly by the Ancre River and the southern side by the Avre. These water barriers were, comparatively speaking, no protection to the Allies, but the high ground on the Allied sides was an ideal spot for artillery emplacements, which commanded all the German positions in the tip of the salient. The German problem was to break through the sides of this wedge and broaden the salient or face a possible disaster. The attempt at Arras, as has been noticed above, failed. During the first week of April tremendous assaults were made from Albert at the Ancre line on the north, and on the Avre line from Grivesnes to north of the Amiens-Roye road on the south. Although local successes were gained by the Germans, they failed in their main purpose, i.e. breaking the lines of the Avre and Ancre and widening the salient. The chief reason for this was the time element, which had permitted the British and French to bring up men and guns and thus stabilize their lines. Another contributory cause was the fact that a heavy rain had turned the Somme battlefield into a desolate sea of mud, and hindered the Germans' transportation of men, munitions and supplies. The failure during the first week of April to smash the sides of the Amiens salient ended the battle. As to results, the main German plan was frustrated. The French and British were still united and held strong defensive positions. The Germans had taken practically all the ground they held at the beginning of the battle of the Somme in 1916, and some more besides, approximately 1500 square miles. Both sides suffered severe losses. A conservative estimate would place the German casualties at a quarter of a million men, while the Allies' were probably 50,000 less. Most of the Allies' losses were borne by the British.

Ferdinand Foch, Allied Commander-in-Chief. The terrific blow struck at the British army on the 21st of March, with the subsequent demoralization and almost complete defeat of the Allies, compelled them to take a step that up to this time they had been loath to take. That was to appoint one man as the leader of all the Allied armies. It is idle to speculate on what might have happened if this had been done previously, but many critics have stated that the great March disaster would have been avoided under a unified command. On Nov. 12, 1917, after creation of the Supreme War Council, Lloyd George said concerning it ". . . The Italian disaster necessitated action without delay to repair it. . . . It is true we sent troops to Saloniki to succor Serbia, but as always they were sent too late. Half the men who fell in that vain effort to pierce the Western front would have saved Serbia, saved the Balkans, and completed the blockade of Germany. . . . 1915 was the year of the Serbian tragedy: 1916 was the year of the Rumanian tragedy. . . . National and professional traditions, questions of prestige and susceptibilities, all conspired to render our best decisions vain. . . . The War has been prolonged by particularism. It will be shortened by solidarity." These words seem to point to a unified command but Lloyd George was compelled to go back on them because the British General Staff, which was opposed to the scheme, was too influential with the British public and Parliament. The move was characterized as an attempt to subordinate the military to the political leaders. The British felt that a French leader would not protect the British lines to the sea, and the French felt that a British leader would sacrifice Paris for the sake of defending the coast. But Allied failure on the Western front, such as at Cambrai, the collapse of Italy, and the colossal defeat just suffered by the British arms, converted the British public to Lloyd George's point of view.

From the time that the United States entered the War, President Wilson had argued unity of command as well as the pooling of all the resources of the Allies. When the Germans struck in March, General Pershing offered the small American forces in France to the Allies for use in any way they saw fit. This act on the part of the American commander finally overruled the last objections on the part of the British Staff. General Foch, whose ability, achievements, and popularity in the Allied countries, eminently fitted him for the task, was named Commander-in-Chief of all the Allied Armies. His first statement was an assurance that Amiens would not fall. In all the countries involved he was heartily welcomed as the man of the hour by the press and the public.

Battle of Lys River. Possibly as a result of the Von Hutier idea of changing the direction of the attack or possibly as a result of the check they received before Amiens, the Germans suddenly launched an attack between the high ground north of Ypres and Arras with their IV and VI armies. The German Staff also estimated that the British armies defending these fronts were considerably weakened by the attack on Amiens. The main part of the attack was aimed between the first mentioned positions and La Bassée, astride the Lys River. A break-through of any size would seriously imperil the channel ports, inasmuch as the British had scarcely 40 miles to manœuvre in. An advance similar to that before Amiens would have resulted in the capture of Calais, one of the chief bases of supply of the British armies. The chief objectives of the first German thrust were Béthune, Bailleul and Hazebrouck. The last named place was a little over 15 miles from the starting-place, and if captured meant the fall of Ypres and the dislocation of the entire railway line behind the British and Belgian armies.

On April 9 the German armies struck at a portion of the line between Estaires and Bac St. Maur, held by a Portuguese division and smashed it completely, capturing Richebourcq-St. Vaast and Laventie. This attack created a gap of about 3 miles in the British lines and through this opening German troops began to pour and spread out in ever-increasing numbers. On the 10th the Germans crossed the Lys River at several points between Estaires and Armentières, and launched a tremendous assault at the base of Messines Ridge. These movements caused the fall of Armentières. On the 11th the Germans launched an attack all along the front from La Bassée to the Ypres-Comines Canal and took Estaires and Steenwerck. The Germans, as in their previous offensive, were making rapid advances in the centre toward Hazebrouck, but were checked by the defense around the wings at Ypres and Arras. Unless one or the other of these wings could be pierced the German advance was bound to be stopped before it could reach its main objective at Hazebrouck. By the 13th the Germans were only 5 miles from Hazebrouck. The seriousness of the British position may be gathered from General Haig's statement to his troops on April 12, "Many among us are now tired. To those I would say that victory will belong to the side which holds out the longest. Every position must be held to the last man. There must be no retirement. With our backs to the wall, and believing in the justice of our cause, each one of us must fight to the end. The safety of our homes and the freedom of mankind depend alike upon the conduct of each one of us at this critical moment."

Although it appeared that the German offensive had slowed up on the 14th, on the 15th the Allies met with severe reverses. A terrific assault towards Bailleul and Wulverghem resulted in the capture of Bailleul, Wytschaete and Spanbraekmolen. On the 17th the Germans occupied Poelcappelle Langemarck, and Passchendaele, which the British were compelled to evacuate, in order to escape the dangers of a salient, the base of supplies of which was nearer to the Germans than to the British themselves. The capture of Wytschaete placed the British positions around Ypres in a very precarious situation. Messines Ridge, on which this was located, dominated all the British positions in Ypres and overlooked the means of communication with that city. In order to prevent a serious catastrophe the British retired to a line that ran from Bixschoote to the neighborhood of Zonnebeke. By the 18th their positions were almost identical with those they held after the first battle of Ypres in 1914. The surrender of territory was a terrible blow to British morale and pride. The first and second battles of Ypres had made that city, in the eyes of all Englishmen, what Verdun was to the Frenchmen.

The Germans, checked for the time being in the north, made a heavy assault on Villers Bretonneux, southeast of Amiens, on the 24th. With the aid of a number of tanks, they captured the village. At the same time, just south of this, French and American forces were compelled to abandon an unimportant salient near Hangard, in the valley of the Luce River. Mount Kemmel, which seemed to be the only remaining key to the Ypres salient, was the scene of extremely bitter fighting from April 24 to April 27. The Germans, prodigal of men, made frontal and flank attacks on the positions, until by sheer weight of men and metal they compelled the Allies to relinquish the height, as well as the villages of Kemmel and Dranoutre. Ypres did not fall as was expected because of the failure on the part of the Germans to capture Mont Rouge, Mont des Cats, Scherperberg, and several other hills that belonged to the same range as Mount Kemmel.

The second great German thrust was ended. It failed to accomplish its purpose, although approximately 800 square miles of French and Belgian territory were occupied. The significant fact that remained after these two German attempts to gain a decision was that the 15-mile front between Lens and Arras held. This prevented the Germans from broadening their salients and thus, in a sense, limited the depth of their penetration inasmuch as a narrow salient is constantly in danger of being "pinched."

Forcing of the Aisne and the Marne. The fact that the defensive around Arras, particularly Vimy Ridge, and around Ypres, particularly Mont Rouge, held against all assaults, forced the Germans to turn to the southern side of the Picardy salient and attempt to widen it there. Hindenburg would undoubtedly have preferred to attack the British army again, but as that would require a large amount of preparation, he decided to go through with his plans on the Aisne, in order to keep the offensive. A few days previous to the beginning of the battle of the Aisne heavy artillery fire in the Picardy and Ypres salients seemed to presage an attack in those localities. When the real direction of the attack was revealed and the Germans forced the Chemin des Dames positions and the Aisne River with comparative ease, many critics believed that Marshal Foch had been out-generaled and out-manœuvred. Later events proved that he had adopted the best course of action, because, while he could doubtless have held these positions at great cost, he achieved far better results by permitting the Germans to advance in the centre while holding them on the wings, thus placing them in a vulnerable position.

On May 27, the Aisne offensive began. As in the previous two, great concentrations of men and material were made by the Germans with comparative ease, and apparently without the knowledge of the Allies. A three-hour artillery preparation, composed mainly of gas, with a sprinkling of high explosives, preceded the infantry attack. The attacking force comprised 250,000 of the best fighting men in the German army. The British and French defenders consisted of between 50,000 and 75,000 men. The attack was on a 40-mile front from around Vauxaillon, near the Ailette, to Reims. The chief attack was near Craonne and its purpose was to outflank the Chemin des Dames, in case it could not be taken by frontal assault. The entire Chemin des Dames line was overrun on the 27th, and the Allies retreated across the Aisne between Vailly and Berry-au-Bac, a distance of 18 miles, in relatively good order. On the 28th, the Germans drove forward about 6 miles on a 9-mile front between Vauxaillon and Cauroy, took about 20 towns and villages, crossed the Aisne and Vesle Rivers and reached Fismes on the southern bank of the latter river. The Allies were falling back in the centre, but on the Reims side they held the Thillois-Savigny-Brouillet line which protected that city. An attempt was made to do the same on the western side to protect Soissons, but the line failed to hold. The same day also saw the end of the German assaults in the Ypres and Picardy sectors, which were intended to divert attention from the main battle. The Allies recovered their lines on the Lys-Ypres front east of Dickebusch Lake. The American 1st division took Cantigny, near Montdidier, after a brilliant assault, and held it against several strong counterattacks.

On the 29th Soissons fell after an extremely heavy bombardment of high explosive and incendiary shells. On the 20th the Germans continued their advance in the centre but were checked on the flanks. They captured Fère-en-Tardenois and Vezilly, and forced the Allies back on Reims, but in the south were held along the Soissons-Château-Thierry highroad. They succeeded in wiping out the salient south of Noyon from the Oise canal to Soissons. The 31st saw an 8-mile drive to the Marne, which was reached on a 6-mile front from Château-Thierry to Dormans. Attempts in the next few days to broaden this front, particularly in the direction of Epernay, were severely repulsed.

On June 15 the Germans began to widen this salient to the westward. They pushed 6 miles in that direction along the Ourcq, a tributary of the Marne. This drive brought them beyond Neuilly and Chony and reached Nouvron and Fontenoy northwest of Soissons. A heavy assault against Reims, with the intention of smashing the eastern side of the salient, was severely checked before it made any headway. The tide of battle was now slowly but surely swinging to the side of the Allies. Although the Germans had almost 500,000 men across the Aisne, General Foch, by calling on the British, French, American, and Italian reserves, presented at least an equal number to them. On the next day French counterattacks in force slowed up the German drive westward.

The German advance had now practically stopped and during the next few days, the French, with the assistance of the Americans, not only stopped the Germans, but drove them back in the neighborhood of Château-Thierry. On June 6, Franco-American troops advanced nearly a mile in the vicinity of Veuilly-la-Poterie, and Americans took Torcy and Bouresches, which they held against strong counter-assaults. The subsequent activities of the Americans in this sector will be treated in the following section. On June 18, a terrific attack on Reims, carried out by 40,000 Germans, was completely crushed.

The German War Office announced that 45,000 prisoners and 400 guns had been captured; 650 square miles of territory had been occupied, and the Germans had advanced a maximum depth of 30 miles, and created another salient with a narrow tip, only 6 miles, along the Marne. No considerable strategical advantage had been gained, unless it be the fact that the Germans were now only 44 miles from Paris instead of 62. The price paid to gain what was merely a geographical advantage, was conservatively, 110,000 men, killed, wounded, and captured.

The Offensive Against Compiègne. The battle of the Aisne and Marne left the Germans in a very precarious position. The salient had to be widened, strongly fortified, or else abandoned. The line from Château-Thierry was in the shape of a huge crescent with the bend facing towards the Germans. The German plan was to link up the Picardy salient with the Marne salient and thus wipe out the huge bulge in their line and to capture Compiègne, Compiègne Forest, and Villers Cotterets Forest and then use the first mentioned place for a direct attack on Paris. The capture of Compiègne was considered absolutely necessary because of the insufficient line of supplies for the troops in the Marne salient. The capture of Compiègne would open up the Liége trunk line and solve the problem of supply. The river valleys of Aisne, Oise, Marne, and Ourcq would then be available for a converging attack on Paris, the nerve centre of France. The strategy of the offensive was sound but its execution failed. In five days the Germans suffered one of their most ghastly failures of the entire war. The offensive lacked the element of surprise, which, undoubtedly, was the chief cause of the initial successes of the earlier offensives. The French command had made a minute survey of the field and placed artillery and machine guns in such position as to enfilade all avenues of attack. They also made provisions, in case of initial German successes, to check their forward movement on second and third defense lines, as carefully prepared as the first. The French plan was to hold this front line lightly and resist the enemy on the combat lines, which were out of range of the German light artillery.

The attack was preceded by a heavy artillery attack, again mainly composed of gas, which lasted from midnight until 4.30 in the morning of the 9th of June when the attack began on a 20-mile front from Montdidier to Noyon. As in the previous battles the Germans advanced in the centre but were held on the flanks. The total advance on the first day was 2½ miles and was only attained after frightful losses. The French made a heavy counterattack on the very first day between the Oise and the Aisne, which showed that the forces on both sides were nearly equal. On the next day the Germans advanced about 3 miles farther and captured, after extremely bitter fighting, Mery, Belloy, and St. Maur. The German penetration was now about 5 miles and this was approximately the depth of their entire advance.

On the third day the Germans were compelled to bring up fresh divisions and, with their aid, reached the Aronde River, a small stream on the western side of the battle line. They also advanced a mile along both banks of the Matz River and almost reached its junction with the Oise on its northern bank. On the eastern end of the battle line, Ourscamps Forest was enveloped. This day was the turning-point of the battle, because before it was over, two French counterattacks had driven the Germans back between Ribescourt and St. Maur, and recaptured Belloy, Senlis wood, and the heights between Mortemer and Courcelles. On the next day the French gained further ground between Belloy and St. Maur. The Germans forced a crossing of the Matz, but on the 13th the French again counterattacked in force and drove the Germans back across the Matz. This ended the German offensive which resulted in the using up of over 300,000 German troops and the actual putting out of action of 80,000. No strategical advantage was gained.

A word should be spoken here of the activities of the Franco-American troops in the neighborhood of Château-Thierry. On the 10th, American marines moved forward in the Belleau Wood and by the next day had captured all of it. The Americans also crossed the Marne on scouting expeditions.

Second Battle of the Marne. On July 15, Ludendorff opened his fifth and what proved to be the last German offensive of the year. It also proved to be the last German offensive of the War. It was under the personal direction of the German Crown Prince and was called "Friedensturm" (peace offensive). The whole line attacked was roughly 60 miles long and extended from Château-Thierry to Dormans, around Reims, and then east almost to the Argonne Forest. It is estimated that the German Crown Prince had more than 800,000 men available for this "peace offensive." The plan of attack was to encircle and capture Reims by taking the Reims mountains, and also to get control of the railway centre of Epernay, which would compel the French to give up the entire Champagne line, which was very strongly fortified, and thus leave the centre in a very vulnerable position. The capture of Reims would also solve the supply question of the overextended Marne salient.

The attack began at 6 A.M. on the 15th. The first blow was aimed at the Americans on both sides of Château-Thierry. The Germans crossed the Marne in June southeast of Château-Thierry between Fossay and Mezy, compelling the Americans to retire on Condé-en-Brie. Here a counterattack was immediately organized, which drove the Germans back across the river and left 1500 prisoners in American hands. On other positions of the front the Germans were more successful. They crossed the Marne east of Dormans and advanced astride it in the direction of Epernay. At Bligny, southwest of Reims, they penetrated positions held by Italian troops and thus threatened to get in the rear of Reims. Southeast of Reims, the Germans made a fierce attack east of Prunay, with the idea of squeezing out the city, in conjunction with the advance at Bligny. General Gourand's IV army put up a magnificent resistance and held the Germans to very slight gains after inflicting appalling losses on them. The 42d American division formed part of this army. On the 16th and 17th, further attacks against the American forces were checked almost before they had started, but the pockets around Bligny and Prunay, southwest and southeast of Reims, respectively, were deepened. Everywhere else the Germans were held or driven back by counterattacks. The distance across the base of the Reims salient was scarcely 10 miles, which shows the critical position of this Allied bulwark. It is estimated that the Crown Prince in this "peace offensive" used 400,000 men, just one-half of those available, and that at the end of three days one-fourth of those employed were on the casualty list.

The Allied Offensive. The great German offensive begun in March was finally terminated on July 17 and the Allied counteroffensive began on the following day. In this counteroffensive there were two distinct periods although the fighting was practically continuous. The first period was that covered by the operations that ended in the compulsory retirement of the Germans not only from the three great salients made by the advance of their armies in 1918—the Marne, Somme and Lys salients—but also from the St. Mihiel salient captured in 1914. This period ended about the middle of September. This was followed by the final campaign in which the Allied armies advanced in practically a continuous line from the Channel to the Meuse River; it ended with the Armistice. This period began about the 25th of September and ended November 11.

Marne Salient. As early as June 1, General Pershing saw that the Marne salient was inherently weak, and suggested to Marshal Foch an immediate attack along the western face toward Soissons. Marshal Foch was strongly impressed by Pershing's plan but determined to wait until he had a preponderance of force. By the middle of June a plan for a counteroffensive, drawn up by General Pétain, in conference with Generals Fayolle, Mangin, and Degoutte, had been approved by Marshal Foch. While the Crown Prince was attempting to encircle Reims and cross the Marne the details were being worked out. The plan was to strike on the western side of this salient along the line between Soissons and Château-Thierry. The preparations for this counterattack were kept very secret. Vast quantities of supplies were stored up in the Villers-Cotterets forest, which lent itself admirably to the purpose. Great numbers of men of the army of manœuvre (the existence of which the Germans doubted) were concentrated in the ravines and valleys of this forest without detection by the enemy.

The Allies attacked on July 18 on a 28-mile front from Ambleny, west of Soissons, to Bouresches northwest of Château-Thierry. The attack was made without artillery preparation, the advancing infantry being protected by large numbers of tanks and a creeping barrage. It was made by Franco-American troops, the latter being most prominent in the Soissons and Château-Thierry regions, actually being the spearhead of the attack in the former place. The blow took the Germans completely by surprise, and, as a result of it, and the vulnerability of the German lines, the Crown Prince and his armies were driven across the Vesle. The hinge of the entire German retirement was the high ground around Chaudon, southwest of Soissons. The first push netted the Allies a 6-mile advance to the Crise River, which runs around the Chaudun plateau and which joins the Aisne at Soissons. This brought General Mangin and his Franco-American force to within a mile of the city, but the German High Command continued to hurl in fresh divisions in this vicinity, which effectively prevented the retreat from becoming a rout. The Allies also advanced from 2 to 3 miles astride the Ourcq, and the whole German line from Soissons to Château-Thierry began to retreat. Assaults carried out by British, Italian, and French troops, along the line from Château-Thierry to Reims won initial success but were unable to make a break-through similar to that on the western side.

Château-Thierry was evacuated on the 21st and on the same day Franco-American troops crossed the Marne and advanced 4 miles toward the Ourcq. By the 23rd the entire Soissons-Château-Thierry highroad, with the exception of a small portion south of Soissons, was in the hands of the Allies. On the eastern leg of the salient the British and Italian troops achieved local successes, but were unable to make a hole big enough to threaten the rear of the enemy. They did keep many German divisions actively engaged which might otherwise have been used to stem the Allied advance. On the 24th the Franco-American forces advanced 2 miles north of Château-Thierry and the British penetrated the German lines in the neighborhood of Vrigny on the eastern leg of the salient. On the next day the Germans made a heavy assault against the eastern leg, with the hopes of widening the salient, but they were thrown back everywhere. On this day the French captured Oulchy, and, together with the Americans, occupied 40 square miles of territory. After a week of severe fighting, the Crown Prince was using every effort to extricate his armies in the best possible shape out of a salient of which the neck was scarcely 20 miles wide. A German counter-offensive or another attack against Ypres which Hindenburg had planned for August, were out of the question.

By the 27th the Germans were in full retreat and on the 28th they abandoned the line of the Ourcq. On the eastern side of the salient the Allies crossed the Reims-Dormans highway after bitter fighting. This threat to completely crush the Germans resulted in severe fighting in the vicinity of Vrigny and St. Euphraise. The advance to the Vesle River was marked by extremely heavy fighting between the Prussian Guards and American forces at Sergy and Seringes. The former place changed hands nine times and the latter five before remaining in the hands of the Americans. On the 31st, the Germans made bitter but unsuccessful efforts to keep the Americans from Nesles forest. On August 1 the Allies struck on a 10-mile front north of La Fère, penetrated 2 miles, captured the height north of Grand Rozoy, and advanced to Cramoiselles. This effectively broke the hinge around Soissons and enabled the French to enter the city on the 2d after bitter street fighting. The advance on the 3d was 6 miles deep in some places and recovered more than 50 villages, the most important of which was Fismes. The Germans were now completely behind the Aisne-Vesle line and made desperate attempts to hold the north bank of the latter river with the aid of the heavy artillery on the far side of the Aisne. The results of the first Allied offensive of the year were enormous—35,000 prisoners and more than 500 guns were in Allied hands. The Germans at home, as well as in the field, were convinced that their armies were not invincible. On the other hand the morale of the Allies was considerably heightened both by the German defeat and the spirited fighting of the American soldiers.

Somme Salient. On Aug. 8, 1918, Marshal Foch struck his second great blow. In many ways it resembled the Marne offensive. His aim was to "pinch" the overextended salient in Picardy, reaching out toward Amiens. He was making his plans and preparations for this attack while the offensive was being carried out on the Marne. The immediate objective was the railroad running from Péronne to Roye.

The attack was on a front approximately 30 miles long from Amiens to Montdidier. Later this front was extended all the way to Soissons. The element of surprise was entirely with the Allies. The Allied aircraft, artillery, and tanks, worked in complete harmony with the infantry. The British IV army, under Rawlinson, struck the Germans, under von der Marwitz, before Moreuil, and, in three days, drove them back 15 miles in some places and an average of 10 miles along the entire line. Most of the advance was on the plateau just south of the Somme River. During this time the French I army under Debeney, who were supporting the right of the British, crossed the Avre River in the face of an extremely destructive artillery fire and wiped out strong enemy positions, which threatened to outflank Rawlinson's advance. When he had accomplished this, he and Rawlinson began a concerted advance in the general direction of the Hindenburg line. By the 18th the Germans had retreated to the Albert-Chaulnes-Roye-Lassigny line and had lost most of the Lassigny plateau. On the 13th the French struck between the Oise and the Matz Rivers and captured Canny-sur-Matz. This blow also threatened Noyon, since that place was dominated by the artillery along the banks of the Oise.

On August 20 Mangin, with the aid of American troops, launched an offensive from the Oise near Ribecourt to the Aisne near Soissons. This was a part of Foch's plan to keep the whole line in action so that the German High Command would have great difficulty in bringing up reserves. Probably it was the activity of the Franco-Americans from Montdidier to Reims that enabled the British to make such huge strides to the Hindenburg line without suffering severe losses. The object of Mangin's blow was to secure the control of the plateau between the two rivers. Ten thousand prisoners fell into the hands of the Franco-American troops. On the same day Lassigny fell and the Germans evacuated Ourscamps Forest. On the 23d, the French advanced 7 miles along the front from Lassigny to north of Soissons. They captured several villages and crossed the Ailette River. On the 23d the III French army crossed the Divette River, near Avrincort, and General Mangin's X army crossed the Oise River and the Oise Canal at Manicamp 8 miles east of Noyon and reached the outskirts of Morlincourt, which seriously threatened the entire Noyon salient.

Roye fell on the 27th, Chaulnes on the 28th, and Noyon on the 29th. The operation which resulted in the capture of Chaulnes drove forward 8 miles and made it certain that the German retreat could not stop short of the Hindenburg Line.

On the 30th, Mt. St. Siméon northeast of Noyon was completely occupied and the Franco-Americans captured Juvigny, a small town north of Soissons, which was of great strategic importance because it controlled the Juvigny plateau. The entire line of the Roye-Noyon-Soissons railway was now in the hands of the Allies. During the next five days the Franco-Americans saw bitter fighting, but nevertheless made advances of an extremely important nature. They gained a strong foothold on the Soissons-St. Quentin highway, by the capture of Terny-Serny. In conjunction with this advance on and from the Juvigny plateau the French made rapid progress up the Ailette River and captured Crecy-au-Mont and Leury (September 1). The result of this drive between the Oise and the Aisne in the neighborhood of Soissons was to outflank the German positions on the Vesle. Consequently, on September 4, the Germans began a hasty retreat on a 20-mile front from the river, setting fire to ammunition dumps and other supplies that they could not take away with them. Their retreat was covered by the heavy artillery on the north bank of the Aisne and the Chemin des Dames. Franco-American troops forced a crossing of the Vesle on the first day of the retreat. By the eighth, the Allied troops were fighting around Villers-en-Prayères and Revillon. By the middle of the month the Germans were everywhere thrust behind the Aisne in this region as far as Vailly. The French now began preparations to make a direct assault on the St. Gobain forest and the western end of the Chemin des Dames. Laon could be seen in the distance.

In the meantime, the other French armies operating just south of the Somme River were making rapid strides toward the Hindenburg line. On September 4 the French gained northeast of Noyon and forced the Germans to beat a hasty retreat over the territory between the Canal du Nord and the Oise. On the 6th, Ham and Chauny fell and the French advanced 6 miles in some places east of the Canal du Nord. During the next few days they made slow progress astride the Oise in the direction of La Fère. When the fighting slowed down the French and Americans were practically in the positions held by the French before the Hindenburg line previous to the huge offensive of March 21.

The beginning of this section related that Rawlinson smashed the southern side of the Amiens salient by striking from Albert to Montdidier. Foch gave the Germans no rest. After Rawlinson's blow had exhausted its possibilities, he hurled Byng's III British army north of the Somme and took Bapaume, and when this blow exhausted possibilities he hurled Horne's I British army astride the Scarpe and actually broke the Hindenburg line, besides threatening Cambrai and Douai.

On August 21, Byng struck on a 10-mile front from the Ancre River to Moyenneville and took seven villages. In the course of the next day's fighting the British captured Albert, after bitter street fighting, and advanced 2 miles on a 6-mile front. A similar gain was made the next day from Bray to the vicinity of Grandcourt, which resulted in the seizure of nine villages and an imminent threat to outflank Bapaume. On the 24th, the British captured Bray on the Somme, 10 other towns and the famous Thiepval Ridge captured by the British in the Somme drive of 1916. The British swept on despite stiffening resistance and the utter disregard with which the Crown Prince of Bavaria hurled his reserves into the fray; 12 more villages and the Albert-Bapaume highway were seized on the 25th. After steady pressure the Germans were compelled to give up Bapaume on the 29th, and to begin a retreat along the whole line southward to Péronne and Brie on the Somme. Two days later the Australians in a brilliant assault stormed Mt. St. Quentin and Feuillancourt. The former position is the key to Péronne and this city fell on the first of September, along with Bouchavesnes and Rancourt.

The interest of the drive toward the Hindenburg Line now centres in the advances made by Horne's army, which struck astride the Scarpe, when Byng's forward movement began to slow up. Nevertheless it was the success of Byng's push that made Horne's attack possible. Horne's blow was tremendously successful because it not only broke the Hindenburg line at its northern end but broke the famous Drocourt-Quéant switch line as well. The very first day of the new drive, August 26, saw the piercing of the Hindenburg line. The Canadians captured Wancourt and Monchy-le-Preux. On the next day they smashed through the Hindenburg line for 4 miles southeast of Arras, and occupied Cherisy, Vis-en-Artois, and the Bois-du-Sait. Scotch troops crossed the Sensée River just south of the Cojeul and captured Fontaine-les-Croiselles, besides seizing Rosux and Gavrelle, north of the Scarpe. On the 28th, the Germans lost Croisselles and the Canadians took Boiry and Pelves behind the Hindenburg Line. Bullecourt was reached on the 29th, and the British were face to face with the Drocourt-Quéant line which had held them up in their Cambrai offensive at the end of 1917 (see *supra*).

The Drocourt-Quéant line was a very formidable line of defense intended to be a second barrier to the great bases at Cambrai and Douai. It branched off from the main line at Quéant and then ran almost parallel to it to Drocourt. The British attacked it at 5 o'clock on the morning of September 2, under the protection of an extremely heavy barrage fire. In their first attack the British penetrated 6 miles of the lines to a depth of 4 miles. During the second day, the British having broken the line, penetrated 6 miles along a front of more than 20 miles. Quéant was taken by storm, along with a dozen towns and villages. More than 10,000 prisoners fell to the British in this one operation.

They now settled down to a slow but steady advance along the Bapaume-Cambrai road. It might be added here that Lens was evacuated by the Germans on September 4, but the Allies were unable to occupy it immediately because it was saturated with poison gas. By the 12th, Havrincourt, Mœvres, and Trescault were in their hands, and the threat toward Cambrai increased.

Lys Salient. In order to save the Crown Prince of Bavaria's army from an overwhelming defeat similar to those suffered during the "pinching" of the Marne and Picardy salients, the German High Command determined to withdraw from the overextended salient south of Ypres. This withdrawal was accelerated by short, sharp blows by the British. The first retirement was in the neighborhood of La Bassée on August 5. This movement was followed by an attack on the Lawe River which advanced more than ½ mile on a 5-mile line. Two days later the British made an advance between the Lawe and Bourre Rivers which penetrated 2000 yards and occupied five villages, including Locon. Haig then struck due west of Armentières, between Bailleul and Vieux-Berquin, and captured Outtersteene. These attacks were made on the side of the salient and besides joining almost all of its area, placed the tip pointing toward Nieppe Forest, in a serious position.

Merville, almost at the tip of the salient, was entered on August 19, after an advance by the British on a 6-mile front. On August 30, the Germans evacuated Bailleul, and the next day the famous Kemmel Hill. Haig had planned to take this hill by assault with the aid of the American divisions, but the German withdrawal forestalled him. The British on the same day advanced along the Lawe River on the southern leg of the salient. On September 2 American troops north of Wytschaete were thrown into battle and captured Voormezeele, while the British were taking Neuve Eglise and some territory east of Estaires. Early in September the IV and VI German armies were ordered to evacuate the Lys salient to economize troops.

St. Mihiel Salient, and the American Army. By September 12, Foch realized that he had exhausted the possibilities of further immediate advance against the Hindenburg line. Instead of resting, which of course, would permit the Germans to rest also, he hurled the American army against the St. Mihiel salient, and reduced it, thus confronting the Germans with the necessity of defending Metz and the Briey iron fields. This salient, enclosing the Woevre plain, and with its tip extending to the Meuse, had existed since the first year of the war. One of the most important results of Pershing's successful offensive was the freeing of the great railway system running through Verdun, Toul, and Nancy. It was the loss of this railway that greatly hampered the bringing up of reserves during the Crown Prince's tremendous assaults on Verdun.

Pershing was able to form his distinctly American force only with the greatest difficulty. The Allied attitude from the beginning had been one of absorption. France and Great Britain and even Italy requested that the American troops be used to reinforce Allied troop units. General Pershing stoutly insisted on the foundation of an American army which should be thoroughly trained in open warfare and deliver an American blow against Germany on a definite front. After considerable argument and many conferences Pershing finally won his point, and as the first step he organized seven army corps. The American army was formed on the Vesle front but it was secretly transferred to the Woevre front with headquarters at Neufchâteau. It was given the mission of reducing the St. Mihiel salient by Foch, at Bombon, on July 24. General Pershing took command of the army himself.

Pershing's general plan was to make a feint toward Belfort, and then in a surprise attack strike at both sides of the salient and advance to the centre while carrying on a holding engagement at the nose of the salient. The battle order from left to right was as follows:

The Southern Force. The American 1st Corps (General Liggett) with right near Pont-à-Mousson, had divisions on the line as follows: 82d (Burnham), 90th (Allen), 5th (McMahon), and 2d (Lejeune), with the 78th (McRae) in reserve. The American 4th Corps (Dickman) with right joining the left of the 1st Corps had divisions on the line as follows: 89th (Wright), 42d (Menoher) and 1st (Summerall) with the 3d (Buck) in reserve.

Central Force (French). The French 2d Colonial Corps (Blondlet) with right joining the left of the American 4th Corps, had French divisions in the line as follows: 39th, 36th, and the 2d Cavalry division (dismounted).

The Western Force. The American 5th Corps (Cameron) with the right joining the left of the French 2d Colonial Corps, had divisions on the line as follows: 26th (Edwards), 4th (Hines), and the French 15th.

The west of the line was near Watronville. General Pershing held the 35th and 91st Divisions (Traub and Johnston) in rear of the western face of the salient, in reserve, and a general reserve consisting of the 80th Division (Cronkhite) in rear of the western face and the 33d Division (Bell) in rear of the southern face.

The chief attack was made on the southern leg on a front extending about 12 miles due west of Pont-à-Mousson. The attack on the western leg extended for a distance of about 8 miles from between Dommartin and Fresnes. Simultaneously with these attacks the French destroyed the bridges over the Meuse River at St. Mihiel. The attacks were made at 5 A.M. on September 12, after about four hours' artillery preparation. Foggy weather aided the attackers. The chief resistance was in the west, where the German positions were defended by the heights on the edge of the Woevre plains. The Americans stormed these heights, the highest of which is Les Eparges, and took the villages of Herbeuville, Hattonchâtel, Hauonville, Billy, St. Maurice, Thillot, and Hattonville, and during the night entered Vigneulles, which is at the southern end of the line of hills protecting this side of the salient. On the southern leg of the salient the results were just as successful to American arms, and were carried out with the same precision. During the first day Labayville, St. Bausseaut, Vilcey, Essey, and the important town of Thiaucourt were captured. During the night Pannes, Nonsard, Buxières, and St. Mihiel were captured. Twenty-seven hours after the attack began, the forces advancing from the east and west met at Vigneulles and Heudicourt, and the St. Mihiel salient was no more.

During the next few days the pocket was "mopped up" and the new lines consolidated: 16,000 prisoners, among whom were some Austro-Hungarians, and almost 450 guns were taken. Besides these, vast stores of ammunition, arms and military supplies were captured. Nearly 175 square miles of territory and 70 villages were delivered from the enemy. The

Allies were now in a position to seriously threaten Metz and the great Metz-Mézières trunk railway, one of Germany's main supply lines. Another important result, for the Germans as well as for the Allies, was to show that the American forces had reached a stage of development where they could be depended upon to take their full share in the War.

What might be called the first period of the Allied offensive was now over. The result was everywhere favorable to the Allies. With the exception of the Aisne region, the Germans were back at their starting-place in March. The German people at home, although somewhat buoyed up by false reports, had lost their supreme faith in the army. Vast quantities of supplies and ammunition were captured or destroyed to prevent capture. Eight German divisions had been destroyed since the beginning of the Allied offensive up to the middle of September. Approximately 200,000 prisoners and 2300 guns had fallen into Allied hands. Almost 300,000 fresh American troops were pouring into France a month. Ludendorff's attempt to retreat to a smaller front was frustrated by Foch's tactics, the fundamental theory of which was to keep the enemy engaged all along the line and not to let him effectively use his reserves. This was the principle of exhaustion and is strikingly similar to Grant's campaign which won the Civil War.

Argonne-Meuse Offensive. As has been related above, Marshal Foch, in the last week of September, began an offensive over the entire front from Switzerland to the sea. He attacked the German right in Flanders, the centre along the Hindenburg line, and the left between Reims and the Meuse River. From the strategic point of view, the German left was by far the most important front. A break-through of any size here would cut the lines of communication between Germany and her armies in France and Belgium. The Argonne-Meuse line was also the hinge of the German retreat in Belgium and northern France, and, if broken, would doubtless cause a huge débâcle. The German defenses on this region, both natural and artificial, were exceptionally strong. The bend in the Aisne, west of the Argonne Forest, the forest itself and the Meuse River, were tremendous natural advantages; the German High Command, realizing the strategic importance of the sector, had placed many of its best divisions there, as well as profusely sprinkling the area with barbed wire and machine-gun emplacements.

After the fall of the St. Mihiel salient, which really paved the way for this offensive, the American army took over the lines from the Argonne Forest and the Meuse River. This army was to coöperate with Gouraud's IV French army, which extended from the neighborhood of Reims to where it joined the Americans in the Argonne. For the opening attack in the American sector General Pershing employed three corps: *Left.* 1st Corps (Liggett), which contained the 77th, 28th, and 35th divisions, with the 1st division in reserve. *Centre.* 5th Corps (Cameron) which contained the 91st, 37th and 79th divisions, with the 3d division in reserve. *Right.* 3d Corps (Bullard) which contained the 4th, 80th and 33d divisions, with the 32d division in reserve. The general reserve included the 29th, 82d, and 92d divisions. Pershing stated "About 2700 guns, 189 small tanks, 142 manned by Americans, and 821 airplaines, 604 manned by Americans, were concentrated to support the infantry. We thus had a superiority in guns and aviation and the enemy had no tanks. The French and Americans hoped to advance on either side of the Argonne and squeeze the Germans out of the Argonne. They were unable to do this in the first attack as they were temporarily held up by German second positions."

First Phase. The preliminary bombardment began at 11 P.M on September 25 and at 5.30 A.M. on the 26th of September the infantry attack was launched. The French advanced 4 miles and the Americans about 6. By the 28th the Americans had taken Montfaucon, Exermont, Garcourt, Cuisy, Septsarges, Malancourt, Ivoiry, Epinonville, Charpentry, Very, and 10,000 prisoners. The French took Sevron, the Butte des Mesnil, and Navarin Farm. The Americans were within range of the Kriemhilde line which extended from Grand Pré to Damvillers across the Meuse. East of the Meuse the Americans captured Marcheville and Rieville, which strengthened the flank of the army west of the Meuse. On the 29th and 30th, Gouraud advanced to within 5 miles of Vouziers.

Second Phase. The second phase of the Argonne-Meuse offensive was carried out by the 1st, 5th, and 3d Corps and lasted from October 4 to 31. In the first part of this phase the American army encountered its hardest fighting of the War. About the middle of this period, General Pershing divided the American forces into the I and II armies. The I army, which was assigned to General Liggett, extended from the Argonne to Fresnes-en-Woevre. The II army, extending from Fresnes to the Moselle, was commanded by General Bullard. Beginning on the 4th, the I American army captured Cesnes, and advanced 2 miles up the Aire River valley. On October 5, the Germans before Gouraud retired along a 12-mile front closely pursued by the French army. By the 11th, the French held the whole line of the Suippe River and the Americans had seized the heights dominating the Aire valley. So far the French had taken 21,000 prisoners and 600 guns. On the 14th, the Americans took St. Juvin, and two days later took the important town of Grand Pré and Champigneulles. On the 17th Romagne fell and the Americans were everywhere beyond the Kriemhilde positions. During the next day Banthéville and Talma Farm were seized in surprise attacks. They changed hands several times before remaining in the possession of the Americans. On the same day the French crossed the Aisne near Vouziers, and made important gains toward Réthel.

The only German defense between the Americans and the Belgian border was the Freya-Stellung which ran from near Dun-sur-Meuse to the Bourgogne wood. About 10 miles north of this line was the great trunk railway line running from Metz to Mézières, through Sedan and Montmédy. Part of the Freya line was seized on October 26 and the railway line was bombarded.

Last Phase and Pursuit. In connection with this phase of the Argonne-Meuse offensive, General Pershing states, "On the 21st my instructions were issued to the I army to prepare thoroughly for a general attack October 28 that would be decisive if possible. In order that the attack of the I army and that of the IV French army on its left should be simultaneous our attack was delayed until November 1.

"On this occasion and for this first time the army prepared for its attack under normal conditions. We held the front of attack and were not under the necessity of taking over a new front with its manifold installations and services. Our own personnel handled the communications, dumps, telegraph lines and water service, our divisions were either on the lines or close in rear, the French artillery, aviation and technical troops which had previously made up our deficiencies had been largely replaced by our own organizations, and our army, corps and divisional staffs were by actual experience second to none."

On November 1, both General Pershing and General Gouraud began their final advance. The latter crossed the Aisne between Rethel and Vouziers, and advancing with Berthelot's army on the left, reached the outskirts of Mézières, when the Armistice went into effect (November 11). General Pershing's forces reached Sedan on the 6th. Between that date and the 11th, east of the Meuse, he seized the heights of the Woevre, and had brought Metz into offensive gun-fire range.

The Franco-American advance in the Champagne-Argonne-Meuse region cut the German main line of communication (mentioned above) and foreordained a complete defeat within a very short time for Germany, had the Armistice not intervened. Some of the bitterest fighting of the War occurred in this section. Most of it was hand to hand and the nature of the ground, with its ravines, gullies, forests, etc., made it necessary to wipe out machine-gun nests with infantry rather than with artillery. The Americans captured 26,000 prisoners and 468 guns. The French took about 30,000 prisoners and 700 guns. It is estimated that the Germans lost 150,000 men trying to defend their main line of communication.

American Troops in France. On Armistice Day, 42 American divisions had either reached France or were en route; of these, 29, including replacements from the other divisions, were actually engaged in combat. Of the latter, 7 were Regular divisions, 11 National Guard divisions, and 11 National Army divisions. The total American forces sent to France is given as 2,084,000 of whom it is estimated that 1,390,000 took part in campaign; of the latter 1,100,000 as divisional troops, 240,000 as corps and army troops, and 50,000 in the service of supply.

The casualties in the American army were about 260,000, of whom about 50,000 were battle deaths. As the army met with no serious reverses, the number of prisoners taken by the enemy was small, only 4500. The casualties occurred mainly between May 28, 1918, when the 1st division attacked Cantigny, and November 11. In its operations it captured 63,000 prisoners and about 1400 pieces of artillery in addition to other arms and stores.

Breaking the Hindenburg Line. In the section treating the German retreat to the Hindenburg line it was narrated how certain sectors of this line were penetrated and how the Quéant-Drocourt line was smashed. This section will deal with the breaking of the line itself, the capture of Cambrai, St. Quentin, and Laon and the advance across France and Belgium until the Armistice put an end to the fighting. The reader must bear in mind that while this tremendous drive was pushing the centre back the Allies were crushing one flank in Flanders and the other in the Argonne-Meuse region. In the bitter fighting that resulted in the breaking of the famous defense system, the 27th—O'Ryan—and the 30th—Lewis—American divisions played important parts.

Although the main attack was made on September 29, important advances in the direction of Cambrai were made on the 27th, when Byng and Horne with the American 2d Corps—Graves—(27th and 30th divisions) struck on a 14-mile front before Cambrai, crossed the Canal du Nord, and pierced the outposts of the Hindenburg line. On the 28th, Marcoing, Fontaine-Notre-Dame, Cantaing, and Noyelles were taken. On the 29th, Rawlinson, with the aid of the Americans, struck on a 30-mile front from St. Quentin to the Sensée Canal. The former crossed the Scheldt Canal and the latter, after seizing Ballicourt and Nauroy, entered the suburbs of Cambrai itself. Horne now attacked in the Arras sector and advanced toward Douai by capturing Oppy and Biache-St. Vaast. This compelled the Germans to retire from the Lens coal-field region. Byng, by crossing the Scheldt Canal northwest of Cambrai, threatened the city from that direction.

While these operations were going on around Cambrai, the fate of St. Quentin was being sealed. After nibbling operations, the French and British captured Thorigny and Le Tronquoy, about 3 miles from the city (September 30). On the first of October, Debeney's army occupied part of the city, and the next day seized all of it. In the meantime Rawlinson's army forced the Scheldt Canal and occupied Le Catelet and Beauvoir.

On October 9 a great drive covering the whole line from Cambrai to the neighborhood of St. Quentin was begun without artillery preparation. It was a tremendous success, penetrating 9 miles on a 20-mile front. Cambrai was occupied on the very first day, which necessitated a further retreat on the Arras-Lens front, toward Douai. By the 10th the British had advanced their lines to the Selle River between Solesmes and St. Souplet, and captured the important German base of Le Cateau. On the next day the Germans abandoned the line along the Sensée River and the Allies were closing in on Douai. This city fell on the 17th.

On the 20th, the British forced a crossing of the Selle north of Le Cateau and on the 22d advanced from northwest of Tournai to southwest of Valenciennes, patrols actually reaching the suburbs of the latter city. On the 25th the Valenciennes-Le Quesnoy railway was reached on a 7-mile front. On November 2, Valenciennes fell after a pinching operation, and they advanced along the road to Mons. On November 4, the British and Americans struck on a 20-mile front between the Scheldt and the Oise-Sambre Canal and forced the Germans to make a retreat on a 75-mile front from the Scheldt to the Aisne. As a result of this the French took the fortified city and railroad centre of Hirson, and the British captured the fortress of Maubeuge on the 9th of November. On the 11th, the last day of fighting, the British captured Mons, the scene of their defeat and retreat in August, 1914.

In considering the breaking of the Hindenburg line, the events that occurred between the Oise and the Aisne and which resulted in the capture of Laon and the Chemin des Dames, must be included. Foch determined to use his "pincers" method on a large scale in order to capture Laon. To accomplish this he had to advance through the formidable forest of St. Gobain and recapture the Chemin des Dames positions. After the "pinching" of the Marne salient (July, 1918) the Franco-Americans had nibbled away at the German positions to get a good place to start their offensive. The Americans had taken the Juvigny plateau and later the French seized the Vauxaillon plateau just south of the Aisne. The German Crown Prince made repeated and bitter attacks to retake these strategic positions, but they were futile as well as costly. On September 28, General Mangin's Franco-American army captured Fort de Malmaison, the old limestone position which is in the rear of the Chemin des Dames. Then began a slow advance between these positions and the Ailette River as well as between the Aisne and the Vesle. Berthelot's V army in conjunction with Mangin's X army and with the aid of Italian troops, began an advance northwest of Reims, which resulted in the capture of Berry-au-Bac on October 7. On the 9th, Bazancourt and Vaux-les-Mauron fell. By the 12th, Mangin had succeeded in occupying practically the entire Chemin-des-Dames positions. The next day saw the success of Foch's strategy because the St. Gobain Forest, La Fère, and Laon were evacuated by the Germans with scarcely any fighting.

The French armies of the left now advanced rapidly between the Aisne and the Oise Rivers with the idea of reaching the Franco-Belgian frontier between Hirson and Mézières. When the Germans began their retreat between the Scheldt and the Aisne, the French armies of the left exerted strong pressure on the German flank. By the 8th of November they were at the outskirts of Mézières, but were unable to capture it before the Armistice was signed on the 11th.

Thus ended the battle or series of battles which resulted in the breaking of the Hindenburg line and which were also largely responsible for the Germans suing for an armistice. The occupation of the east bank of the Meuse north of Verdun by the Americans left the Germans with no easily defended line west of the Rhine. It is extremely doubtful whether the Germans could have reached the Rhine with sufficient men, material and organization, to prevent an invasion of Germany by the Allies on a grand scale.

Operations in Belgium. The opening attack on September 28 was made by the reorganized Belgian army, under the personal direction of King Albert, and the British II army, under Plumer, on a 10-mile front from Dixmude to Passchendaele Ridge, north of Ypres. This initial attack penetrated 4 miles. On the next day the Belgians captured Dixmude, Passchendaele, Stadenberg, Mooreslede, and Zarren and were only 2 miles from Roulers. On this same day the British took the formidable Messines and Passchendaele Ridges and Gheluvelt. On the 1st of October, the Allies crossed the Menin-Roulers road and struck in a southerly direction, reaching the Lys River between Warvioq and Warneton.

The threat to envelop the industrial centre of Lille had now become so pronounced and had created such a serious position for the German forces that the German command determined to evacuate it, which necessitated retirement from the Belgian coast. Consequently, on the 2d the Germans began the evacuation of the city and a retreat on both sides of La Bassée Canal. This retreat was accelerated by the joining of Degoutte's VI French army to the Belgian and British armies. The Belgians captured Hooglede and Handzeeme northeast of Roulers, and the British seized Rolleghencapelle, between Courtrai and Roulers. Armentières was entered on the same day.

After a week and a half of further preparation, the Allies struck an extremely heavy blow aimed at clearing the west bank of the Scheldt as far as Ghent. The attack extended from the Lys, near Comines, to the sea. The Belgians drove forward 7 miles north of a line running from Handzeeme to Courtermarck, and the French and British to the Hooglede plateau, Winckelhoek and Lendelede. The German forced retreat from Belgium now began in earnest. The Belgians advanced steadily along the roads to Bruges and Ostend from Thourout, and the French advanced toward Thielt, while the British advanced along the Lys from Comines. On the 17th the British entered Lille and naval forces entered Ostend, which had been evacuated. On the next day Zeebrugge was entered, as well as Bruges, Thielt, Courtrai, Tourcoing, and Roubaix.

Between the 20th and 25th of October, the French and British forced the Lys Canal in the direction of Ghent. The British in the south took Bruay and Estain. On the last day of the month Byng's army, with the aid of the 30th American division, struck between the Lys and the Scheldt from Deynze to Avelghem and captured several villages, and towns. While this operation was going on the British and French were driving the Germans back on Ghent and the lines of the Scheldt. The retreat was precipitous. On November 3, the Belgians advanced 10 miles along the Dutch frontier and reached the Terneuzen (Dutch) Ghent Canal. This advance coupled with that of the French and the British in the south brought the Allies to within 5 miles of Ghent. The British forced the Scheldt near Pofter and began an advance on Brussels. Tournai fell to the British on November 9, and when fighting ceased two days later, the line in Belgium ran almost north and south from Terneuzen to north of Audenarde and then southeast to Mons. Marshal Foch is credited with the statement that the German army would have been captured or destroyed within six weeks (after November 11) but he had agreed to an armistice to save lives. More than 60,000 prisoners and 500 guns of all calibres had been captured in this flank movement.

The Armistice. Negotiations between the United States and Germany, which began on October 5, ended on November 5, when President Wilson informed the Germans that Foch had been authorized by the United States and the Allies to open negotiations with accredited German agents. This was followed two days later by announcement that German agents had been appointed and were about to leave the German Headquarters at Spa, Belgium. They were received at Foch's quarters the next day and received the terms of the armistice from him. A request to stop hostilities until the terms had been sent to the German Headquarters was refused. After several delays the terms were accepted by Germany on November 11 at 5 A.M., Paris time, and the War ended at 11 A.M. that day. A brief summary of the terms follows.

Germany surrendered all her submarines and agreed to disarm her surface men-of-war which were to be interned in neutral ports, or taken over by the Allies. The treaties of Bucharest and Brest-Litovsk were renounced, all damage done was to be repaired and all foreign occupied territory was to be evacuated. An indemnity was to be agreed upon later. The Allies were to occupy the valley of the Rhine. There was to be a neutral zone on the east bank of the Rhine and Allied and American bridgeheads at Mayence, Coblenz, and Cologne, each with a radius of 30 kilometers.

The evacuation of the territory west of the Rhine went along very smoothly. The Allies were hailed as deliverers in Belgium, Luxemburg and especially in Alsace-Lorraine, which was triumphantly entered by French forces. A similar entry was made into Brussels by King Albert and his Queen riding at the head of the Belgian troops. The British took over the administration of the zone around Cologne, the Americans that around Coblenz, and the French that around Mayence.

On Dec. 14, 1918, the terms of the Armistice were renewed until Jan. 17, 1919. During this period the conditions that were unfulfilled were to be completed. The following provision was also added to the general terms: "The Allied High Command reserves the right to begin, meanwhile, if it thinks it wise in order to ensure new guarantees, to occupy the neutral zone on the right bank of the Rhine to the north of the bridgehead of Cologne, up to the Dutch frontier. This occupation will be announced by the Allied High Command by giving six days' notice." Subsequent renewals of the Armistice terms occurred during the time that the Peace Conference was holding its meetings at Paris.

THE EASTERN FRONT

The early advance of the Russian armies into East Prussia in August, 1914, seriously affected the German invasion of France and almost upset the entire German plan. Von Hindenburg, however, frustrated the attempt of the Russians to overrun East Prussia by his victory at Tannenberg. Meanwhile the Russian armies advanced victoriously into Galicia and soon were well on their way to Cracow and into the passes of the Carpathians. To relieve the pressure on the Austrians, German Headquarters organized a counteroffensive through West Poland, which ended in a deadlock in the winter of 1914–15 with the opposing armies intrenched. In the spring of 1915, the Central Powers began a great offensive and by September of that year the Russians were driven out of Poland and Courland. This front then remained stabilized until May, 1916, when the Russians opened a successful campaign against the Austrian front to relieve the pressure of the Austrians in Italy. This success was followed by the Russian Revolution which ultimately prevented that country from being a further factor in the War.

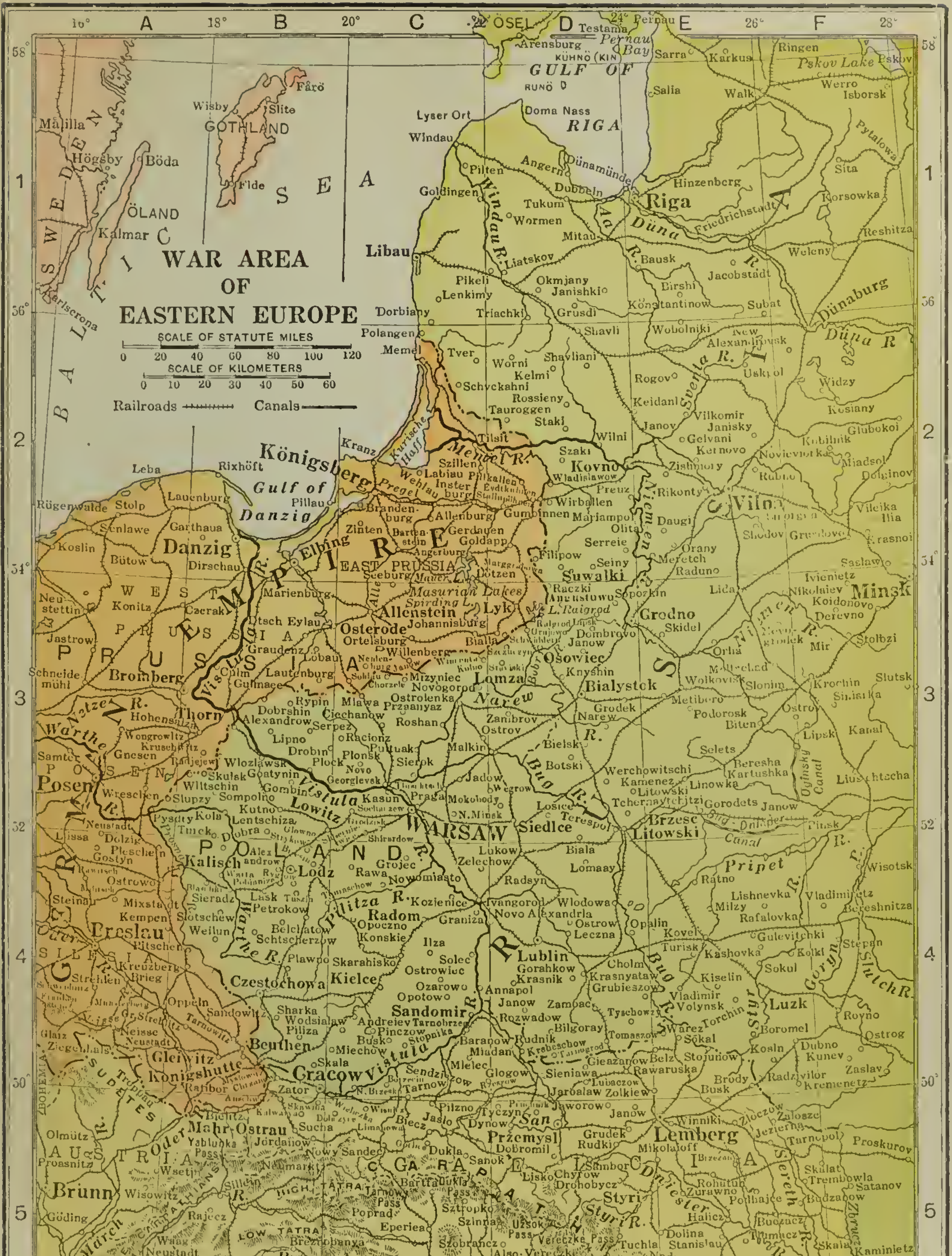
The detailed account of the military operations falls under the following head: (1) Russian invasion of East Prussia terminating in the battle of Tannenberg and the first battle of the Masurian lakes; (2) Russian invasion of Galicia; (3) German operations in West Poland; (4) second battle of the Masurian lakes; (5) Austro-German drive in Galicia; (6) great Austro-German drive in the east; (7) Russian offensive in 1916; (8) military operations during the Kerensky government; (9) military operations during the Bolshevik government to the end of the War.

The struggle on the Eastern front was conditioned by a number of circumstances. First the German plan, which was based on a decisive victory in France before the Russians could get ready; few troops were therefore to be left to guard the east front. Next was the unexpected promptness of the Russian mobilization and concentration. Lastly and of paramount importance was the configuration of the frontier itself and its organization in view of war. The striking feature of the configuration was that Russian Poland projected like a huge bastion 200 miles deep between East Prussia on the north and Gâlicia on the south and that the political frontier separating the belligerent states was in no sense a military frontier. The Russian base of operations against East Prussia and the line of defense to which the armies could retire in case of defeat was that formed by the Niemen River between Kovno and Grodno and the Narew River with its principal tributary, the Bohr, from Grodno to the mouth of the Narew. On the Niemen were the fortified bridgeheads of Kovno, Olita and Grodno where railways crossed the river. On the Narew and Bohr were the fortified bridgeheads of Osowiec, Lomza, Ostrolenka, Rozan, Pultusk, Sierok, and at the junction of the Narew and Vistula the great fortress bridgehead of Novogeorgievsk. The German base of operations in the north was the Vistula River between the fortresses of Danzig and Thorn. Along this stretch of river there were a number of fortified bridgeheads. The province of East Prussia lay in advance of this line and for its defense the Germans had to rely on active defense by troops based on their complete network of railways and roads. The Masurian lakes near the frontier formed a north and south natural barrier about 40 miles long and the fortress of Königsberg was a strong point of support for military operations.

The Russian base of operations in Central Poland was the Vistula River from Novogeorgievsk to the Austrian frontier; along this stretch of river were the great fortified bridgeheads of Warsaw and Ivangorod. The German frontier from the Vistula to the Austrian frontier was an open one but parellel to it were a number of excellent railways for active defense.

From the Vistula to the frontier of Rumania the Austro-Russian frontier was an open one and for its defense both countries had to rely on active operations of their armies. The military frontier of Austria was the Carpathian range of mountains in rear of its border provinces of Galicia and Bukovina. Against invasion from the east, Austria could hardly hope to hold the entire province of Galicia, so her military authorities had constructed a barrier line from the Vistula to the Carpathians along the San River. On this river there were the fortified bridgeheads of Jarislau, Radymo and the great fortress of Przemysl.

In accordance with the Allied plan, the Russian armies were to assume the offensive as soon


WAR AREA
OF
EASTERN EUROPE
SCALE OF STATUTE MILES
0 20 40 60 80 100 120
SCALE OF KILOMETERS
0 10 20 30 40 50 60
Railroads
Canals
BALTIC SEA
SWEDEN
GOTHLAND
ÖLAND
GULF OF RIGA
Gulf of Danzig
Königsberg
Danzig
Memel
Libau
Windau
Riga
Düna R.
Dünaburg
Mitau
Kovno
Wilna
Vilna
Grodno
Minsk
Bialystok
Osowiec
Lomza
Suwalki
EAST PRUSSIA
Masurian Lakes
Allenstein
Lyk
Thorn
Posen
Bromberg
WEST PRUSSIA
POSEN
POLAND
WARSAW
Vistula
Narew
Bug R.
Brzesc Litowski
Siedlce
Lodz
Kalisch
Radom
Ivangorod
Lublin
Kielce
Czestochowa
Sandomir
Breslau
SILESIA
Beuthen
Cracow
Tarnow
Przemysl
San
Lemberg
Pripet
Kovel
Luzk
Rovno
Dniester R.
Stryi
Czernowitz
BUKOWINA
CARPATHIAN MTS.
GALICIA
VIENNA
Pressburg
BUDA-PEST
Danube R.
Tisza
Debreczen
Kaschau
Miskolcz
AUSTRIA-HUNGARY
ROUMANIA
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as possible. The aim of their first campaigns was to drive the Germans out of East Prussia and the Austrians out of Galicia and Bukovina in preparation for an advance from West Poland. For these campaigns they immediately organized six great armies, two for the invasion of East Prussia and four for the invasion of Galicia. The Russian commander-in-chief was the Grand Duke Nicholas.

Russian Invasion of East Prussia. For the defense of East Prussia, German Headquarters left in the east of the active army only three army corps and a cavalry division. There were mobilized in addition two reserve corps and the local Landwehr and Landstrum troops. These troops formed the VIII army—von Brittwitz—and also furnished the garrisons for the fortified bridgeheads on the Vistula and the garrison of the fortress of Königsberg. As the Russians would probably invade East Prussia both north of the Masurian lakes from the direction of Kovno and south of the lakes from the Narew River, the VIII army was divided into two separate wings; the left wing, consisting of two active corps and three reserve divisions with the cavalry division, was to guard the frontier north of the lakes, while a single active corps with Landwehr troops was to guard the frontier south and west of the lakes.

In August, 1914, Russian Headquarters organized two armies for the invasion of East Prussia. The I army—Rennencamp—was to advance from the Niemen River between Kovno and Grodno and advance along the Kovno-Königsberg railway north of the Masurian lakes. The II army—Samsanoff—was to advance from the Narew River with its left resting on the Warsaw-Danzig railway and its right passing the south end of the Masurian lakes. Contact between the two armies was to be secured after passing the lakes. Rennencamp was the first to reach the frontier, August 17, just as the German armies in the west began their advance; here he encountered the advance posts of the left wing of the VIII army. For a week there was constant fighting in which the weaker German force was steadily pushed back and on August 24 Rennencamp reached the line of the lakes and Insterburg. Instead of pushing on westward he apparently halted here to await the arrival of Samsanoff to protect his left and in the meantime his cavalry sought the right flank of the II army and reconnoitred along his front. Samsanoff reached the frontier several days later, August 22, and easily dispersed the weak detachments in his front. His centre now moved on Allenstein while his right moved northward to seek contact with Rennencamp.

On August 22 the situation seemed very serious to the commander of the VIII German army, who found both wings in retreat, and although he made preparations to concentrate on Samsanoff, he informed German Headquarters at Coblenz that he might be compelled to retire behind the Vistula. At this stage Headquarters decided to intrust the command of the VIII army to von Hindenburg, a retired general who was thoroughly conversant with the topography of East Prussia, and sent to him as his chief of staff von Ludendorff, a staff officer of the II army who had shown great initiative in the capture of the town and bridges of Liége. Von Hindenburg took command on August 23 and found the situation as above stated. The two Russian armies were still separated and his only chance for success was to decisively defeat one of them before they could unite. Calling from the nearby fortresses all their available troops, he succeeded in raising his army to five and one-half corps, which was nearly that of the II Russian army. His plan was a bold one for he proposed to leave but a mere screen in front of Rennencamp and employ his entire force against Samsanoff. In order to make his victory decisive, if possible, he proposed to envelop both wings of the II Russian army. His predecessor had already made this possible by moving a corps from the extreme left of his army to the extreme right by rail. It took several days to get the troops in position but by the 27th all was ready for the attack. Two and one-half corps were in front of Allenstein to check the advance of Samsanoff's centre, consisting of three corps; two corps had withdrawn from Rennencamp's front and were ready to move southward in rear of the lakes on Samsanoff's rear protected by a single corps, and one corps was ready to turn Samsanoff's left protected by a single corps. Fortunately for Hindenburg, Rennencamp made no attempt to advance and his cavalry failed to penetrate the German screen to discover what was going on in its rear.

The battle of Tannenberg, as it was called, began on the morning of August 27 and lasted three days. Samsanoff was found dead on the field and two of his corps commanders with 90,000 men were captured. Three of his corps were practically annihilated and the others escaped only with severe losses. The battle was named in honor of one of the same name fought there in 1409 between the German Knights and the allied Poles and Lithuanians. As the I and II Russian armies were advancing into East Prussia, Russian Headquarters began the organization of the X Army at Grodno to serve as a general reserve. Two corps of this army advanced across the frontier east of the Masurian lakes just in time to cover the retreat of the remnants of the II army.

After the battle of Tannenberg, von Hindenburg was reinforced by two army corps and a cavalry division from the Western front and made preparations to attack Rennencamp's army. His plan was to engage Rennencamp's front with his main force while his right wing moved south around the Masurian lakes to cut off the retreat of the Russian army. His right wing, however, unexpectedly encountered the X Russian army, which defeated his plan, and all he was able to accomplish was the retreat of the Russians across the frontier to the Niemen River. In these operations, which began September 7 and lasted about a week, the Germans claim to have taken 45,000 additional prisoners; they call the operations the first battle of the Masurian Lakes. While the situation on this front was still unstabilized, von Hindenburg was compelled to go to the assistance of the Austrians.

Russian Invasion of Galicia. The German plan, as we have seen, contemplated the crushing of France, while Russia should be held by the Central Powers. In form, so far as Austria was concerned, the holding was to begin by an invasion of Russian Poland. South of the frontier two railways run roughly parallel to the boundary, and from these two run branch lines and feeders. The Russians were not nearly so well off in the matter of transportation. Given, therefore, the supposed slowness of Russia's mobilization and the poverty of her rail system, an invasion of Russian Poland seemed to be a promising undertaking.

According to the plan of attack drawn up by the chief of staff, Gen. Conrad von Hotzendorff, the invasion was to be made by two armies. The I army under General Dankl concentrated on the lower San River was to advance northward east of the Vistula to seize the railway junction of Lublin; its left was protected by a detachment, largely cavalry, which was to operate west of the Vistula and then cross that river. Its right was protected by the IV army —Auffenberg—which was concentrated at Jaroslav and was to advance northward to the railway junction of Cholm. The III army—Brudermann—was concentrated east of Lemberg and was to defend the frontier between the Bug and Dniester Rivers. The II army was on the Serbian frontier but had one corps in Galicia which was to guard the frontier south of the Dniester River and coöperate with the III army.

The Russian mobilization against Austria was begun a week before that against Germany and in the month that elapsed before actual hostilities the armies were concentrated for active operations. In southern Poland between the Vistula and Bug Rivers was an army group consisting of the IV and V Russian armies under General Ewart. On the eastern frontier of Galicia between the Bug and Dniester Rivers were the III Russian army—Russky—and the VIII Russian army—Brusiloff—forming a group under Ivanoff. South of the Dniester River were detachments of the VII Russian army on the frontier of Bukovina. Each of the four principal armies was stronger than any of the three Austrian armies.

On August 25, well south of Lublin and Cholm, the two Austrian armies encountered such strong resistance that they were unable to advance as the IV and V Russian armies were in their front. On August 22 the great Russian advance of the III and VIII armies began and the VII invaded Bukovina. The Austrians were unable to offer any adequate resistance and the Russians advanced triumphantly and occupied Lemberg on September 3. To stem the Russian tide, Austrian Headquarters recalled the remaining corps of the II army from Serbia and with the II, III and IV armies took up the position of Rawaruska-Grodek west of Lemberg facing east. Here was fought a battle, September 7–11, on the same days that Hindenburg was attacking Rennencamp in the north and the battle of the Marne was in progress in the west. The Austrians were defeated and retired to the San River where the I Austrian army was compelled to join them. The Russians now pushed on, crossed the San River and invested the fortress of Przemysl. South of the Dniester they occupied Bukovina, took possession of the passes in the Carpathians and their cavalry was advancing into Hungary. Such was the situation when Austrian Headquarters called on the Germans for help and von Hindenburg was sent from East Prussia to Silesia to take command there and organize a new army.

German Operations in West Poland. In order to create the IX German army in Silesia, von Hindenburg was compelled to withdraw four of his corps from East Prussia and replace them as far as possible with Landwehr and newly organized units. When he reached Silesia, von Hindenburg learned that there were few Russian troops in Poland west of the Vistula River; with the Austrian chief of staff he decided on the plan of operations. The IX German army with the I Austrian army on its right was to advance eastward to the north of the Vistula thus turning the flank of the Russians in Galicia, so that they would be obliged to cease their pressure on the Austrians south of the Vistula to meet this threat. The IV, III and II Austrian armies were then to advance as soon as possible and relieve the fortress of Przemysl; the IV army from the west and the III and II over the Carpathian mountains.

The IX German army began its advance in the latter part of September and soon the effects of the movement were seen in the shifting of the Russian troops. These fell back across the San River and the IV and V armies began a movement up the east side of the Vistula River. The IX German and the I Austrian armies reached the Vistula without much opposition and eventually the I Austrian army took up the front from Ivangorod to the San while the IX German army extended its flank northward to Warsaw. They were, however, unable to capture the bridgehead of Ivangorod or that of Warsaw, so the Russians still had access to the west bank. In Warsaw the Russians had begun the formation of their IX army. Due to the shifting of the Russian troops, the Austrians were able to get supplies into Prezemysl but that was all; their armies were unable to cross the San River.

When the Russians began to shift their troops, the command of those left in Galicia was given to Ivanoff and those assigned to operate in West Poland to Russky. By the 20th of October, Russky felt strong enough to engage his adversaries west of the Vistula and the Russians advanced once more, this time on the whole front from Kovno to the Carpathians. In East Prussia, the German VIII army was compelled to retire across the frontier to an intrenched line which ran from the Masurian Lakes to the Niemen River. Von Hindenburg was unable to offer adequate resistance in West Poland and with the I Austrian army retired about 200 miles back across the frontier into Posen and Silesia. To delay the Russian advance he destroyed the railways that his troops had just repaired. In Galicia the Austrians retired to the vicinity of Tarnow and over the Carpathians leaving the garrison of Przemysl to its fate.

On November 1 the situation of the Central Powers on the Eastern front was apparently desperate, as the German armies in the west were engaged in the desperate battle of Flanders and could not afford to send infantry to the east; most of the cavalry had already been sent to the VIII and IX armies. Von Hindenburg was now placed in command of both the VIII and IX armies and von Mackensen was placed in command of the IX army.

Realizing that he was not strong enough to meet the Russians at all points of their front, von Hindenburg decided to concentrate the IX army for a flank attack. He therefore had it railed to the frontier between the Vistula and Warta Rivers where it could advance with one flank protected by the Vistula. The defense of the frontier from the Warta southward was left to Landwehr and local troops assisted by the I Austrian army. They were to advance if his attack was successful.

On November 11 he was ready to strike; at this time the Russians were already near the frontier all the way from the Vistula to Cracow and some of their cavalry had actually crossed it. The IX German army drove back the right wing of Russky's armies between the Niemen and the Warta and the endeavor of the Russians to check the advance resulted in more or less confusion along their entire front. Ewart now took command of the left wing of these armies while Russky remained in command on the right. The operations in West Poland continued from week to week and ended only about the close of the year. They ended with the opposing armies intrenched along the Bzura, Rawa and Nida Rivers. The most important engagement was the battle of Lodz, in which, in attempting to envelop the flank of the Russian armies, three German divisions and two cavalry divisions were suddenly cut off from the remainder of the IX army and for two days were surrounded by Russians. According to German reports they finally emerged with 10,000 prisoners. In Galicia the Austrians were driven behind the Dunajec River and lost nearly all the important passes in the Carpathians. After operations closed in November on the Western front, a number of corps were sent from there to West Poland in the hope that the Russians might be forced behind the Vistula River. By the time of their arrival the Russians were already intrenched and the desperate attempts made to dislodge them resulted only in tremendous losses in the attacking German troops.

At the close of the year the combatant troops on the Eastern front, as given by the German chief of staff, were as follows:

	Germans	Austrians	Total	Russians
On the East Prussian frontier	105,000	....	105,000	320,000
West Poland	385,000	140,000	525,000	847,000
Galicia and Bukovina	12,000	513,000	525,000	521,000

A German division was assisting the Austrians in the Carpathian passes.

1915. Second Battle of the Masurian Lakes. At the close of 1914, as previously stated, the Russians again occupied East Prussia as far west as a north and south line through the Masurian Lakes. This force was the X Russian army—Sievers—as the I Russian army was now along the frontier between the lakes and the Vistula. German Headquarters decided to take advantage of the cessation of hostilities on other fronts and by a winter campaign drive the Russians across the frontier and if possible across the Niemen and Narew Rivers. For this purpose several new divisions were sent to von Hindenburg and he formed the X German army —von Eichorn—to operate to the left of the VIII army. As at Tannenberg, von Hindenburg planned to envelop both flanks of the X Russian army by attacking close to the Niemen in the north and south of the lakes. The Russians were in winter quarters and not expecting attack when it suddenly developed February 7 and was executed under severe weather conditions with frequent snow storms. The campaign lasted two weeks and ended with the capture of 100,000 Russians, including a corps and three division commanders and some 300 guns. The Germans attempted to capture the fortress of Ossoviec but were repulsed. The operations were extended to cover the front of the I Russian army but met with little success. Russky, who had been in command of the Russian right which included the X army, was now relieved by Alexieff.

In Galicia, during the winter, the IV Austrian and the III Russian armies faced each other between the Vistula and Carpathians while the II and III Austrian and VIII Russian armies faced each other on the crest of the Carpathians. The XI Russian army was besieging Przemysl. German divisions had been sent to reinforce the Austrians in the mountains to recapture the passes but the winter operations there were of no avail. In March, Przemysl surrendered and its besieging army reinforced the VIII Russian army. In Bukovina the VII Austrian army was engaged with the VII Russian army.

In the spring of 1915 the situation on the Eastern front was very unsatisfactory to German Headquarters. The Austrian armies were discouraged and from the crests of the Carpathians the Russians threatened an invasion of Hungary. The government of Italy was wavering and at any moment Austria might be called upon to meet a new enemy. It was therefore decided to attempt a blow that would compel the Russians to retreat from the mountains. For this purpose a new army, the German XI army, was organized behind the IV Austrian army; this was made up of picked corps from the Western front and was well supplied with heavy artillery. Von Mackensen, who had successfully commanded the IX army, was assigned to its command and the IV Austrian army as well as the Austrian and German troops in the Carpathians were directed to coöperate with him. This new army quietly replaced the troops of the IV Austrian army in the southern sector between the Vistula and the Carpathians. If the XI German army could break through the left wing of the III Russian army and advance at the foot of the mountains, the Russians in the passes would have to retreat or risk the danger of capture. Once the passes were freed, the Austrian and German troops in their rear could advance to the plain and take part in the general drive. It should be stated that the Russian intrenched lines were by no means so strong as the intrenched lines on the Western front.

Austro-German Drive in Galicia. A terrific cannonade began along Mackensen's front on the afternoon of May 1 and continued through the night to prevent the Russians from repairing damages. On the 2d it began at daylight and lasted four hours, when the infantry attack was launched. The Russian front was shattered and although here and there the Russians offered stubborn resistance the tide swept on and one by one the Carpathian passes were evacuated and the Austro-German forces in their rear moved down to swell the forces in the plain. By May 15 the San was reached, where the advance was temporarily halted to repair the railways, bring up supplies and heavy artillery, relieve some of the corps engaged in the first movement, and secure both banks of the river for a further advance. It was at this time that Italy declared war and a part of the I Austrian army was sent there to reinforce the V and VI armies from the Serbian front. On June 2, Przemysl was evacuated by the Russians and by the middle of June the Austro-German armies were ready for another advance. In the meantime the Russians had taken up a defensive position on the Rawaruska line, where they had defeated the

Austrians in 1914. This line was forced on June 18 and on June 22 one of the Austrian armies occupied Lemberg.

From the San River the IV Austrian and XI German armies had turned northward and advanced with the left flank resting on the Vistula but at the frontier they were stopped. The Russian armies in West Poland had retired to the vicinity of the Vistula and had concentrated a strong force in their front. To reduce this resistance it became necessary to strike another blow at some other point of the Russian front. Operations had already been begun in the extreme north where the German Baltic army, largely cavalry, had crossed the Niemen River in April and now occupied the line of the Libau-Kovno railway. On July 2 there was a conference between von Falkenhayn, chief of staff of the German armies, and von Hindenburg to determine the new point of attack. Von Hindenburg recommended that this attack be made in the direction of Kovno and thus threaten the main lines of communication of the Russians which ran through Vilna and its vicinity. A successful drive here would compel the Russians to retreat toward the Pripet marshes. Falkenhayn, however, considered this plan too ambitious and was content with forcing the Russians to evacuate the line of the Vistula. Upon his recommendation, therefore, the attack was to be delivered along the Narew River; here a successful drive would compel the Russians to evacuate Warsaw but would leave their lines of retreat open.

The Great Austro-German Drive in the East. For the opening attack of the great drive which was to extend from the Baltic on the north to Rumania on the south a new XII army—von Gallwitz—was formed on the left of the VIII army, whose mission was to force the crossing of the Narew River. The attack opened on July 13 but it was only 10 days later that the Germans by the capture of the bridgeheads Ostralenka, Rozan, and Pultusk were able to cross the Narew in force. It was immediately followed by the complete withdrawal of the Russian forces from West Poland across the Vistula River and the beginning of the general retreat. Ivangorod was evacuated on August 4 and Warsaw on the following day. In Novogeorgievsk the Russians left a garrison of 80,000 men but under the fire of heavy artillery it fell in a few days and its garrison surrendered. The retreat of the Russians was followed by an advance of the Austro-German forces along the entire front. In the south the Austro-German Carpathian armies moved eastward from Lemberg and into Bukovina; farther north von Mackensen with his two armies advanced to the Bug River, where the Russians evacuated the fortress of Brest-Litovsk, August 25, and fell back to the Pinsk marshes, the Austro-German forces in West Poland crossed the Vistula and reinforced the XII army; the VIII army forced the crossing of the Narew and Bohr Rivers and captured the bridgehead of Lomza, August 10, and that of Ossoviec, August 22; the X army advanced against the fortress of Kovno on the Niemen, captured it on August 17, and the great railway junction at Vilna a month later; in the extreme north the German Baltic army captured Mitau and reached the Dwina River between Riga and Dwinsk or Dunaburg.

About the middle of September active operations ceased and the Eastern front became stabilized. The new front followed the Dwina River from Riga to Dwinsk then ran almost due south to the Dniester River; the Russians still occupied a small section of eastern Galicia. While the Germans had possession of all the frontier fortresses of Russia and had seriously injured the morale and the fighting ability of the Russian armies, they had not been able to force a decision on the Eastern front because of their failure to prevent the retreat of the Russian armies. It was during the Russian retreat on September 5 that the Grand Duke Nicholas was relieved from the command of the Russian armies and sent to command the Russian forces on the Turkish front; the Czar took command of the armies with Alexieff as chief-of-staff and Russky again commanded the northern group.

Year of 1916. After the cessation of operations in the autumn of 1915 and during the following winter the Russians made strenuous efforts to reorganize and equip their armies. In this they were considerably handicapped by a corrupt and inefficient war department and by their inability to receive munitions from their allies and neutrals. During the winter supplies from the outside could only be received through ports on the Pacific where terminal facilities were inadequate and over a long line of railway with limited rolling stock in poor condition as a result of the War. In the spring, Kuropatkin, who had been in command of the Russian armies in the Russo-Japanese War, was assigned to the command of the northern group, and Brusiloff to the southern group. Ivanoff was assigned to duty at headquarters. Ewart remained in command of the central group.

The military situation on the Russian front was improved during the autumn, winter, and spring by the withdrawal of German and Austrian troops, first for the drive in Serbia, then the attack on Verdun and lastly by the Austrian drive in Italy. At this time the northern and central groups of Russian armies, which extended from Riga to the Pripet marshes, were facing the Baltic, X, VIII, and XII German armies under von Hindenburg and the central group under Prince Leopold of Bavaria, consisting of the IX German army with some Austrian troops which prolonged the line to the marshes. The southern Russian group was opposed mainly by Austrian troops; in the centre was an Austro-German army under German command.

When the German Crown Prince opened his tremendous assault on Verdun in February the Russians were requested to attack the Germans to relieve the pressure on the Western front and to prevent the sending of German troops to the Western theatre. Attacks were consequently made at various points. The main attack was made by two armies of the central group east of Vilna in March. Severe fighting followed, but did not change the position of the lines, although the object was probably accomplished. While they were unable to assume the offensive, the Germans had strongly organized their lines, as they desired to hold all the territory gained in order to draw from it supplies; the Allied blockade had cut them off from supplies through neutral states. Minor attacks were made on this front during the year but without material results.

Brusiloff's Offensive. Brusiloff whose front extended from the Pripet Marshes to Rumania had under his command four armies and was later reinforced by a fifth from the central group. When called on in May to assist the Italians by a counterattack in the east he was ready to act. At this time, the Russians had on the east front about 140 divisions of infantry and 33 divisions of cavalry, probably depleted in strength. From the railway junction of Rovno, then held by the Russians, two railways run westward, one to the northwest to the railway junction of Kovel where the line forks toward Warsaw and Brest-Litovsk and the other to the southeast toward Lemberg crossing the Galician frontier at Brody. It was along these two railways that Brusiloff planned attacks by his right wing, consisting of two armies with Kovel and Brody as objectives. Farther south one army was to attack on each side of the Dniester River.

The attack began on May 4; that same day the Austrian line in front of his right wing was broken and two days later the Russians had captured Lusk, several miles in rear of the Austrian front. The two Russian armies now advanced and at the end of two weeks had advanced about 40 miles on a front of 80. In the meantime, German troops were sent from the north, and succeeded in checking the advance. A fifth Russian army was now deployed on the right of the others but was unable to make any headway; the objective, Kovel, could not be reached. The attack north of the Dniester was repulsed and it was only in the latter part of July, when Brusiloff captured Brody and threatened the flank of the Austro-German army on this front, that it fell back to a new position 15 miles in the rear, from which it could not be dislodged. South of Dniester, the Russians recaptured Bukovina and advanced as far as they could safely go while the Austro-Germans still held the north bank. About the middle of August the Russian operations ceased on this front, as Rumania was about to declare war and Brusiloff was directed to send troops to her aid.

Although he had effected no material change on the Eastern front, Brusiloff had caused Austrian troops to be withdrawn from Italy where they had begun an offensive campaign and thus permitted the Italians to go on with their own offensive operations, and he probably also encouraged the Rumanians to declare war. Had the Russian armies in the north coöperated with him, possibly greater results might have been attained.

Year of 1917. The operations on the Russian front were greatly influenced by the political changes during the year. In March the reactionary government of the Czar was overthrown and a provisional government established under Kerensky. In November the Kerensky government was overthrown and the Bolsheviks came into power under the leadership of Lenin and Trotsky. For the details of the Russian Revolution see RUSSIA, *History.*' Previous to the fall of the Czar's government there was an unsuccessful offensive attempted on the Aa River in the Riga district, the prime object of which was to relieve the tremendous pressure on Rumania.

Military Operations During the Kerensky Government. After the breakdown of the Russian offensive on the Aa River, the Russian front was comparatively quiet until the Russian Revolution was well under way. The situation on the entire front was deplorable. Discipline had completely broken down. Generals were appointed and removed or they resigned. The orders issued by the officers had to be approved by the men themselves. Fraternization between the Russian and German soldiers was carried on to a large extent and could not be checked. The situation could not have been much worse. As a result of this demoralization, the Germans and Austrians were able to remove several divisions from the Russian front for use on other fronts. What fighting was done was spasmodic and of a local character. The Allies looked on the revolution at first with favor as they thought it would result in a more vigorous prosecution of the War but they soon discovered that it really resulted from war weariness. The Kerensky government was urged to renew hostilities but it was not until the middle of the year that operations could be renewed. Even then there was little hope that anything could be accomplished by the northern armies as they had been influenced by German propaganda and by the events in the capital.

Brusiloff, who was now commander-in-chief, therefore decided to assume the offensive with his old armies, now commanded by Guter on the Austrian front, as these armies had been less affected by the revolution than those in the north. The northern armies were to coöperate in the general advance but it is doubtful if he expected much from them.

The operations of the southern armies began on July 1 and, as in the preceding year, the Russian armies swept all before them for about two weeks and advanced about 30 miles on a front of 100. This attack compelled German Headquarters to bring some of their best shock troops from the Western front. The counterattack of these troops was made against the left flank of the Russian group of armies July 19 and it was at once discovered that the Russians were no longer the disciplined troops of the previous years. The left army was routed, and as disintegration began in the other three, all the armies retired across the frontier and for the first time since the beginning of the War there were no Russian troops in Galicia. The northern Russian armies made some isolated attacks but without success.

In August, in the extreme north, the Germans captured the port of Riga which had resisted all their efforts of the preceding year. This was followed by the occupation of the islands at the mouth of the Gulf of Riga and the landing of troops on the coast of Esthonia to the east in preparation for an advance on Petrograd if necessary. However, the Kerensky government was replaced by that of the Bolshevist government in November and an armistice was declared between the new government and the Central Powers early in December. Military operations on the Russian front now ceased as the armistice was later followed by the treaty of Brest-Litovsk (see RUSSIA).

Military Operations Under Bolshevist Government Until Nov. 11, 1918. After the Bolshevists had made peace with the Central Powers, their attempts to pacify that part of Russia which remained in their hands were rather unsuccessful. A considerable army of Czecho-Slovaks was roaming around the central part of Russia, attempting to reach Vladivostok and then join the allies in order to down their hereditary enemies, the Austrians. These men had deserted from the forces of the Central

Powers or had been taken prisoners and had later fought with the Russians. After Brest-Litovsk they received permission to cross Siberia. For some time their relations with the Bolsheviks were very friendly, then Moscow ordered them disarmed; the Czecho-Slovaks resisted and conflicts occurred between them and the Soviet forces. The first battles began in May and continued throughout 1918.

When it became known that the treaties of peace between Germany on the one hand and Finland, Russia, Rumania, and the Ukraine, on the other, were to be used by Germany as a means for making these countries subservient to Germany, the Allies determined upon a certain amount of military intervention in order to try to save something from the chaos that existed in Russia. The Allies seized the region around the Murman coast, with the cities of Murmansk, Kola, and Kem (July, 1918). The purpose of this was primarily to prevent the Germans from capturing the supplies that the Allies had landed at the Arctic terminus to the Murman railway completed during the War. The Americans furnished a small force for this expedition.

In July, 1918, it was also announced that the Allies after a long period of consultation had determined to send a combined force of men to Vladivostok to aid the Czechs as far as possible, and also to attempt to break up the armed bands of Austrian and German prisoners who were the main part of the Bolshevik forces. Therefore 10,000 Americans, 10,000 Japanese, and smaller numbers of French and British were placed under the command of General Otani (Japanese), and despatched to Vladivostok in August. Maj.-Gen. William S. Graves was placed in command of the American troops. For further details see SIBERIA.

ITALIAN FRONT

Italy's entrance into the war in May, 1915, which the Allies hoped would relieve the pressure on Russia, had two main movements: (1) to the north, to close the passes of the Alps against invasion; (2) to the northeast, to cross the Isonzo and take Trieste. The Isonzo line was reached, but the operation was not completed. An Austrian invasion from the north (May, 1916) was checked mainly by an opportune Russian drive into Galicia. After a successful attack against Austria the Italians were compelled to beat a precipitous retreat to the Piave in 1917. From there they organized the blow that crushed Austria in 1918.

Year of 1915. As a result of an agreement between Great Britain, France, and Italy, known as the Pact of London, Italy declared war on Austria, May 23, 1915. The Italian army on a peace footing consisted of 12 army corps or 25 infantry divisions, which at war strength without reserves would give an army of about 375,000 men. The division consisted of two brigades of infantry, about 12,000 men, and one regiment of field artillery with 30 guns. Each regiment of infantry had a section of two machine guns. The cavalry consisted of 29 regiments which were to furnish the corps cavalry and independent cavalry divisions. Of heavy artillery there were four regiments of four batteries each, equipped with 6-inch howitzers which were to be assigned to armies. The Italian army entered the campaign with an insufficient equipment of artillery, which was gradually increased in the course of the War.

The work before the Italians was simple in respect of conception, difficult in point of execution. The configuration of the frontier at once fixed the nature of the task. It was absolutely essential to close the passes of the Alps from Switzerland eastward in order to protect the flank and rear of their armies on the Isonzo line and to prevent invasion of Italy from the Trentino. This condition secured, the task of the remainder of the forces was to cross the Isonzo, for it must not be forgotten that Italy's material objective was Trieste with the Istrian Peninsula.

Four armies took the field, two on each frontier, the northern and eastern. A fifth force, composed of Bersaglieri and Alpini, was designated for operations in the Carnic Alps. Gen. Count Luigi Cadorna, the chief of the general staff, was in general command, although the armies were under the nominal leadership of the King. On May 24 the frontier of the Trentino was crossed and two weeks later the road to Verona was closed. During the opening days of the campaign in this region the Austrians had opposed but slight resistance to the forward movement of the Italians because of the events on the Eastern front. Farther west the Italians closed the gateways opening southward into the valley of the Tagliamento after severe fighting. In the Trentino as a whole the Italians managed to get control of most of the roads leading into their own country.

The nature of events on the eastern frontier was almost wholly determined by the obstacle forming the line of separation between the contending armies, i.e. the Isonzo River. From its left (Austrian) bank rises ridge upon ridge, whereas the right bank from which the attack must come, below Gorizia, is flat, the Friuli plain. In crossing the river here, therefore, the Italians would be compelled to fight uphill. The rectangle Gorizia-Gradisca-Trieste-San Daniele is occupied by the Carso plateau, with hills from 150 to 1700 feet high. This plateau would have to be taken, or at least a passage opened through it, before Trieste could be reached. On May 24, Italian troops occupied various small towns just across the frontier. Their troubles began when they undertook to cross the Isonzo, for soon after reaching it they found it in flood. Their difficulties were increased by the failure of the cavalry to seize the bridges at Pieris. A dash for these bridges would have insured a crossing and might have gained possession of a part at least of the Carso plateau. As it was, the Austrians blew up the bridges before any Italians got across. The flood subsiding on June 5, a crossing was made at Pieris, and Monfalcone occupied. But now a fresh obstacle presented itself; the Austrians flooded the low country at the foot of the Carso plateau. The advance was thus blocked, and operations along the entire line delayed. After three unsuccessful attempts to make another crossing of the river just above Sagrado, the Italians finally succeeded on June 24. By the 27th they had obtained a bridgehead on the Isonzo and a line of advance to the Carso plateau. This formed part of a general struggle over the whole line from Plezzo to the sea. The conflict was necessarily intensified at certain points, such as Gorizia, Plava, and Tolmino.

Gorizia lies in a bend of the river, and is dominated by the hills behind it stretching away into the general mountain system. On the west bank, Monte Sabotino, itself commanded by the hills on the eastern bank, likewise controls the position; from Sabotino run the Podgora heights well below (south of) Gorizia. Between Podgora and Gorizia is open ground 3 miles wide, bounded on the southeast by the river. Sabotino and Podgora, thoroughly organized defensively by the Austrians, were unsuccessfully attacked by the Italians at the end of May. They were slightly more successful at Plava. On the 17th of June, after heavy fighting, they gained the summit of the hill controlling this town. They held the hill thereafter in spite of the efforts of the Austrians to win it back, but were unable to extend their holdings on the left bank. At Tolmino the river turns 90 degrees from southeast to southwest. In the bend stand two hills joined by a saddle, Santa Maria and Santa Lucia. These were held by the Austrians, and formed with Sabotino and Podgora the only positions retained by them on the west bank of the Isonzo. The resistance offered at Tolmino was more serious than apparently the Italians had expected. Their attempt to seize it by sudden attack failed, and they were compelled to proceed against the place by regular investment. In the meantime they were more fortunate to the northwest at Caporetto, which they had occupied on the first day of the War. By June 23, the Italians had succeeded in getting into positions from which they threatened the Plezzo valley. They now came down from the north against Tolmino. In August they attacked Santa Lucia and Santa Maria, but were compelled to resort to trench warfare. Later in October the offensive was resumed, without, however, succeeding in dispossessing the Austrians. At the end of the year the Italians had gained one of their points. They had closed the gates of the northern frontier, and held the keys. On the other hand, they were unsuccessful on the Carso. A period of relative quiet then prevailed.

1916. Austrian Attack in the Trentino. The Austrian plans for 1916 contemplated an attack on the Italian front before the Italians recovered from their unsuccessful campaign of 1915. Inasmuch as they selected the Trentino front, which was largely mountainous, they were compelled to wait until May before beginning operations, so that the snow would have a chance to melt. During the winter and spring, the Austrians were concentrating troops in Trent, collecting them from the Russian and Serbian fronts, as well as from the interior. The advance was to be made over the mountains between Lake Garda in the west and the Brenta River in the east. In this section there were a number of valleys which led to the crest of the mountain boundary and thence to the plains of Italy. The Austrian forces, which were concentrated, however, were entirely too weak to accomplish the object set before them and did little more than divert interest from the Isonzo front.

The front to be attacked was held by the 1st Italian army, which was ill prepared for modern warfare and which was led by an overconfident commander, who had taken little care to fortify his position, which he knew for months was going to be attacked. The attack began in the middle of May and was preceded by a heavy bombardment, which, being new to the Italian troops, had a very demoralizing effect upon them. The result was a slow but steady advance on the part of the Austrians. At the end of two weeks, Asiago and Arsiero had been captured. By this time the attack had exhausted itself and this fact, coupled with an attack by the southern group of Russian armies, forced the Austrians to begin to recall their troops. They fell back to a position intermediate between their advanced and original positions. No serious fighting followed this withdrawal, as the Italians returned to their attacks on the Isonzo front.

Operations on the Carso Plateau. While the Austrian attack was being carried on in Trentino, the Italian II and III armies continued their operations against the Austrian positions north and south of Gorizia. By August their work had produced results which made a successful assault feasible. The attack was delivered north and south of Gorizia on August 6. It was preceded by a bombardment of great intensity. By the 9th the Austrian first line had been broken and by the 12th they had been driven back 3 miles to their second position. Gorizia had been evacuated on the 9th. North of this town all the Austrian positions on the heights of Sabotino and Podgora west of the Isonzo were captured. During the remainder of the year attempts were made by the Italians to advance farther along the Carso plateau, but the Austrian lines proved too strong.

1917. Italian Spring and Summer Offensive. The winter on the Italian front was very severe and of long duration. The time was spent in increasing the entire military establishment on the front and in preparing to meet an Austrian attack on the Trentino front and in organizing an Italian attack on the southern part of the battle line. The plans of the Italian General Staff were as follows: First, to engage the enemy on the entire front from Tolmino to the sea in an intense artillery action which would leave him doubtful as to the real direction of the decisive attacks; then to attack along the Isonzo with the II and III armies. The II army was to seize the heights on the east bank of the Isonzo from Gorizia about 6 miles northward. When the Austrians concentrated here the III army was again to press forward in the main attack along the Carso plateau in the south.

Operations were begun on May 12, and on May 14, the infantry advanced from Plava and Gorizia. On the entire front the Austrians presented stubborn and determined resistance. The first phase of the assault lasted until May 22, by which time the Italians had captured the Austrian first line. The Austrian second line, however, was on heights which overlooked and dominated the first line. In order to create a diversion the Austrians unsuccessfully attacked in the Trentino region, May 19 to 22.

On May 23 the Italian infantry began the second phase of the battle. After tremendous artillery preparation, it attacked on the south edge of the Carso plateau from Castagnavizza to the sea. Over 100 aëroplanes aided in this battle. On the next day the battle was resumed and extended from Gorizia to the sea. Allied monitors bombarded the extremity of the Austrian lines with heavy naval guns. The Italians advanced in the face of exceedingly stubborn resistance—counterattacks, violent shelling, and aërial bombardments from machines flying near the ground. The Italians advanced their lines about 2 miles, but had not accomplished all that was expected, inasmuch as the key position was 2 miles farther on from the new Italian front line.

The Austrians, on June 1, began an offensive which compelled the Italians to retire somewhat from their newly-won positions. On account of conditions in Russia they were able to bring up great quantities of men and material from the Eastern front. On June 3, a general attack from Mount San Marco to the sea was begun and lasted with unabated intensity for three days. It was at first successful, driving the Italians back about 1¼ miles. A counterassault by General Cadorna in the Trentino compelled the Austrians to give up this offensive, which was supposed to neutralize the Italian gains in the latter part of May. During July and the first part of August the opposing forces battled back and forth in an attempt to get advantageous positions. On the night of August 18, the Italians began a spectacular offensive from Tolmino to the sea, a front of approximately 37 miles. The attack was made by the II army, under General Cappello, which operated on the Bainsizza plateau, Monte Santo, and Monte San Gabriele, and the III army under the Duke of Aosta, which operated in the Vippacco and Brestovizza valleys, and in front of Mount Hermada, the keypoint to the Carso plateau. These armies were aided by Italian and British monitors in the Gulf of Trieste.

The Italians paved the way for their advance by a great engineering feat. They had diverted the course of the waters of the Isonzo River from its bed above Anhovo and had built bridges across the shallow stream that remained. This work was done at night and at daylight the stream was rediverted to its regular channel. By means of these bridges and some pontoon bridges hastily constructed, the Italians crossed the river on the 18th and gained a foothold on the northern part of the Bainsizza plateau. At the same time Cappello's right wing began to envelop Monte Santo. These two movements compelled the Austrians to retire to the easternmost edge of the Bainsizza plateau. From the nature of the Austrian defenses, it was quite apparent that the Austrian Staff thought this plateau impregnable. On August 24, the Italians occupied the summit of Monte Santo, 2240 feet high, but attempts to reach the summit of Monte San Daniele were futile.

The Duke of Aosta had been busy in the south in the meanwhile. His object was to surround the Hermada Mountains, which were the key to the Carso plateau and Trieste, and to occupy the Vippacco valley. He was unable to break through the Hermada Mountains, however, and spent the entire month in fruitless efforts.

At the end of September, General Cadorna reported to his allies that his offensive of 1917 was ended. In the attacks north and south of Gorizia his losses in killed, wounded, and missing were 350,000; with losses due to sickness, his casualties were about 700,000. The II army especially suffered from the latter cause. It is probable that the Austrian losses were about as great, as they appealed to the German G. H. Q. for assistance.

Austro-German Counterattack and Italian Retreat. As has been described above, the main Italian army was striking on a comparatively limited front on the Bainsizza plateau. This attacking force was composed of seasoned veterans. The armies protecting its flanks were of unequal strength and were used for different purposes. Those on the upper Isonzo were Territorials, i.e. older men who in peace times are held in reserve. They extended from Tolmino to Plezzo and were to protect the flank of the Bainsizza army. The troops on the lower Isonzo were veterans, who were thrusting forward on the Carso plateau *pari passu* with the troops on the Bainsizza and who were ultimately to march on Trieste.

The German General Staff had been receiving calls for help for some time and at last gave heed to them, sending the XIV Germany army, consisting of six or seven divisions. The strategy of the Austro-German plan was to strike at the unseasoned troops on the upper Isonzo, break through, and then cut the lines of communications of the other two armies by outflanking them. This plan was put into operation and worked exceedingly well. The task was made easier by the collapse of Russia, a superiority of artillery, surprise, socialistic propaganda, and cowardice, which General Cadorna claimed was exhibited by his troops on the upper Isonzo.

The battle began on October 24, with a bombardment of the Plezzo-Tolmino front and the northern flank of the Bainsizza plateau. Under cover of these guns the Germans and Austrians broke through the front line trenches at Plezzo and Tolmino and crossed to the western bank of the Isonzo. Converging from these points on Caporetto, the Germans opened the way down the valleys of the Natisone and Judrio Rivers. This move threatened the rear of the Bainsizza and Carso armies, and compelled them to begin a hasty retreat. The retreat from the plateau through Gorizia across hastily constructed bridges over the Isonzo became a rout. On the 28th, Civadale was taken, which opened up railway communication with Udine, the seat of the Italian Headquarters. This advance also compelled the IV Italian army, which was guarding the frontier in the Carnic Alps, to abandon the passes on the frontier and retreat down the streams flowing into the Tagliamento and Piave Rivers. On October 30, Udine fell, and by November 1, the Austro-German forces had reached the Tagliamento River, which they crossed in scores of places after a slight pause. The Italian II army was no longer a fighting unit. The next river flowing into the Gulf of Trieste was the Livenza. This offered very little chance of resistance and was defended merely to give more time to prepare the line of the Piave River, from 10 to 20 miles farther west. French and British infantry and heavy artillery, which were sorely needed, were arriving daily in ever-increasing numbers, and being sent to the critical points. The French sent six divisions and the British five. At this stage a change in command was made. General Cadorna was succeeded by General Diaz, who was to be assisted by Generals Badoglio and Giardino. Cadorna was assigned to the Supreme War Council, which was organized largely as a result of the Italian disaster (see above). Reserves were held on the Adige line in case the Italians were unable to hold the Piave. The Adige line was very strong naturally, and was practically incapable of a flanking movement such as had won all the rivers so far gained

The line eventually taken by the Italians ran along the Piave River from the Adriatic to the foothills of the mountains, thence westward across the Mount Grappa group of mountains to the Brenta River where it connected with the lines of the I Italian army, which prolonged the line across the Asiago plateau and through the mountains to Lake Garda. The IV Italian army held the line between the two rivers, while the III held the line along the Piave. The Austro-German attack had by this time exhausted itself and neither the X or XI Austrian armies in the north nor the German and Austrian Isonzo armies were able to make any impression on the new line. During December, therefore, the German divisions were withdrawn. The Austro-Germans had taken almost 4000 square miles of territory, 300,000 prisoners, and 2700 guns. The winter months, which were very severe, were spent by the Italians, with the aid of the British and French, in strengthening the Piave line, particularly at its weakest point, in the mountains.

1918. The Austrian Failure. The long looked for offensive on the Italian front, which was expected to finish the work of 1917, developed in June, 1918, and extended along the whole front from the Asiago plateau to the sea, nearly 100 miles. The Austrian plan of attack was as follows: Field Marshal von Hoetzendorf was to break through the Allied positions on the Asiago plateau, and at Monte Grappa and Monte Tomba, and then march down the Brenta valley, and debouch on to the plains by way of Bassano. In conjunction with Hoetzendorf, General Borovic was to cross the Piave between Montello and the upper stretches of the Piave delta, and thus outflank Venice and leave it the alternative of surrender or destruction. The capture of Montello would assure the Austrian domination of several important railway centres and possibly cause a huge disaster. The offensive was well planned and everything was done to insure its success. The Austrians were well supplied with gas shells, smoke shells, rafts, pontoons, and every other means of carrying on modern warfare. From the outset, the attempts to reach the manufacturing heart of Italy were doomed to failure. In the mountain region the opening attack took the first line trenches from the British and French defenders. Less than two days later, the Allies, at the point of the bayonet, had recovered all the ground lost and some more besides.

The Austrians were little more successful along the Piave. Their success was largely due to the effective use of "tear" shells and smoke screens. They crossed the Piave at several places and, by the 16th, they reached Fossalta and threatened to cross the canal of the same name, which branches off from the Piave at Fossalta and extends to Porte Grand. Nature now came to the aid of the Italians, in the form of exceedingly heavy rainstorms, which made the Piave a swollen flood. This had two enects: first, by washing away nearly all the bridges, it cut off almost completely the Austrians on the western bank of the river; and second, it enabled Italian naval monitors of light draft to go up the river and heavily bombard the Austro-Hungarian positions. On June 23, the Italians began an offensive all along the western bank against the isolated Austrian positions. By the first week in July, not only had the Allies driven the enemy back to its old positions, but in some cases had captured ground that had been lost in 1917, notably the delta at the mouth of the Piave. The offensive and counter-offensive had now exhausted themselves and General Diaz held the line of the Piave until ordered by Foch to open an offensive.

Complete Collapse of Austria-Hungary. Austria-Hungary was the third member of the Central Alliance to make a separate peace with the Allies (see below). An armistice amounting to unconditional surrender was signed on November 3, after Italy and her Allies had secured one of the most decisive victories of the War in which 63 Austrian divisions were utterly routed by 51 Italian divisions, 3 British, 2 French, and 1 Czecho-Slovak division, and the 332d American infantry regiment. On November 4, the Italian War Office reported "The Austro-Hungarian Army is destroyed. It suffered heavy losses in the fierce resistance of the first days of the struggle, and in pursuit it has lost an immense quantity of material of all kinds, nearly all its stores and depots, and has left in our hands about 300,000 prisoners, with their commands complete, and not less than 500 guns."

The main attack was made on October 24, when the Italians and their allies began a heavy artillery fire in the mountainous regions around the Asiago plateau and Monte Grappa. The first Italian infantry assault forced a passage of the Ornic River and captured Monte Salarole, and parts of Mounts Prossolan and Pertica. By the 28th the allied armies had forced their way across the Piave and were driving the enemy precipitously before them, with cavalry units well in advance of the infantry. The Austro-Hungarians were in a disorderly rout and made absolutely no attempt to carry along or destroy their munitions and supplies. Vittorio was reached on the 30th, and on the next day Italian forces reached Ponte nelle Alpi, which separated the Austrian army in the mountains from that along the Piave. The capture of the Vadal Pass on the same day penned 15 Austrian divisions between the Brenta and Piave Rivers.

By November 1, four armies had reached the Livenza and cavalry outposts had operated almost to the Tagliamento. On the 2d, the Italians had advanced in the Trentino as far as the Sugana valley and by the next day, when the armistice was signed, Roverato and Trent were occupied. Italian and British cavalry also had entered Udine and had overrun the plains surrounding it. On the last day of the fighting, Italian land and sea forces had occupied the great Austrian naval base and seaport at Trieste.

On October 31, Austria-Hungary sued for an armistice. Terms were handed to her on the next day, which were accepted. They went into effect on November 4. The more important clauses provided briefly for the demobilization of the Austro-Hungarian Army on all fronts, the evacuation of all occupied territory, wherever held by Austro-Hungarian troops, repatriation of Allied prisoners of war, and the occupation of any strategical points in Austria-Hungary by the Allies that they desired.

BALKAN FRONT

Serbia, Bulgaria, Saloniki. War was declared by Austria on Serbia June 28, 1914, and at once Austrian forces began to concentrate on the Serbian frontier. Serbia began her mobilization two days before Austria declared war. The Austrian plan was to invade the northwest corner of Serbia; one corps was to cross the Save River at Shabatz and three were to cross the Drina River from Bosnia. Accordingly, after demonstrations on the Danube, on August 12, she sent her first troops over at Losnitza on the Drina and on the same day she crossed the Save near Shabatz. Other troops crossed the Drina at Zvornik and Linbovia. The direct objective of the Austrians was to reach Valievo, and thence Kraguyvats, the site of the national Serbian arsenal. The commanding generals of the respective sides were Potiorek (Austrian) and Putnik (Serbian).

The line of the Austrian invasion being known, the bulk of the Serbians moved to meet it in the direction of the Jadar valley, while sending troops to the northwest to offset the invasion from Shabatz. In the meantime the Austrians moved up the Jadar, and the Serbians intrenched at Jarebitze, across the valley. The battle opened in earnest August 16, on the Serbian right. The action, lasting all day, resulted in the defeat of the Austrians, and in bringing to naught their plan to join their forces on the Jadar. It also left the Serbians free to operate against Shabatz, which they entered on the 14th. While this operation was going on, the Austrians farther south had been retreating to the Drina, and the Austrian invasion had failed, due to overconfidence and exposing their columns to separate attacks by the Serbians who were thoroughly acquainted with the country.

On September 1, the Serbs invaded Syrmia, a province lying between the Save and the Danube. On the whole this step was ill-advised, and in any case of short duration, for now the Austrians were about to launch another invasion, like the first, from the line of the Drina, under the same general.

After six weeks of position fighting the Serbs retreated, abandoning the Matchva and the Tzer. On November 1, the Austrians again invaded Serbia from the same frontier with two armies, composed of four active corps and reserve divisions. Valievo was entered on the 11th. The Serbs now took up a position down the Kolubara River to the Lyg, up which their line turned to the southeast; the heights south of this position were occupied and protected by earthworks. On the 11th, the Austrians attacked towards Lazorevatz, and moved against a detached force 20 miles southwest guarding the valley of the western Morava. On November 20, the first of these attacks proved successful and drove in the Serb centre. By the 24th, the action had extended over the whole front with continued success falling to the Austrians. They had now succeeded in extending their front to Belgrade, which they entered December 1, and thus had cut the region in two, driving back the Serbs in the direction of Kraguyevats, on a line from the Belgrade railway to the western Morava. The situation was now saved to the Serbs by the resumption of the offensive. On December 2 they attacked, and in the next few days drove back the Austrians right and centre to Valievo. The advance was equally successful in the other sectors. Its result was an interposition between the three Austrian corps in the south and the two farther north. The three southerly corps retreated as well as they could on the frontier. The action now turned towards Belgrade, towards which the Austrians were steadily driven back. The evacuation of the capital occurred on December 14 and 15.

It is difficult to understand the object of Austria's operations in Serbia during 1914 when she needed all her troops on the Russian front. It was highly improbable that the Serbians would cross the Danube and an invasion of the mountainous provinces of Bosnia and Herzegovina could have been easily defeated by the local corps stationed there. It was to her interest to remain on the defensive on this front.

1915. Bulgaria. In October, 1915, Serbia was once more called upon to defend her territory, for Bulgaria had finally decided to cast in her lot with the Central Powers (see BULGARIA). Accordingly her armies crossed the Serbian frontier towards Nish, striking in conjunction with the Austro-German forces which had already begun their invasion from the north under the leadership of Von Mackensen. Meanwhile French and British troops, under an arrangement with Venizelos, the prime minister of Greece, debarked at Saloniki, and were hastening up along the Saloniki-Nish railroad. In the first week of October the Austro-German army crossed the Danube near Belgrade and at Semendria, while other armies attacked farther west along the Drina and Save Rivers. Bulgaria's first operations were directed towards Nish; but realizing the danger of the arrival of Allied reinforcements at Saloniki, the Bulgarians then developed their main attacks farther south against the railroad at Vranya and Vilandovo. The advance of the Austro-German columns was at first slow, for by the end of October they had gained, advancing on a 100-mile front, only from 25 to 40 miles south of Belgrade. In the south, however, the Bulgarians having seized the Nish-Saloniki railway at Vranya, promptly confirmed their grip on the enemy's line of supplies by taking the important city of Uskub (October 22), and Veles, 25 miles farther south.

The Germans took the Serbian arsenal at Kraguyevats during the second week in November. In the meantime, the other Austro-German columns had reached the east and west line of the Western Morava before the middle of the month. The fall of Nish was not long delayed, upon a heavy bombardment by the Bulgars. A route to Constantinople had already been opened via the Danube, when Germans and Bulgars joined hands near Orsova.

Meanwhile the Anglo-French forces from Saloniki held the railroad from Krivolak south to the frontier, and had gained some successes against the Bulgars around Strumnitza. The French were scarcely able to maintain their position on the Vardar and Cerna Rivers, and the small British force was but little in evidence north of Doiran.

The remaining strokes in Serbia's defeat followed quickly. Sicnitza, Novibazar, and Mitrovitza (the last the temporary Serb capital) fell in rapid succession before the Austro-German columns. Teutonic and Bulgarian invading forces joined hands at Prishtina, on the railroad branch south of Mitrovitza. On November 30, the two remaining cities of importance, Prisrend and Monastir, were lost to Serbia. The fugitive Serb army was driven either into Montenegro or Albania. At the beginning of December, the main object of the German-Bulgar campaign in Serbia had been achieved. The

Serbian army had been eliminated as a fighting force and the surviving Serb troops, fewer than 100,000 men, had retreated into Montenegro and Albania en route for the Adriatic shores.

The retreat of the Serbs from Katchanik left the French left flank, on the Cerna River, in a critical position. The retreat of the Allies, however, was skillfully conducted, and they succeeded in escaping to neutral territory, where they fortified themselves at Saloniki, with the intention of holding their position at all costs and using it as a base for future operations.

Year of 1916. Montenegro was conquered by the Austrians in January, 1916. The Austrians then proceeded to take Scutari in Albania (Jan. 26, 1916), and joined hands with the Bulgars, east of Durazzo, February 17. The Italians abandoned the place February 26, and the Austrians now advanced against Avlona. The remnant of the Serbian army was transported by the Allies from the Albanian coast to the island of Corfu to undergo reorganization. After a few months' rest the refitted army was taken to Saloniki to reinforce the French and British.

When Rumania decided to enter the War on the side of the Allies (see below) one of her terms was that the Allies should begin an offensive from Saloniki to prevent Bulgaria from taking part in the operations against her. About the first of August, therefore, General Sarrail was made commander-in-chief of the Allied forces and began operations in the centre against the Bulgarians on his front. The Bulgarians replied by invading Greece and occupying the line of the Struma River and the fortress of Kavala on the coast of Macedonia and the town of Florina west to Lake Ostrovo. Sarrail, not being able to advance in the centre, transferred his offensive to the west and the French and Serbs captured Florina and advanced into Serbia, capturing Monastir about the end of November. This campaign was of little assistance to the Rumanians. The failure of Greece to declare war on Bulgaria after the invasion of the country led to the establishment of the Greek revolutionary government under Venizelos at Saloniki and on some of the Greek islands.

Year of 1917. No events of any importance occurred on this front during this year. General Sarrail began an offensive in the spring but gave it up very shortly, accomplishing nothing. King Constantine was forced to leave the country and one of his sons was placed on the throne by the Allies in the course of the year (see GREECE). Greece declared war on the Central Powers and the Greek army was organized and trained to aid the Allies.

1918. Surrender of Bulgaria. The Bulgarians were very much dissatisfied with the terms of the Treaty of Bucharest and resented the action of the German and Austrian governments, which had dictated the terms. Of the Bulgarian army at this time, Ludendorff says: "The Bulgarian army had time for rest and training. But it could not be denied that since March its spirit had visibly deteriorated, owing to bad food and clothing. The irritation against Germany was cleverly fomented by hostile propaganda and by Bulgarians who favored the Entente. The peace of Bucharest and the withdrawal of a few German units to the west added fresh fuel to it."

Bulgaria was the first of the Central Powers to surrender to Allied arms. This act marked the beginning of the end of the great War. Bulgaria's surrender was the direct result of a brilliant offensive carried out by the Allies under the supreme leadership of Gen. Franchet d'Esperey, who assumed command of the Saloniki front in June, 1918. The artillery preparations began on Sept. 14, 1918, and on the 17th and 18th the Allied right started to advance, as well as the centre. British and Greek troops struck around Lake Doiran, on the right of the Macedonian front; French and Serbian troops struck in the centre, and Italians struck on the left rear and in Albania. By September 22, the Serbians had succeeded in cutting the communications of the I Bulgarian army, operating along the Vardar, and those of the II army and the Germans north of Monastir. This day saw a general pursuit of the armies of the Central Powers on a 90-mile front. On the 23d, the Serbians and French crossed the Vardar. On the 24th French cavalry entered Prilep. The British entered Strumnitza on the 26th, and the Serbians reached Kochana and Veles. The road to Sofia was opened to the victorious Allies. Consequently the Bulgarians sued for a separate armistice. One containing terms of unconditional surrender was granted on the 30th, when active fighting ceased. The last act of the fighting was the occupation of Uskub by the French on the 30th.

A brief summary of the armistice terms, which were purely military, are as follows: Bulgaria was to evacuate all Allied territory, demobilize her army as rapidly as possible, and turn over to the Allies all means of transport. The Allies were to be allowed to pass through Bulgaria if necessary to future military operations; control of the Danube and Bulgarian merchant marine on that river was to be given up; all important strategic points to be occupied by the Allies if they wished; the armistice was to remain in force until a general peace was concluded.

Interest in the Balkans after the signing of the armistice centred in the driving out of Austrian troops from Albania, Serbia, and Montenegro. On October 1, the Bulgarians began to evacuate Serbian territory, and two days later the Austrians began the evacuation of Albania. By the end of the month they were well out of Montenegro also. On November 3, Belgrade was reoccupied and the II Serbian army crossed the Danube and Save Rivers, and on the 10th entered Serajevo, the Bosnian capital and scene of the assassination of the Archduke Francis Ferdinand and his wife on June 28, 1914.

RUMANIAN FRONT

As has been stated above, the question of Rumania's entrance into the War was settled on Aug. 27, 1916. Her period of neutrality was greatly affected by events on the Russian and Dardanelles' fronts. The failure of the Gallipoli campaign, the Russian retreat, and the invasion of Serbia kept her out of the War in 1915. After Brusiloff's successful advance in June, 1916, Rumania determined to enter the War on the side of the Allies. She frankly admitted that her action was influenced to a great extent by the thought that the time was ripe to put into effect her nationalist policies. She made the following demands upon the Allies before she took the decisive step: Brusiloff was to keep up his offensive, the Saloniki army was to attack, certain concessions of territory were to be made to her, and she was to be supplied with ammunition, etc. These demands being promised, Rumania declared war. Her reliance on the Allies was too great, however. Her chief weakness was lack of ammunition. As this could be supplied only through Russia, it was inevitable that Rumania should go short, because Russia had scarcely enough for herself, in the first place, and in the second, the Russian Revolution soon put Russia out of the War. This new force added about 500,000 trained men to the Allied cause. Including the reserves, 900,000 men could be put into the field.

The territory of Rumania forms a great letter Y. The base is formed of the province of Dobrudja, which is bounded on the south by Bulgaria, on the east by the Black Sea and on the north and west by the Danube. The two arms are formed by the province of Moldavia, which extends northward between the Pruth River and the Carpathian range of mountains; and the province of Wallachia, which extends westward between the Danube and the Transylvanian Alps. The two mountain chains form a great barrier 350 miles long, separating Rumania from Hungary.

The Rumanian plan of operations contemplated an invasion of Hungary by three armies deployed over this immense front, which were to advance in a number of small columns through the passes and eventually unite on the Maros River near Karlsburg for the final advance to the range of mountains separating Transylvania and Hungary proper. The Rumanians proposed to hold and annex Transylvania, which was largely inhabited by Rumanians. Assuming that even if Bulgaria declared war, her forces would be held by the Allied advance from Saloniki, the Rumanians left a single army to guard the line of the Danube and the Bulgarian frontier.

The plan of the Central Powers was to form a group of three armies for operations in Transylvania and one in Bulgaria. One of the former armies was composed of the scattered troops on the frontier at the beginning of hostilities and the other two were to be new armies organized from reserves and troops on other fronts; i.e. the I Austrian and the IX German. The German army was to be commanded by von Falkenhayn, late chief-of-staff. These new armies would not be concentrated before the middle of September. In Bulgaria, a group under von Mackensen was to be formed of the III Bulgarian army and a number of German and Turkish divisions.

In the campaign which began on August 28, we note the following phases:

Aug. 28 to Sept. 20.	Advance of Rumanian armies into Transylvania and the advance of Mackensen's group into Dobrudja.
Sept. 20 to Oct. 20.	Retreat of Rumanians from Transylvania. Mackensen held in check in Dobrudja.
Oct. 20 to Nov. 10.	Austro-Germans held on the frontier in the north. Mackensen advances in Dobrudja across the Bucharest-Constanza railway.
Nov. 10 to Nov. 25.	Austro-Germans penetrate Vulcan Pass and reach the plains of Wallachia. Mackensen held in check in Dobrudja.
Nov. 25 to Jan. 10.	Mackensen crosses the Danube at Sistova with his German and Turkish forces and with the Austro-German forces from the north drives the Russian and Rumanian forces out of Wallachia and across the Sereth River. The Bulgarians left in the Dobrudja hold the Russo-Rumanian forces in check until the latter retire from the Dobrudja, when the Bulgarians cross the Danube and rejoin Mackensen.

On August 28, the I, II, and IV Rumanian armies crossed the mountains; the I army in the west from the Danube to the Red Tower Pass; the II army in the centre between the Gyimes and Tarsburg Passes, and the IV army north of the Gyimes Pass. The II and IV armies met with little opposition and by September 20 were on the meridian of Fogaras between the Maros River and the Carpathians. The various columns of the I army met with greater opposition, and had barely reached the base of the mountains. At the Red Tower Pass the column had taken Hermanstadt and at the Vulcan Pass the town of Petrosiny. The division on the Danube had taken Orsova at the Iron Gates. While the Rumanian armies were advancing triumphantly in Transylvania, Bulgaria declared war on September 1 and immediately von Mackensen crossed the frontier into Dobrudja, and on September 6 captured the larger part of two divisions left by the Rumanians on the south bank of the Danube at Tutrakan. This unexpected blow caused the Rumanians to divert the commander of the II Rumanian army —Averescue—with some of his divisions from Transylvania to the Dobrudja to check the advance of Mackensen. This he was able to do before Mackensen reached the Bucharest-Constanza railway.

Such was the situation about September 20 when the I Austrian and IX German armies had completed their organization and were ready to move. Their plan was first to secure the Vulcan Pass and then penetrate the gap between the II Rumanian army at Fogaras and the I army at the Red Tower Pass and attempt the capture of the Rumanians in the vicinity of Hermanstadt by seizing the pass in their rear. The operations were successfully executed; both passes were captured, with a large number of Rumanian troops. Leaving guards in the passes, the main body of the two armies moved eastward against the II Rumanian army, which was obliged to seek safety by falling back to the mountain passes. The IV Rumanian army was compelled to conform to this movement and by October 20 both armies were back in the mountain passes. The Russians now relieved the IV Rumanian army so it could be used farther south. During this period Mackensen was unable to advance and called for reinforcements.

As a result of the retreat of the Rumanian armies in the north, Averescue was sent to his old command, the II army, and strenuous efforts were made to hold the I Austrian and IX German armies at the mountain passes. In this the Rumanians were successful during the latter part of October and the early part of November. During this period, however, Mackensen, having received reinforcements, broke through the Rumanian defense in Dobrudja and succeeded in advancing across the Bucharest-Constanza railway and capturing the seaport of Constanza. A short distance east of the railway he was obliged to again intrench, as the Rumanians had been strongly reinforced by Russians and he met with temporary defeat.

Early in November the Austro-Germans north of the mountains received further reinforcements and made a determined effort to reach the Wallachian plains by the Vulcan Pass, where the Rumanians were weakest. After 10 days' hard fighting they succeeded in reaching Craiova and about November 25 were on the Aluta River facing east. As soon as he was assured that the northern armies would reach the Wallachian plains, Mackensen decided to leave the Bulgarians to hold his trench line in Dobrudja and transfer his German and Turkish troops to the north bank of the Danube. These troops were ferried across the Danube November 23–25 at Sistora and Mackensen assumed command in Wallachia. The Rumanian division that had taken Orsova was now wholly cut off and was later compelled to surrender.

From November 25 to January 10, the Russo-Rumanian armies were driven steadily eastward and the passes in the north were evacuated in succession. At the close of the operations the opposing armies were facing each other along the Sereth River. The Dobrudja was evacuated by the Russo-Rumanians and most of the Bulgarians joined von Mackensen on the north bank of the Danube. Moldavia still remained in the possession of the Rumanians, who moved their capital to Jassy, as the Russians still held the passes of the Carpathians.

In October, a French Military Mission reached Rumania, and after the close of hostilities, the Russians took over the front and the Rumanian army was reorganized and trained by French officers.

1917. In July, 1917, the Rumanians were again to assume the offensive in coöperation with Brusiloff's offensive under the Kerensky government. The Russian advance, however, soon terminated in a rout and operations ceased. In December, the Bolshevik government entered into an armistice with the Central Powers and Rumania was compelled to follow suit.

1918. After the surrender of Bulgaria, September 30, Rumania again took up arms but the surrender of Austria followed so quickly that the Rumanian forces were not engaged.

TURKISH FRONT

The strategic importance of Turkey from the Germanic point of view lay in keeping supplies from Russia through control of the Dardanelles. Activities on the Turkish front manifested themselves in five distinct phases: (1) Armenian front (a) Turkish thrust against Russia (1914–15), (b) Russian campaign (1916) forcing the Turkish armies behind Trebizond, Erzerum, and Bitlis line to the west and threatening Bagdad on the south; (2) British advance in Mesopotamia; (3) Turkish attack on the Suez Canal; (4) Gallipoli campaign by Franco-British forces; (5) conquest of Mesopotamia and Palestine with resultant collapse of Turkey.

War was begun by Turkey and Russia on Oct. 31, 1914, through the activities of the Turkish fleet, but formal declaration was withheld by the Allies until the first week in November. As a matter of fact Turkey began to mobilize at the end of July, 1914, and by the end of October it was estimated that she had 500,000 men in her army with 250,000 more at the depots. The strength of her army on a peace basis was estimated at 250,000. Attempts had been made by German officers to reorganize and train the Turkish army just previous to the Balkan wars, but without much success. The staff and supply services were woefully weak, and the great quantities of artillery lost in those wars were scarcely replaced. The country was divided into four military districts with headquarters at Constantinople, Erzingan in Armenia, Damascus in Syria, and Bagdad in Mesopotamia. At the beginning of the War, Allied troops appeared in the Caucasus district of Russia on the Armenian border and in Mesopotamia a British force landed at Fao at the mouth of the Shatt-el-Arab River and secured a base for operations in Mesopotamia.

1915. Armenian Front. On the Armenian front the Russian base for operations was Kars and the Turkish base Erzerum, opposite Kars. Each city was about 50 miles from the frontier and about midway between the Black Sea and Mount Ararat. About the middle of November, 1914, a Russian column crossed the Turkish frontier and advanced about half the distance to Erzerum along the roads leading to that base. In the meantime a Turkish force advanced against the Russian column, while a corps at Trebizond attempted to reach the flank and rear by way of Kardahan. The Turks crossed the frontier but were defeated and the Trebizond unit got no farther than Kardahan. The Turks recrossed the frontier and operations ceased for the remainder of 1915 because both the Russian and Turkish troops were needed elsewhere. Persian territory was invaded and some operations of minor importance carried out near Tabriz.

Mesopotamia. The Turks had two corps in the Tigris valley, one at Mosul and the other at Bagdad, 200 miles farther south. The British occupied Basra early in November, 1914, to gain a base for operations in Mesopotamia and to protect the British oil fields in southern Persia. The operations of this force were conducted by the Indian government. The force was gradually increased to an army corps and in April, 1915, General Nixon was sent to command it. About the end of May, General Townshend started north up the Tigris with the 6th Indian division, accompanied by naval vessels of light draft. In a month, it reached Amara about 100 miles up the river with only slight opposition. During July the 12th Indian division advanced about 100 miles up the Euphrates.

The advance had been accomplished so easily that the British commanders determined to combine the two forces and advance up the Tigris to Kut el Amara, which is about 100 miles south of Bagdad. The expedition started on August 1, and Kut was reached about the last of September, with only one engagement of any size. The British were successful in this. The pursuit was kept up until the British-Indian army reached Azizieh about halfway between Kut and Bagdad. The problem before the British was now whether to continue on to Bagdad or wait at Kut for reinforcements. Townshend favored the latter course but for political reasons General Nixon overruled him and ordered the advance on Bagdad. Consequently an advance was begun from Azizieh in the middle of November and by the 21st Townshend reached Ctesiphon, about halfway between Azizieh and Bagdad. Here the Turks were strongly intrenched. Townshend unsuccessfully attacked on the 22d. He remained in front of the Turkish positions until the night of the 25th, when, upon learning that the Turks were about to be reinforced, he began a retreat on Kut. He reached this place December 2, closely pursued and harassed by the Turks. He determined to hold it until relief arrived and as the year closed he was invested by the Turks and his position was very precarious.

Egypt. As early as 1914, the Turks planned a campaign against Egypt, in the hope probably of raising an insurrection in that country. The plan of operations called for the crossing of the Sinai Peninsula through a desert 150 miles wide, as well as the Suez Canal. The main column, consisting of three divisions, was to start from Beersheba in southern Palestine. A smaller column was to follow the coast road from Gaza to El Kantara on the canal, and a third column was to follow a caravan route still farther south and reach the town of Suez. The three columns reached the canal about the first week in February. A miscellaneous force defended the canal, Australians, New Zealanders, Indians, English, and Egyptians. All attacks on the canal were easily repulsed and the Turks retreated unpursued by the Allies. No damage was done to the canal and the front remained stabilized for the remainder of the year.

Gallipoli Campaign. The temptation to strike a blow at the vitals of Turkey by taking possession of the Dardanelles, and hence of Constantinople, was irresistible (for a description of the straits, see VOL. VI). Success here would have met with a rich reward. A way would have been opened to supply Russia with the war munitions she so sorely needed; the Balkan question would have been settled out of hand, and in a manner favorable to the Allies. But the entire campaign was mismanaged from the outset; the nature of the effort to be made was certainly not correctly estimated; efforts were scattered; time was lost.

For the naval campaign, reference should be made to the naval sub-division of this article. It opened Nov. 3, 1914, and it was not until the following March that joint land and naval operations were decided upon after a great deal of bickering and hesitation. By that time the Turks had received ample warning, and here, as elsewhere, under German leadership, had made what turned out to be more than ample preparation.

In the Gallipoli Peninsula, nature was on the side of the defense. Furthermore, the Turks enjoyed an advantage in their supply of men, for the bulk of their forces was in the neighborhood of Constantinople and could therefore be drawn upon as needed. Gen. Sir Ian Hamilton was selected to direct the land operations of the Allies. These were to be carried on by a French force under General d'Amade, drawn from north Africa, and by Colonials, Territorials, and some Indians from Egypt and Imperial troops.

On arriving at Tenedos (March 17), selected as his headquarters, Sir Ian made up his mind that the transports had been so badly loaded that he would not undertake any operations until the loading had been corrected. The transports were accordingly sent back to Egypt to be reloaded. Upon their return five weeks had been lost to the Allies and gained to the Turks. The British began their landings on April 25, under exceedingly great difficulties. The Turkish force on the peninsula was in the neighborhood of 100,000 men, commanded by the German general, Liman von Sanders. The chief landings were made at the tip of the peninsula. Once ashore, the advance was to be made against the village of Krithia, and the height of Achi Baba was then to be carried. At each of the beaches selected the Turks were ready and received the landing party with tremendous fire. Obstacles of all sorts under the water and on the beaches and cliffs were skillfully placed in way of the invaders. The Australian and New Zealand corps (Anzacs) near Gaba Tepe especially distinguished themselves by rushing the Turks with the bayonet, clearing the slopes and securing a foothold on the top. The French landed a regiment on the Asiatic side, near Kum Kale, for the purpose of preventing an attack by gun fire against the transports at the nose of the peninsula. In this they were more or less successful, but at considerable loss to themselves. The result of the work of the 24 hours was that the Anzacs, isolated, were holding a semicircular line against an enemy ever increasing in numbers; at the tip of the peninsula one landing was abandoned, some forces were holding their own but isolated, while other landing parties had managed to join hands. The next three or four days were marked by severe fighting and an advance of the British from the tip of the peninsula. By the afternoon of April 28 some of the troops had pushed up to within 1300 yards of Krithia but could get no farther. The lines then dug in. On May 1, the Turks attacked at night, and there was a counterattack the next day. This is the first so-called battle of Krithia. The second occurred on May 6, and was an attempt to win the Krithia Ridge; this attempt failed but the British advanced their line 500 yards. The third came off on June 4, with the same objective and the same result. The fourth was fought on July 12, and resulted in an advance of 300 yards more or less. Achi Baba still remained in Turkish hands. Meanwhile the Turks were attacking the Anzacs (May 5–10) and were repulsed. They renewed their efforts in great force on May 18, and were again beaten off with great loss. There were other engagements, as that of the French (June 21) who captured a work known as the Haricot Redoubt, and the English action of June 28, known as the battle of the Gully Ravine. And so it went until fresh British forces were landed at Suvla Bay on August 7, and the Anzacs advanced upon the ridges of Sari Bair.

The Suvla Bay landing and simultaneous operations at the tip of the peninsula and by the Anzacs constitute the last great attempt to drive the Turks off the peninsula. In May, Sir Ian Hamilton asked for two additional corps; by the end of July he got them. His plan was now to reinforce the Anzacs and direct them to make a drive and capture Sari Bair. A landing at Suvla Bay would surprise the Turks and might enable the Anzacs after taking Sari Bair to push on to Maidos. The Turks at Krithia and on Achi Baba would thus be cut off. A containing attack was to be made at the tip of the peninsula. This attack was delivered on August 5 and failed. It was renewed on the 7th and resulted in minor local successes; its main purpose of keeping the Turks busy on the spot, and preventing them from lending a hand elsewhere, may be said to have been realized. The Anzacs, reinforced, attacked on the 6th, and very nearly succeeded in their purpose; but on the 9th an assaulting column lost its way, and arrived too late to clinch the positive gains made on the spur to the southwest of the main elevation (Hill 305) of the Turkish position. During the attack on Sari Bair the landing at Suvla Bay was begun August 6 by night under the direction of Lieut.-Gen. Sir F. Stopford. It resulted in failure, for although the troops got ashore, once there they accomplished nothing. Apparently there was no well thought out plan of operations, or, if there was, it was not carried out. Some of the troop units were landed in places other than those designated, others were late in moving out. Some local successes were obtained, however, and on the evening of August 7, the British extended in a semicircle around the bay. On the 8th, the British stood fast and made no attempt to advance, and so lost their opportunity not merely to accomplish something on their own account, but to help their comrades farther south engaged in the desperate struggle for Sari Bair. There was more or less fighting during the next week. Open fighting gave way to trench warfare. There was one more battle on August 21, when an unsuccessful attack was made to take Hill 100, about 2 miles east of Suvla Bay.

The struggle for the Dardanelles was now virtually over and it ended in a ghastly failure for the Allies. Sir Ian Hamilton was recalled in October, and the whole peninsula evacuated in December and January, some of the troops going to Saloniki, but most of them going to Egypt to be apportioned among the other fronts. General Hamilton in his *Gallipoli Diary* places the blame almost entirely upon the insufficiency of artillery and inefficiency of the Home authorities in supplying guns, ammunition, spare parts, workshops, etc. The British casualties were 100,000 with about an equal number evacuated because of sickness. The Turkish losses were placed at about the same amount.

1916. Armenian Front. As soon as operations were possible in 1916, the Russians, under General Yudenitch, advanced across the frontier from the Black Sea to Lake Van. Another unit under General Baratoff entered Persia to drive the Turks out of northern Persia. In the middle of February, Erzerum was captured. This was followed by the capture of Bitlis and Mush near Lake Van, and Trebizond on the Black Sea in April. In July, Erzingan, the headquarters for Turkish troops in Armenia, was captured. In the meantime the Russian forces in Persia advanced south as far as Kermanshah, then turned toward the frontier which they reached in May; the objective was Bagdad. The surrender of the British forces at Kut, however, prevented this column from advancing past the frontier. In August the Turks began a counteroffensive which resulted in the recapture of Van and Mush. An advance in Persia forced the Russians back almost to their own frontier. The second half of the year saw little fighting on this front but the Russian forces compelled the retention of a large Turkish force also.

Mesopotamia. As stated above, General Townshend was invested in Kut-el-Amara at the close of 1915. His position was a strong one and the Turks made several futile efforts to take it by assault and bombardment. Then they determined to starve the British out. In order to accomplish this they constructed defenses on both sides of the Tigris below Kut to prevent a relief expedition from advancing up the river. About the middle of December, General Lake, who relieved General Nixon, began to organize a relief expedition 50 miles south of Kut. This force was organized around the 12th and 7th Indian divisions. This unit was weak numerically and did not have the proper artillery, transportation, or medical supplies.

The relief force, commanded by General Aylmer, set out on January 4, but received a check at Sheik Saad, 25 miles from Kut. Although the attempt to take the positions by force failed, the Turks abandoned the works by January 9. By the 21st, the British had advanced 6 miles further but were compelled to halt before Umm-el-Heuna, which also successfully resisted an attack in force. They held on here until early March, when they were reinforced. An unsuccessful attack was made on the night of March 8–9. On April 5, with the aid of the 13th division which had arrived from Gallipoli, the British captured Umm-el-Heuna. The Turks, however, merely retired to a stronger position at Sannaiyat a mile in the rear. Attempts to take these works between the 8th and 18th failed, and on April 29, General Townshend and his force of 10,000 men, after 143 days of siege, were compelled to surrender because of starvation. After the fall of Kut operations in Mesopotamia came to a standstill. The British made preparations on a larger and much more efficient scale for an advance on Bagdad in 1917. General Lake was relieved of the command in Mesopotamia by General Maude. The failure in Mesopotamia has generally been ascribed to overconfidence, weather (heat and floods), and inadequate transportation and equipment for trench warfare.

Egyptian Front. After the unsuccessful attack on the Suez Canal in 1915, the British, early in 1916, destroyed all the water holes within 30 miles of the canal to prevent further operations against it. They also determined to construct a railroad north to the Katica oasis and to put a pipe line alongside it. In April and August the Turks made efforts to interfere with this construction work but were repulsed. By the end of the year the British had pushed the railway and a complete and modern water-supply system to within 15 miles of El Arish, the most advanced of the Turkish strongly held positions. This activity presaged an attack in Palestine in the near future. During the year the revolt of the Arabs in Hedjaz occurred (see HEDJAZ).

1917. Palestine. The British began an advance on Rafa on the Sinai Peninsula, based on the railway which had been constructed there. This town fell early in February and the British advanced northward toward Gaza and eastward toward Beersheba. They were compelled to spend the summer on the Gaza River after failing to take these places in two attacks. In October they advanced again and by January, 1918, had won a series of brilliant successes. On October 31, Beersheba was taken and on November 6, Gaza fell. By November 15, General Allenby had cut the Jaffa-Jerusalem railway at Ludd and Er Ramle. Two days later Jaffa, the port of Jerusalem, was occupied. The British advanced down the Surar River valley toward the Holy City and up the Damascus-Beersheba railway in order to encircle the city and cut off its supplies, so that it would not come under the bombardment of the artillery. All the towns surrounding the city were gradually taken by storm and as the British closed in it became apparent that the Turks would not risk a siege. The city fell on December 10. There was general rejoicing throughout the world over the return of the city to Christian hands after having been in Turkish hands for almost seven centuries. The Turks west and northwest of the city broke up into small bands and carried on guerilla warfare until the British finally got control of all the high land. General Allenby then pushed across a small stream 4 miles north of Jaffa and captured several small towns which gave him all the high land in the neighborhood, and assured a good defense of the Jaffa-Jerusalem railroad.

The success of the British arms in Palestine effectively put an end to Turkish threats on the Suez Canal and Egypt which had been going on for three years. It also aroused the hopes of the Zionists, who dreamed of reëstablishing a Jewish homeland in Palestine. The British government announced in the Balkan Declaration that it looked with favor on the Zionist movement.

Mesopotamia. General Maude, who took command of the Mesopotamian forces in August, 1916, spent the remainder of the year in reorganizing his command and lines of supply. During the same time the Turks had reduced their force at Kut, although they considerably strengthened their positions. When General Maude was ready he began an attack on the Turkish lines east of Kut between the Tigris and the Hai (Dec. 20, 1916). By the middle of January, 1917, the British reached the Tigris up as far as Kut. A month later the Turks evacuated their works on the south bank and were all on the north bank of the Tigris, which owing to floods was 350 yards wide at this point. Under great difficulties the British crossed the river on February 23. The Turks were now in full retreat. On March 11, the British entered Bagdad. This campaign did much to restore the prestige of the British in Mesopotamia and throughout the entire Moslem world. It also compelled the Turkish forces in Persia to retreat. The remainder of the year was spent by the British in making their position secure within a radius of 100 miles of Bagdad.

1918. Collapse of Turkey. Turkey was the second member of the Central Powers alliance to surrender to Allied arms. This was a direct result of a crushing defeat administered by General Allenby. As was narrated above, Jerusalem was captured by General Allenby in December, 1917. Between that time and September, 1918, the British commander was making preparations for his attack on a grand scale. His first object was to secure his right flank by the capture of Jericho and the line of the Jordan. This operation was carried out in February, and was highly successful, the two objectives having been taken shortly after the middle of the month. During March General Allenby was engaged in gaining a line which would enable him to carry out operations east of the Jordan and against the Hedjaz railway, in coöperation with the Arab forces under the Emir Feisal. These were southeast of the Dead Sea and were under the command of Allenby. Rainy weather and the raising of the level of the Jordan River prevented General Allenby from making any advance across that river. He made several raids which materially hindered the Turkish forces. His further progress was also held up by the difficulties of the Allies in France. He reported that in April the 52d and 74th divisions, 9 yeomanry regiments, 5½ siege batteries, 10 British battalions, and 5 machine gun companies were withdrawn preparatory to embarking for France. In May, 14 more battalions were sent to Europe. During July and August, 10 more British battalions were withdrawn from the fighting in the eastern area. While it is true that most of these units were replaced by Indian forces, nevertheless his actual fighting force was so reduced that he was unable to continue the advance against the Turkish troops until the following September. During the hot summer months the only fighting of any note was an attack delivered by Turkish-German forces on July 14. It gained initial successes by taking Abu Tellul, an important height, and surrounded several other advanced positions. These gains were almost immediately lost again as a result of a brilliant counterattack by Australian forces.

On September 18, the British and the Arabs began an advance in Mesopotamia and Palestine which was ultimately to result in the surrender of Turkey and settle once and for all the Berlin to Bagdad route which had already been broken by the collapse of Bulgaria. Allenby made minute preparations for his blow and completely fooled the Turks as to his intentions. The British, with some French forces in support, struck on a 16-mile front and broke through the Turkish lines between Fafat and the sea and advanced 13 miles. By the 22d, enemy resistance between the Mediterranean and the Jordan River had practically broken down completely and the Allies were forging ahead rapidly. In four days they had advanced approximately 60 miles and had occupied Beisan, Nazareth, and El Afule. Arab forces east of the Jordan destroyed railroads and bridges crossing the stream and thus forced the Turks to retreat in a northerly direction only. Haifa and Acre were seized on the 23d and the Turks east of the Jordan were forced to retreat southerly in the direction of Amman. Three days later saw the British at the Sea of Galilee and the occupation of Tiberias, Semakh, Es-Samra, and Amman. On the 27th the British forces joined with the Arabs east of the Jordan at Mezeris. The advance was now a steady pursuit, without any frontal fighting on the part of the Turks. Damascus fell on the 1st of October, Zahleh and Rayak on the 6th, and Tripoli and Homs on the 16th. In the first three weeks of the campaign more than 80,000 prisoners and 350 guns fell into the hands of the British and Arabs.

The last half of October saw the capture of Aleppo and the complete defeat of the Turkish troops along the Tigris by British forces under General Marshall. This last event was accomplished by the capture of Kaleh Sherghat, which completely cut off communication with Mosul, which, with Aleppo, was the main base of supplies of the Turkish-German forces in Asia Minor.

Facing a supreme disaster, the Turks sued for an armistice. They sent the British general, Townshend, who had been captured at Kut-el-Amara, to the Allied commander of the Ægean fleet, Vice Admiral Calthorp, to ask for terms. He asked for regularly accredited agents to carry on the negotiations. These were sent to the island of Lemnos, and after a three-day session, terms were handed to the Turks which they accepted on October 30, and which went into effect the next day. A summary of these terms, which practically amounted to unconditional surrender, follows:

The Dardanelles, Bosporus, and Black Sea were to be opened to the Allies; there was to be immediate demobilization of the Turkish army; surrender of all Turkish warships, and use of mercantile vessels; Allied occupation of any strategical points in Turkey desired by them; immediate withdrawal of Turkish forces from Persia; all Germans and Austrians to get out of Turkey within a month and Turkey to break off all relations with their countries.

COLONIES

Africa. As early as Aug. 7, 1914, the British government telegraphed the South African government to suggest the desirability of seizing such parts of German Southwest Africa "as would give them command of Swakopmund, Luderitzbucht, and the wireless stations there or in the interior," but before operations could be carried on against German territory the local government found itself face to face with a rebellion. See SOUTH AFRICA, UNION OF.

Togoland was taken in a campaign that lasted just three weeks, Aug. 7–28, 1914. Surrounded on three sides by hostile territory, with the sea under British control, it could not hope to offer any resistance.

Kamerun called for a more serious effort on the part of the Allies. Like Togoland, it was surrounded on three sides by hostile territory, with the sea under Allied control, but its vastly greater area made operations more difficult and it was more strongly defended. Three expeditions from the northwest were defeated by the Germans in August and September, 1915. Attacking from the sea, however, the Allies took Duala (September 27) and from this point widened their holdings. Two columns pushed their way into the interior along the railways; one of them on October 26 took Edea, repelling six weeks later a counterattack for its recovery. The other column north of Duala captured the entire railway and advanced beyond its head. The French sent down troops from the Tchad, and others, reinforced by Belgians from Equatoria. The result of all these efforts was that German resistance was well worn down, and came to an end with the surrender of Mora Hill early in 1916.

In *German Southwest Africa* the situation was complicated by the South African Rebellion. This rebellion crushed, real operations began in January, 1915, Luderitz Bay having been occupied as early as Sept. 18, 1914. Swakopmund was occupied January 14. The campaign was directed against Windhoek and carried on by two armies; the northern under Botha was to move from Swakopmund, while the southern under Smuts, divided into three columns, was to move east from Luderitz Bay, north from Warmbad, and west from Bechuanaland. By May 1, the end was near. On the 12th, Botha entered Windhoek and the struggle was practically over; for, pushing on to Grootfontein, now the German capital, he received there the surrender of the enemy forces, on July 9.

German East Africa, the most important colony in Africa, gave the British far more trouble than any of the others. During August, 1914, some successes fell to the British—for example, they demolished, August 13, the port of Dar-es-Salaam—but they decided to remain on the defensive, waiting for troops from India. These arrived November 1, and lay off the German port of Tanga. An attack made on the 4th resulted in a decided reverse for the British, who were compelled to reëmbark. The Germans now invaded British East Africa, but were pushed back to Jassin in German territory, where on January 18 they defeated the British, and forced a withdrawal of all outlying posts in that region. They had, as early as September, 1914, invaded northeast Rhodesia, where they came into contact with Belgian troops. General Smith-Dorrien, later relieved by General Smuts, was sent out to take command of the troops in British East Africa and the invasion proceeded from that region, as well as from Nyasa on the south.

The British expedition, commanded by General Jan Smuts, won an important victory at the Kitovo Hills, near the northern boundary of German East Africa. After five days of fighting (Mar. 7–12, 1916) the Germans fell back to a position in the forest along the Rufu River. As a result of the operations that followed, the Germans, although reinforced, were compelled to abandon their positions and retire southward along the Tanga railway.

In September, 1917, the Allies began to tighten the ring around the colony. The Belgians, French, British, and Portuguese were invading it from all sides. All of the seaports were in their hands and Tabora, a strong fortress in the north, was captured (September 1–11), by the Belgians. General von Lettow-Vorbeck, the German commander who held out for such a long time against the Allies, finally surrendered on Nov. 14, 1918, three days after the Armistice was signed.

The Pacific. Japan, as Great Britain's ally, declared war on Germany Aug. 23, 1914, but confined her offensive to Germany's possessions in the Pacific. On August 27, she began the blockade of Tsingtao, and by the end of September, two Japanese armies and a few English troops had completed landing, one on the north and the other with the English at Rozan Bay. The German defenses consisted of three lines, the first of fortified hills, the second of 10 forts, and the third of five. By September 28, the first two lines had been carried, and the siege was begun. On October 31 a general attack was opened on the third line which was occupied November 6. The next day the place was surrendered.

For the capture of the other German islands in the Pacific see the section on *Naval Operations*, below.

NAVAL OPERATIONS

Operations in North Sea and Waters About Great Britain. At the end of July, 1914, the German High Seas Fleet was off the coast of Norway and nearly the whole of the British Grand Fleet lay at Spithead off the Isle of Wight. As the probability of war increased, more and more definite steps were taken to prepare for mobilizing the entire British naval force and putting into commission all ships in reserve and laid up. On August 2, German troops invaded Belgium; on July 29, the British Grand Fleet got under way to proceed to its war base at Scapa Flow. On August 4, Great Britain and France declared war and mobilization of both fleets was directed. Within four hours of the declaration of war, British scouting squadrons were sent towards the German coast, and one submarine flotilla explored the Helgoland Bight.

The German High Seas Fleet, being vastly inferior to the British forces facing it, was hastily withdrawn behind the defenses of the German coast at Kiel and in the Kaiser Wilhelm Canal.

The laying of mines now proceeded with great rapidity. Not only were the German harbors and the vicinity of Helgoland protected but the North Sea was planted with mines where they were most likely to be useful and the passages leading to the Baltic were closed excepting a narrow strip along the coast in Swedish territorial waters, the channels in the mined areas being known only to German and Danish pilots. The separate mine areas were small or narrow but were so numerous as to make navigation dangerous. The British thereupon closed the Strait of Dover by a mined area. They then began a systematic search for German mines, mine layers, and protecting forces, and also despatched their mine-sweeping groups of trawlers as fast as work was found for them. It was in connection with mine planting that the first naval action of the War was brought about. On August 5, H. M. S. *Amphion*, with the third destroyer flotilla, was carrying out a prearranged plan of search when a suspicious ship was reported by a trawler. This was the German mine-layer *Königin Louise,* and she was chased and sunk; but early the next morning the *Amphion* struck a mine and was herself destroyed.

On August 9, protected by the Channel squadron and a special detail of cruisers and destroyers, the first expeditionary force of the British army crossed to France; and thenceforward there was a similarly protected steady stream of transports carrying men, munitions, and supplies.

On August 26, the Eighth Submarine Flotilla, two destroyer flotillas, and their flag cruisers and tenders were ordered to proceed and reconnoitre Helgoland and the waters to the southward. They were followed by the battle cruiser and first light cruiser squadrons. On August 28, the destroyer flotillas, when about 25 miles from Helgoland, and not much farther from Wilhelmshaven, found the enemy in superior force and were compelled to fall back. Admiral Beatty promptly sent the First Light Cruiser Squadron to their assistance, but, as the enemy's force seemed strong, he soon decided to follow with his heavy vessels. The advent of the battle cruisers quickly decided matters. In a short time the German vessels were retiring along the whole front. The light cruisers, *Mainz*, *Köln*, and *Ariadne*, and the destroyer *V-187* were sunk. No British vessels were lost, but the *Arethusa*, flagship of the destroyer fleet, was severely injured and had to be towed to England. The *Queen Mary* was twice attacked and the *Lowestoft* once, by submarines, but the high speed in each case made the attempt abortive. The short range of the torpedoes used in the German submarines was first noticed in these attacks. This action caused the Germans to adopt a purely defensive position.

The month of September was a particularly eventful one. On September 3, the British gunboat *Speedy* was destroyed by a mine and, on September 5, the light cruiser *Pathfinder* was sunk by the German *U-21*, the first surface craft to fall a victim to the dreaded submarine. On September 28, there came an event which startled the world and greatly added to the prestige of the submarine. About daylight that morning, the British armored cruisers *Aboukir*, *Hogue*, and *Cressy* were on patrol duty in the North Sea and steaming at moderate speed in column. At 6.25 A.M., the *Aboukir*, which was leading, was struck by a torpedo from a submarine and began to sink slowly. The *Hogue* and *Cressy* came up to her assistance, stopped and attempted to save life. A little before 7 A.M. a torpedo struck the *Hogue*. She quickly capsized and sank. At 7.15 the *Cressy* was hit by a torpedo and 15 minutes later by another. Some 1460 officers and men lost their lives. All were sunk by the German submarine *U-9*, a 300-ton boat commanded by Kapitan-Leutnant Weddigen. The ease with which he performed his work was due to a lack of a destroyer screen and the folly of the *Hogue* and *Cressy* in stopping their engines in the known presence of submarines. The frightful loss due to this error caused the Admiralty to issue orders forbidding large vessels to proceed to the assistance of others under such circumstances. See section below on *Convoy*, etc., for methods of fighting the submarine.

During the month of October, the Germans lost a destroyer and a submarine; the British, a submarine, an old cruiser, and the dreadnought battleship *Audacious* by a mine. On November 3, Yarmouth and Lowestoft were bombarded. The armored cruiser, *Yorck*, returning from this service, struck a chain of mines entering the Jahde estuary and was sunk.

On the 16th the German auxiliary cruiser *Berlin* was interned at Trondhjem; on the 20th *U-18* was rammed by a patrol boat and foundered; on the 23d, the German destroyer *S-124* was sunk in a collision with a Danish steamer; and on the 26th, the old British battleship *Bulwark* was blown up in Sheerness harbor, due to some form of interior explosion in which her magazines were involved. On December 16, a German battle cruiser squadron bombarded the cities and harbors of Hartlepool, Whitby, and Scarborough. Nearly 100 noncombatants were killed and 500 wounded. These were not fortified places.

On the morning of Jan. 24, 1915, the fast cruiser fleet in charge of Vice Admiral Sir David Beatty, was patrolling in the North Sea. This fleet consisted of the Fast Battle Cruiser Squadron, *Lion*, *Tiger*, *Princess Royal*, *New Zealand*, and *Indomitable;* the First Light Cruiser Squadron, *Southampton*, *Nottingham*, *Birmingham*, and *Lowestoft;* and two destroyer flotillas. About 7 A.M., the cruiser *Aurora* sighted the German light cruiser *Kolberg* and a destroyer flotilla and at 7.25 action began between them. About this time the German fast squadron (Rear-Admiral Hipper), steering northwest, was sighted from the destroyer flotillas. This consisted of the battle cruisers *Derfflinger*, *Seydlitz*, and *Moltke* and the large armored cruiser *Blücher*.. As soon as the information was signaled to Admiral Beatty, he headed for the enemy, which had changed its course to southeast as soon as it perceived the British battle cruisers. At 8.52, the *Lion* (flagship) opened fire on the *Blücher*, the rear ship of the German column, at a range of a little less than 20,000 yards, but did not get a hit until 9.09. The German vessels began to return the fire at 9.14. The *Blücher* had much less speed than the other German vessels and slowly dropped astern. About 10.48 she fell out of line and turned to the northward with a heavy list. The *Indomitable* was ordered to complete her destruction while the others of the British fleet pushed forward after the main body. At 11.03, the *Lion* received a shell in her engine room which disabled her port engine and she hauled out of action. The *Lion* was towed home by the *Indomitable*. The British squadron was now retiring, having pursued the enemy as close as possible to the areas protected by the mine fields and submarines.

On May 1, 1915, the British destroyer, *Recruit*, was sunk by a submarine and a week later the *Maori*, a much larger boat, was destroyed by a mine off Zeebrugge. On May 27, the British auxiliary cruiser *Princess Irene* was blown up in Sheerness harbor, only one of her crew escaping. Early in July *U-30* was accidentally sunk, but was raised within 48 hours and only one of the crew was found dead.

October 1–4, the Belgian coast was bombarded to assist military operations. On October 28, the armored cruiser *Argyle* ran ashore and was wrecked. On November 4, a German submarine of new type (250 feet long) was captured in a British wire net. On November 17, the hospital ship, *Anglia*, was sunk by a mine in mid-Channel with a loss of 100 lives—chiefly wounded men. On November 28, a German submarine was sunk off the Belgian coast by a bomb from a seaplane. On December 30, the armored cruiser *Natal* was destroyed by an internal explosion while at anchor. On Jan. 9, 1916, the *King Edward VII* was sunk by a mine. This battleship belonged to a class that was one of the last and best of the predreadnoughts.

On May 31, 1916, began the greatest naval battle of the War. About four o'clock in the afternoon the British fast battle squadron of seven battle cruisers and four battleships met the German High Seas Fleet of five battle cruisers and 24 battleships off Jutland on the northwest coast of Denmark. The British engaged the enemy but fell back before the vastly superior force in the direction of their main fleet. In this part of the action they lost the battle cruisers *Queen Mary*, *Invincible*, and *Indefatigable*, and three armored cruisers—all of which were sunk; eight destroyers were sunk during the night attacks. The British Grand Fleet came up about six o'clock, and soon afterward the Germans began to retire, pursued by the British. The action continued until after midnight; the night attacks being those of destroyers and submarines chiefly. The German losses included the battleship *Pommern*, the battle cruiser *Lützen*, four fast cruisers, and five destroyers. The losses of officers and men were about: British, 5000; Germans, 3500; among the British were Rear-Admirals Hood and Arbuthnot. The Germans were favored by misty weather, the close proximity of their own coast (which injured vessels could quickly reach), and by the fact that a few minutes after the arrival of the main British fleet, mist and darkness obscured them from the enemy.

On June 5, 1916, the British cruiser *Hampshire* was destroyed by a German mine near the Orkney Islands. Lord Kitchener of Khartum and his staff, on their way to Russia, lost their lives.

In August, Admiral Scheer, commanding the German High Seas Fleet, made a sortie in force. He first sent out 12 submarines which he posted in two lines of six boats each across the expected track of the British Grand Fleet—one 15 or 20 miles north of the Tyne and one about twice as far to the south of it. On August 18, the High Seas Fleet put to sea. Admiral Jellicoe had received ample warning of the probability of such a movement and had instant report of its actual commencement so that he was able to start south with the British Grand Fleet soon after Scheer got his force formed outside the German mine fields. Some hours later, British Submarine *E-23* hit the dreadnought battleship *Westfalen* with two torpedoes which injured her so seriously that she was forced to return to her base under escort. But Scheer pushed on, six Zeppelins scouting ahead. After meeting Beatty's battle cruiser squadron, Jellicoe placed it 30 miles ahead and continued on a southerly course calculated to intercept Scheer before he could reach the British coast. About 6 A.M. on August 19, Beatty's light cruiser screen ran into the first line of U boats, which was moving slowly northward. The light cruiser *Nottingham* was hit by two torpedoes and, while endeavoring to make port, was sunk an hour later by a third torpedo. Jellicoe immediately turned and headed north for a short time while the submarine menace could be gauged and dispositions made to meet it. About 6.30, the Harwich forces (Commodore Tyrwhitt), which were scouting for the German fleet, sighted its light cruisers and upon steaming towards them soon discovered the enemy's battle fleet. About 10.30, Jellicoe turned south again, Beatty and the cruiser screen ahead as before. At 12.30 Beatty's squadron was abreast Newcastle and only 42 miles from the German battleships. Scheer, informed of the situation by his airship scouts, then turned to the south, driving Tyrwhitt's light forces ahead of him. At 2.35 he changed course to the eastward and headed for the entrance to the Helgoland Bight. The Grand Fleet ran into the second line of U boats about 3.20 and soon afterwards Jellicoe, deeming it impossible to overhaul the German fleet until long after dark—and then in the vicinity of the Helgoland submarine base—gave up the chase. He sent Tyrwhitt to take up a position north of Terschelling and make a night attack if practicable. The latter proceeded in obedience to orders but as conditions were unfavorable he returned without attacking. Soon after the Grand Fleet turned north, about 5 P.M. the U boats made another attack and succeeded in sinking the light cruiser *Falmouth*. Scheer's objective was undoubtedly the British Grand Fleet, provided his submarines could sink or disable enough battleships to reduce its strength materially. As they failed to do so he retired. With two or three times as many submarines in three or four lines he might have succeeded if the first one or two lines had allowed Beatty's force to pass over them without attack. A second sortie was planned for October; but the resumption of the qualified submarine warfare against commerce (with warning, visit, and search) left no submarines available for service with the fleet and the project was given up.

On the night of October 26–27, 11 German destroyers made a very successful raid in the Channel, destroyed the transport *Queen* (no troops on board) and seven drifters, disabled one other destroyer and, although chased and fired upon, escaped into Zeebrugge.

On November 5, British submarine *J-1* discovered a division of German battleships endeavoring to refloat two stranded U boats. She torpedoed and seriously injured the battleships *Grosser Kurfurst* and *Kronprinz* but they were able to get back to port.

About November 25 the German raider *Moewe* made her way through the blockade and was followed on the 30th by the *Wolf*. On Jan. 9, 1917, unrestricted warfare against commerce (see BLOCKADE, SUBMARINE) was ordered to begin on February 1, but this was not publicly announced until January 31. In February, German destroyers made a raid in the Channel but effected no damage. On March 17, a more successful raid took place. One British destroyer and a merchant vessel were sunk and another destroyer disabled. On the same day the raider *Leopard* attempted to pass through the blockade but was intercepted and sunk. About this time the *Moewe* slipped back through the blockade after capturing 27 ships, one of which she sent into Swinemunde.

On the night of April 20 occurred the sharpest fight of the War in which only destroyers and flotilla leaders were engaged. About 12.45 A.M., the flotilla leaders *Broke* (Comdr. E. R. G. R. Evans) and *Swift* (Comdr. A. Peck), constituting the West Barrage patrol, sighted German destroyers on the port bow 600 yards away. These boats, six in number, were of the latest and largest German type and were on their way back from the Dover coast where they had fired a few shots but effected no damage. The *Swift* tried to ram the leader but failed and passed through the German line, firing a torpedo at one of the rear boats; then, turning, she again attempted to ram the leader which once more eluded her and fled with the *Swift* in pursuit. The *Broke* hit the second German boat with her torpedo and opened a furious fire from every gun that would bear. At the same time she turned to port and rammed the third German, her stem remaining in the hole it made. While thus locked together, the crews fought hand to hand as in old sailing-ship days. Of the Germans who attempted to board, two were captured, several killed and the rest driven back. The *Broke* then succeeded in extricating herself and attempted to ram one of the other Germans; while she failed in this she hit the German's consort with a torpedo. They both started away and the *Broke* attempted to follow but a shell partly disabled her engines, so she gave up the chase and, turning her attention to a disabled German, which was on fire, silenced her guns and sank her with a torpedo. The *Swift*, returning, completed the destruction of the boat the *Broke* had rammed. The British lost 22 killed; the bodies of 28 Germans were recovered; 10 German officers and 108 men were saved and made prisoners.

On May 4, the first division (six boats) of American destroyers joined the British fleet and they were followed within 30 days by three other divisions of the same size. By midsummer the numbers had grown to 35 while dozens more were nearly completed and were despatched as soon as they were finished, commissioned, and supplied. This great addition to the destroyer fleet made a real convoy system possible, but it was not until a year later that the production of destroyers had so much more than caught up with the U boat building as to make commerce and the transportation of troops sufficiently safe to insure German defeat.

During the summer of 1917 the British monitors bombarded the German submarine and destroyer bases at Zeebrugge and Ostend but effected no important results. On July 9 the British dreadnought battleship *Vanguard* was utterly destroyed by an internal explosion while at anchor in Scapa Flow. Ten (and probably eleven) Allied warships were lost in this way during the War. Eight, if not all of them, were using some form of nitroglycerin gunpowder. The Americans, French, and Germans—who used nitrocellulose powders—had no such experiences.

On October 17, at early dawn, the weekly convoy between Lerwick, Scotland, and the Norwegian coast was attacked by two German light cruisers. There were two British and nine neutral vessels convoyed by the destroyers *Strongbow* and *Mary Rose*. The destroyers were sunk in a very few minutes, and only two or three of the merchant vessels escaped. Considering the fact that this convoy made a regular weekly sailing each way, the convoying force was inexcusably weak.

On November 2, a German decoy cruiser lying in wait for British submarines was sunk by a destroyer flotilla and on November 17 an indecisive action occurred off Helgoland. The British had been laying mines in large numbers across the German exit channels through their own mine fields and the enemy's mine sweepers were kept busy in maintaining a clear channel. An attack on the light cruisers scouting ahead of the mine sweepers was made by a British force consisting of the light cruisers *Courageous* and *Glorious*, several other light cruisers, the battle cruisers *Renown* and *Repulse*, and a number of destroyers. But the German battleships *Kaiser* and *Kaiserin* coming up, followed by the battle cruisers *Moltke* and *Hindenburg*, the British retired.

This was followed, on December 12, by a second attack on the Norwegian flotilla (six vessels) convoyed by the destroyers *Pellew* and *Partridge* and four trawlers. The German force consisted of five or six destroyers. The four trawlers were quickly sunk. The *Partridge* was disabled, captured, and sunk. Her officers and men were made prisoners. The *Pellew*, though chased by three of the enemy, escaped in a rain squall. This second catastrophe led to a change in the Norwegian convoy which had its escort greatly strengthened.

On Feb. 15, 1918, the Second German Destroyer Division made a raid into the Channel from Helgoland Bight, sinking seven drifters and one trawler and injuring three drifters and one mine sweeper. They were not discovered by the patrol until too late and they escaped home-ward without injury. In another raid from Dunkirk on March 21, the German destroyers were not so lucky. Instead of trawlers and drifters, they met the flotilla leader *Botha* (1700 tons) and the destroyer *Morris* (1000 tons). The *Botha* rammed a German at full speed and cut it in two. A second German was disabled by the fire of the British boats. Shortly afterward the *Botha* was hit by a torpedo that disabled her engines. The *Morris* chased the other German boats into Ostend. On her return she sank the disabled German and took the *Botha* in tow.

On the night of April 22–23 occurred one of the most daring feats of the War. This was an attempt by the British navy to close the inner channels of Zeebrugge and Ostend by sinking in them old cruisers whose holds were half filled with concrete. The force consisted of the old 5750-ton cruiser *Vindictive* carrying a landing party of several hundred sailors and marines; the ex-ferry steamers *Iris* and *Daffodil* carrying some hundreds more; the old 3400-ton cruisers *Thetis*, *Intrepid*, and *Iphigenia*, with holds half filled with concrete; several patrol boats fitted to make a heavy smoke screen; many motor boats and launches for scouting, laying navigation lights, carrying off survivors, etc.; lastly, three destroyers, one carrying Admiral Keyes, commander-in-chief of the district. The destroyers were not expected to join in the blocking operations or in the attack but were designed to keep off German destroyers and to sink any trying to escape. Just at midnight the Zeebrugge breakwater was sighted 400 yards away and the cruisers and ferryboats started in at full speed followed by the small craft. A moment later they were discovered by the enemy who opened on them with heavy and machine guns on the shore and breakwater. In five minutes the *Vindictive* had her bow secured to the breakwater but had to have the *Daffodil* force her stern in on account of the sweep of the tide. The gangplanks—18 in number—were promptly placed but the rolling of the ship made them difficult to use, the men having to jump, drop, or get ashore as best they could, carrying their rifles, machine guns, bombs, etc. Meanwhile the enemy's fire was terrific. The naval captain commanding the bluejackets of the landing party and the colonel commanding the marines were killed before they could get ashore, as were many of their officers and scores of their men. The commander, executive officer, and senior lieutenant of the *Iris* were killed and the officer next in rank was wounded. A shell, exploding between decks among the 56 marines waiting there to go ashore, killed 49 and wounded the other seven. Altogether the *Iris* lost eight officers and 69 men killed and three officers and 102 men wounded. The guns of the *Vindictive* swept the mole and behind their barrage the landing party advanced, driving the Germans before them or into the water. After 15 minutes of desperate fighting the breakwater was cleared, its guns silenced, and the long row of hangars and storesheds set blazing or blown up. An old submarine loaded with explosives was now driven under the viaduct leading to the shore, abandoned and blown up, the Germans who were still firing from the viaduct going up with it. The way was now clear for the concrete ships and 10 minutes later they rounded the end of the mole and drove straight for their objective under fire that was still heavy. The leading ship fouled the wire nets in the channel so she had to be sunk too far out to be of much use, but she cleared the way for the others which were sunk in the narrowest part of the channel, one heading east and one west. It was still possible to work small submarines and torpedo boats around the sunken hulls, but destroyers and large craft were barred. Notwithstanding the heavy fire directed at them practically all of the officers and crews of the concrete ships escaped and were picked up by small craft. The *Vindictive* and her consorts then gathered up their wounded and unwounded and put to sea. Two less well-planned attacks on Ostend failed to secure results of importance.

On Apr. 23, 1918, the German High Seas Fleet made its last sortie. This was directed against the Norwegian convoys which had grown greatly in size and now consisted of 25 to 50 merchantmen with a strong convoying force. The Germans arrived off the Norwegian coast a day too soon to catch the westbound ships and two days too soon to catch those bound to the eastward. The *Moltke* had lost one propeller on the way north and, while being towed back by a battleship, though supposedly covered by the returning fleet, she was torpedoed by a British submarine and seriously injured.

Work on the great northern mine barrage (see MINE, SUBMARINE) began early in the year, but shortage of mines, mine-layers, and men delayed a serious prosecution of the work until the arrival of the American mining squadron in May, with many large mine-layers and vast supplies of mines, permitted the operations to be carried on rapidly.

United States Transport Service. As, at the outbreak of the War, very few American troops were ready for foreign service, the lack of adequate means for the transport of large numbers of officers, men, and supplies was not felt; and the facilities grew faster than the demand for them until May, 1918, when the great rush of troops to stem the German advance strained the capacity of transport to the utmost. The first troops were sent in July, 1917, and the convoy consisted of a few cruisers and transports. The Cruiser and Transport Service was then organized and placed under the command of Rear-Adm. Albert Gleaves who rapidly developed it into the most wonderful thing of its kind the world has ever seen. So successful was the convoy system that after its establishment not a single American transport was torpedoed on her eastward voyage when she was carrying troops. On the return trip, with only the crews and a few others on board, three transports were sunk by submarines and one badly injured but able to reach port, total loss of life on the four ships being 138. On the return voyage it was not always practicable to give the same protection as on the eastward trip. The total army personnel carried was 2,075,834, of whom about 83,000 were doctors, nurses, hospital attendants, mechanics, and civilians employed in auxiliary services. In addition, 5,150,000 tons of cargo were delivered in France and England—artillery, ammunition, aircraft, food, clothing and other necessary military supplies. In July, 1918, 306,500 officers and men were brought over and for the other months of the year from May to October the figures were almost equally large. About half the vessels used were American and half British, but four French men-of-war assisted and several neutral vessels were chartered, principally for carrying supplies.

The German Surrender. The terms of the Armistice required Germany to immediately surrender to the Allies 10 battleships, 6 battle cruisers, 6 light cruisers, 2 light mine-laying cruisers, 50 destroyers of the latest types, and all submarines; all except the destroyers and submarines were designated by name. On November 21, the following vessels surrendered to Sir David Beatty, the British commander-in-chief: 9 dreadnought battleships (*Friedrich der Grosse, König Albert, Kaiser, Prince Regent Luitpold, Kaiserin, Bayern, Markgraf, Kronprinz,* and *Grosser Kurfurst*); 5 battle cruisers (*Seydlitz, Moltke, Derfflinger, Hindenburg,* and *Von der Tann*); 5 light cruisers (*Karlsruhe, Frankfort, Emden, Nürnberg, Coln*); 2 light mine-laying cruisers (*Brummer* and *Bremse*), and 49 destroyers. To make up the deficiencies, the dreadnought battleship *König*, the light cruiser *Dresden*, and one destroyer were surrendered on December 4, and on Jan. 10, 1919, the dreadnought battleship *Baden* was sent in place of the battle cruiser *Mackensen* which was not ready for sea. The total number of submarines to be surrendered was 158; of these, 87 reported to Rear-Adm. Sir Reginald Tyrwhitt off the Suffolk coast in November; by Jan. 1, 1919, 114 were received.

With the exception of the submarines, all the vessels named or enumerated in the foregoing list were interned in Scapa Flow. The Treaty of Versailles provided that the interned ships be permanently given up to the Allies; that within two months tho 8 dreadnought battleships still in Germany should be given up, also 8 light cruisers, 42 modern destroyers, and 50 modern torpedo boats. It further provided that the German navy was thereafter not to possess more than 6 battleships of a predreadnought type, 6 light cruisers, 12 destroyers, 12 torpedo boats, and was to have no submarines. All vessels under construction and not permitted by the foregoing limitations were to be broken up. No vessels were to be built except to replace allowed units of the fleet—battleships after 20 years, cruisers and destroyers after 15 years. The personnel, including reserves for the fleet and coast defenses, was not to exceed 15,000 officers and men. As soon as the decision of the Versailles Treaty was understood by the Germans to be irrevocable, and one week before it was signed, at 11.15 A.M., June 21, 1919, upon signal from the *Emden*, the German captains at Scapa scuttled their ships. Only four were salvaged, the *Baden, Emden, Frankfort,* and *Nürnberg*. As partial indemnity for this act of treachery, Germany was compelled to deliver to the Allies 300,000 tons of floating docks, her remaining light cruisers (*Graudenz, Königsberg, Pillau, Regensburg,* and *Strassburg*), and 42,000 tons of floating cranes, dredges, and tugs.

Naval Vessels of All Combatants Lost or Destroyed. The accompanying table gives the numbers of the most important vessels (arranged in classes) lost by each of the belligerent navies from Aug. 1, 1914, to Nov. 11, 1918, not including any vessels surrendered by the Armistice or by peace treaties. Tho abbreviations used signify as follows: D. B., dreadnought battleship; P. B., predreadnought battleship; B. C., battle cruiser; A. C., armored cruiser; L. C., light cruiser or protected cruiser; D., destroyer; S., submarine. Numbers marked with an asterisk (*) are approximate.

Nation	D. B.	P. B.	B. C.	A. C.	L. C.	D.	S.
United States	....	....	....	1	....	2	2
Great Britain	2	11	3	13	16	64	54
France	....	4	....	5	....	13	13
Italy	1	2	....	2	2	9	7
Japan	1	....	....	1	3	2	....
Russia (to 1–1–'18)	2	2	....	2	1	18	15 *
Germany	....	1	1	6	17	68 *	208 *
Austria	2	1	....	....	3	6	11 *
Turkey	....	2	....	....	1	3	....

The merchant ships of the Allies and neutrals sunk by submarines during the course of the war totaled 4837, divided by years as follows: 1914, 3; 1915, 396; 1916, 964; 1917, 2439; 1918, 1035. During the same period surface craft sank 177 merchantmen, and mines accounted for 497 vessels. The total tonnage of the ships sunk by submarines, surface craft and mines amounted to 12,739,000. The peak year was 1917, when more than 6,000,000 tons were sunk. According to British Admiralty reports, 189 enemy submarines were sunk.

Convoy and Other Antisubmarine Defense Measures. The principle of protecting noncombatant vessels by means of accompanying warships is as old as recorded history and has been used to some extent in almost every naval war. In the World War, for various reasons, its adoption was delayed—except for cross-Channel transport—until the submarine sinkings reached a point that demanded the better use of every method to reduce the destruction. The system of patrolled routes in which cruisers, destroyers, and patrol vessels moved back and forth along the lines of traffic was found to be wholly ineffective. General convoy was opposed by the British Admiralty, tho officers of the Grand Fleet, and owners and captains of merchant vessels. Suitable escort vessels were inadequate in number, and so many destroyers—by far the most efficient escort craft—were needed for naval operations that few were left for other purposes; but the urgency of the situation forced the naval authorities to detach as many of them from the fleet as could possibly be spared. The owners of fast merchant vessels agreed, after considerable grumbling, to the delays made necessary by convoy, and the dissenting captains were forced to accept the convoy system, which entailed much additional care in steering, speedkeeping, etc. The available British destroyers were reinforced in May, 1917, by 24 from the United States Navy. Additional ones were constantly arriving from the United States and new British boats were being completed so that, notwithstanding the withdrawal of many United States boats to protect American troopships, the number available for general British convoy increased from 29 in January, 1917, to 139 in November, and continued to grow. After the system got in full working order in the summer of 1917, the amount of tonnage sunk each month, with some slight fluctuations, decreased steadily to the end of the War.

In most convoys the train (i.e. the vessels being convoyed) consisted of 12 to 40 ships—preferably 25 to 35—arranged in three or more columns. The distance between ships in each column was usually 500 yards and the interval between columns 800 yards, but these figures were sometimes increased in bad weather or under special circumstances. The escort of the earlier convoys consisted of two destroyers, a wholly inadequate force which offered no protection against the weakest of German cruisers or destroyer divisions (usually five boats) and very little against submarines. Cruisers, acting as a covering force for the convoy, were always on patrol in its vicinity, but they frequently failed to arrive until after the escorting destroyers had been sunk or driven off and a heavy toll taken of the ships convoyed. Later convoys had an escort of 6 to 12 destroyers distributed ahead, on each beam, and astern. British convoys were assembled in certain ports and placed in charge of a naval officer, called "commodore of convoy," who took passage in one of the ships with his staff and returned in the escort when the convoy broke up 200 to 400 miles off shore. He received reports of danger and directed the course, speed, and steering. The American troopship convoys were usually accompanied by a regular naval cruiser, the captain of which acted as commodore of convoy. As the captains of most of the troopships were officers of the navy or of the naval reserve, a high degree of convoy efficiency was obtained and this was an important factor in the wonderful success of the work. The "zig-zag" method of steering used when in submarine-infested waters, or when a submarine was sighted, consisted in an irregular and frequent change of course of one to two points on either side of the regular course. This seriously interfered with a submarine's calculations and compelled it to get very close to the target (and therefore within easy sight and range of the destroyers) in order to have any reasonable probability of scoring a hit. Another means of deceiving the submarine as to the course steered by a vessel was camouflage painting, which also added much to the difficulty of sighting a ship and identifying her character; for these reasons it was very generally adopted by both war vessels and merchant ships. A camouflaged ship resembled a huge futurist painting of nothing in particular, the stripes, areas, colors, and lines so breaking up the picture as to render it almost impossible to make out the actual contours of the hull and upperworks except at close range or under exceptional conditions of light and background. Smoke screens, much used by destroyers in naval actions, were occasionally employed by merchant vessels, especially when not under convoy. They were produced by special handling of the fires under oil-burning boilers or by chemicals.

Operations in the Baltic. As soon as the relations with Russia became strained, German ships began to patrol the coast from Memel to the Gulf of Riga. Mine laying by Germany and Russia began in the Baltic at least as early as in the North Sea. On August 27, the German cruiser *Magdeburg* ran ashore in a fog on the Island of Odensholm and was blown up to avoid capture by an approaching Russian naval force. On December 12, the German armored cruiser *Friedrich Karl* was sunk by a mine and on the 25th the old cruiser *Hertha* and a mine layer were attacked by Russian cruisers and sunk. The Russian submarines were now becoming effective and, notwithstanding the ice, were cruising in the Baltic, although the ice interfered with prosecuting operations of importance during the remainder of the winter and in the early spring.

On July 2, 1915, a Russian cruiser squadron drove off a German light cruiser and several destroyers and forced the mine layer *Albatross* to run ashore in a sinking condition. British submarines had now reached the Baltic in considerable numbers, passing under the mine fields or through the Sound and along the Swedish coast. Their presence acted as a strong check on German operations, especially after the German armored cruiser *Prinz Adalbert* was sunk (October 23) off Libau. On November 7, a British submarine sank the German cruiser *Undine*, and on December 19, another submarine sank the *Bremen* and a torpedo boat.

No operations of importance occurred during 1916 and early in 1917 the Russian Revolution left the control of the Baltic entirely in the hands of the Germans.

Operations in the Mediterranean. On the day after war was declared, the German naval force in the Mediterranean bombarded undefended seaport towns in Algeria, the battle cruiser *Goeben* firing upon Philippeville and the light cruiser *Breslau* upon Bona. These cruisers arrived in the Dardanelles on August 10. To avoid immediate trouble for the Ottoman authorities they were supposedly sold to Turkey and renamed *Sultan Selim Javuz* and *Medillu*, but they continued in command of German officers and retained a part at least of their German crews.

On August 9, Austria declared a blockade of the Montenegrin coast and bombarded Antivari. About the same date French and British fleets established a blockade of the Austrian coast at the Strait of Otranto. The Austrians had placed mine fields all along their coast. About the middle of August, Allied forces swept up the Adriatic, driving the Austrians to the northward. They then attempted to take Cattaro for a naval base, but lacked the military force for a garrison and shore operations, and therefore failed.

The peculiar behavior of Turkey and the mining of the Dardanelles caused a British force to be maintained in that region. While on this duty the armored cruiser *Warrior* ran ashore and was injured on September 7. On the 10th, Turkey abrogated the capitulations with foreign governments and during the latter part of October permitted her vessels to sink Russian ships of war and to attack Odessa. De facto war was begun by the Entente Allies on November 1. On November 21, the French submarine *Curie* was sunk while scouting along the Austrian coast. On November 24, Italy landed a force at Avlona to assist her protégé Essad Pasha against the Albanian insurrectionists.

On February 24, 1915, the French destroyer *Dague* was sunk by a mine off Antivari. On April 26, the French armored cruiser *Léon Gambetta* was torpedoed by the Austrian submarine *U-5* and sank in 10 minutes.

On May 24, Italy declared war on Austria; on the same day Austrian torpedo boats, supported by the light cruiser *Novara*, made a raid on the Italian coast, where they were first met by Italian destroyers and finally driven off by Italian cruisers. The Italian destroyer *Turbine* was sunk early in the action. On June 10, the Italians captured Monfalcone with its shipbuilding yards. The advent of Italy into the War completed the control of the Adriatic by the Entente Allies and, on July 6, Italy clinched the situation by a proclamation closing it to all merchant vessels not possessing special permits. Operations of the Austrian submarines were much hampered by the destruction of their base on Lagosta Island by the French destroyer *Bisson*.

On September 28, a fire broke out on the Italian battleship *Benedetto Brin* while she was lying at anchor in Brindisi harbor. The fire was quickly followed by an explosion which destroyed the ship.

During the month of December, 1915, the Italians landed a large force of troops in Albania. The expedition was most efficiently guarded against submarines and the only losses were the destroyer *Intrepido* and the troopship *Rè Umberto*, which struck drifting mines. In January, 1916, a cruiser of the *Novara* type was sunk by the French submarine *Foucault*.

The Italian dreadnought, *Leonardo da Vinci*, blew up in the harbor of Taranto on August 2. The British transport, *Franconia*, was torpedoed on October 5, and on October 9, the French auxiliary cruiser, *Gallia*, was similarly sunk. The British ship *Britannic* was sunk by a mine in the Ægean Sea on November 21. On December 11, the Italian battleship, *Regina Margherita*, struck a mine and sank and 675 lives were lost.

The naval operations in the Adriatic during the year 1918 were very active. On Dec. 9, 1917, Italian torpedo boats made a raid on Trieste, and sank the small battleship *Wien* (5500 tons), and injured another of the same class. On April 22, in a fight between two British and five Austrian destroyers, the former were reënforced, and the latter retreated to Durazzo, with the British in pursuit. On June 10, 1918, the Austrian battle fleet of four dreadnought battleships, accompanied by cruisers and destroyers, while on its way to make a demonstration in force against the Otranto barrage, was attacked by two small Italian torpedo boats which sank the battleship *Szent Istvan* and seriously injured the *Prinz Eugen*, a sister ship.

Operations in the Black Sea and Dardanelles. The first operations took place on October 29, when the Turkish squadron, including the *Sultan Selim Javuz* (ex-*Goeben*) and *Medillu* (ex-*Breslau*) bombarded several Russian ports. A destroyer entered Odessa harbor, torpedoed and sank the gunboat *Donetz* and badly injured the *Kubanetz* (a sister to the *Donetz*), and four merchant steamers. On the same day the *Medillu* bombarded Theodosia, seriously injuring the cathedral and other buildings. On their way to Sebastopol the Turkish destroyers sank the Russian mine layer *Pruth*. The next day (October 30), accompanied by destroyers, the *Sultan Selim* bombarded Sebastopol. By the return fire of the forts she was so badly injured that the admiral collected the squadron and returned to Constantinople.

During January, 1915, the Russian fleet sank several Turkish vessels in the Black Sea, including a number of troopships and transports, and shelled the Turkish naval station at Sinope. On the 17th the French submarine *Saphir* was sunk by a mine in the Dardanelles. About the middle of February, the combined British and French fleets began their fruitless attempt to force a passage of the Dardanelles. No operations in the whole course of the War were so poorly conceived and so inefficiently carried out. It is hard to understand the folly of the British government in embarking upon such an expedition. If there is one thing that is well understood in naval war it is the absurdity of attacking strong forts by ships, especially without adequate military support. Even if the ships can drive out the garrison it will return as soon as the bombardment ceases. Unless the fortifications are badly placed, they cannot be wholly destroyed and the ravages of bombardment can be largely restored by a few days' work. Permanence of victory can only be obtained by occupying the works as soon as the defenders are expelled (see MILITARY OPERATIONS).

As already stated, the operations began in February. Several bombardments of the forts were carried out and considerable injury inflicted upon them. The ships, much hampered by bad weather outside, then entered the straits for closer work. On March 18, the British battleships *Ocean* and *Irresistible* and the French battleship *Bouvet* were sunk by mines and the British battle cruiser *Inflexible* badly injured by gun fire. The plan of forcing the passage by battleships was then given up, and the second phase of the operations soon began. Late in April the British and French troops were landed under fire at the Dardanelles. On May 12, the British battleship *Goliath* was sunk by a Turkish destroyer in a night attack; the battleships *Triumph* and *Majestic* were sunk by submarines a few days later, the former on the 25th, the latter on the 27th. The British submarines were very active at this time in the Black Sea and Sea of Marmora, sinking many vessels, chiefly transports and troopships, but on August 8 they sank the old Turkish battleship *Kheyr-ed-din Barbarossa* and the Turkish gunboat *Berk-i-Satvet*. In June, the German *U-51* was sunk in the Black Sea and the German submarine base at Smyrna destroyed.

About August 1, the French submarine *Mariotte* was sunk. During the summer many British transports and troopships were destroyed by German submarines, the most important being the troopship *Royal Edward*, which was sent to the bottom on August 14 with the loss of 800 lives; but the sinking of the troopships *Ramazan* (British) and the *Marquette* (French) were disasters almost equally great. In the Black Sea the Russians seemed to have been unable to blockade or capture the *Medillu* (ex-*Breslau*) or the *Hamidieh*. In October, the *Sultan Selim Javuz* (ex-*Goeben*) appeared again in the Black Sea but accomplished nothing of importance and seemed to be partly disabled.

The Dardanelles operations were now admitted to be a failure, and the British began to transfer their troops to Saloniki. The operations in the Black Sea still continued but by the summer of 1916 had become of no special importance, since the Turkish navy had for a time been reduced to impotence. On Oct. 20, 1916, the *Imperatritsa Marie,* a Russian dreadnought, blew up.

At the outbreak of the Bolshevik revolution, many of the officers and men of the Black Sea fleet refused to recognize the authority of the Bolshevik leaders, Lenin and Trotsky. This resulted in several battles between the two factions which usually ended disastrously for the anti-Bolshevik group. The ships were surrendered to the Germans on June 10, 1918. The Turkish cruiser *Medjidieh,* which had been sunk in action, and afterwards raised and repaired by the Russians, was returned to the Turks.

Cruiser Operations in Atlantic, Pacific, and Indian Oceans. At the outbreak of war the only German vessels beyond the reach of home ports were the battle cruiser *Goeben,* the armored cruisers *Scharnhorst* and *Gneisenau,* the fast cruisers *Karlsruhe, Breslau, Emden, Dresden, Nürnberg, Königsberg, Leipzig,* and *Breslau,* and a number of small cruisers and gunboats. To these were quickly added several fast merchant steamers, the *Kaiser Wilhelm der Grosse, Kronprinz Wilhelm, Prinz Eitel Friedrich, Cap Trafalgar,* and *Spreewald.* These had their armaments on board or in German colonial ports.

The operations of the *Goeben* and *Breslau* are described elsewhere in this article. The *Scharnhorst* and *Gneisenau* were, after the *Goeben,* the most important vessels on the list and were under the command of Vice Admiral Count von Spee, the only German flag officer outside of European waters. After the commencement of hostilities these vessels were first heard of at Tahiti, where they bombarded the port of Papeete and sunk the French gunboat *Zélée.* The *Nürnberg,* after cutting the America-Australia cable at Fauning Island, joined Von Spee's squadron. He then proceeded to the west coast of South America, where he met the *Dresden* and *Leipzig.* On the afternoon of Nov. 1, 1914, Rear-Adm. Sir Christopher Cradock, with a squadron consisting of the armored cruisers *Good Hope* and *Monmouth,* the fast light cruiser *Glasgow,* and the armed merchant steamer *Otranto,* was off the Chilean coast searching for German cruisers. The old battleship *Canopus* was near at hand and proceeding to a rendezvous to join the squadron. About 4.20 P.M. smoke was seen to the northward and soon afterward Von Spee's squadron, consisting of the *Scharnhorst, Gneisenau,* unarmored cruisers *Dresden, Leipzig,* and *Nürnberg,* was sighted heading south. At 7.03, the enemy opened fire at about 11,500 yards, quickly followed by the British. The superiority of the German ships was at once apparent. At 7.50 a tremendous explosion occurred on the *Good Hope* amidships, the flames reaching an altitude of 200 feet. The *Monmouth* was already out of action, down by the head, and leaking badly. Darkness and a rain squall coming up made the pointing of the guns very difficult, so Von Spee signaled the light cruisers to attack the enemy's ships with torpedoes. The *Good Hope* could not be found and had probably gone down, but the *Nürnberg* discovered the *Monmouth* and, by gun fire at close range, caused her to capsize. In the darkness and thick weather the *Glasgow* and *Otranto* got away without difficulty.

The British Admiralty immediately took steps to meet the situation by secretly despatching a squadron under Vice Admiral Sturdee in pursuit of Von Spee. This consisted of the battle cruisers *Invincible* and *Inflexible,* the armored cruisers *Carnarvon, Cornwall,* and *Kent,* the fast cruiser *Bristol,* and the *Macedonia,* supply steamer. At some rendezvous on the South American coast they were joined by the *Canopus* and *Glasgow.* About 8 o'clock on the morning of December 8, while Sturdee was coaling in the Falkland Islands, the leading ships of the German squadron were sighted. Knowing nothing of the battle cruisers, the Germans came leisurely on, apparently intent on destroying the wireless station. At 9.20, they were within 11,000 yards, and the *Canopus,* still at anchor, opened fire on them over the lowland. They then turned to the southeast to rejoin the main body which immediately proceeded to the eastward at full speed. At 9.45, the British squadron came out and started in chase. About 1 P.M. the *Invincible* and the *Inflexible* began firing on the rear ships of the German column and a little later were able to reach the armored vessels and leave the others to the cruisers. At 4.04, the *Scharnhorst* began to list heavily to port and at 4.17, sank with all hands. The *Gneisenau* continued the hopeless fight, though after 5 o'clock she was hors de combat. At 6 P.M., she heeled very suddenly and sank. Of the German light cruisers, the *Leipzig* was sunk by the fire of the *Glasgow* and *Cornwall* about 9 P.M., and the *Nürnberg* by that of the *Kent* at 7.27. The *Dresden,* which escaped, was discovered off the island of Juan Fernandez on Mar. 14, 1915, by the *Glasgow, Kent,* and auxiliary cruiser *Orama.* After an action of five minutes' duration she surrendered, but was on fire and soon afterward blew up.

Of all the German cruisers the *Emden* had the most spectacular and successful career. On August 1, she left Tsingtao. During her remarkable career of 94 days, the *Emden* captured or sank 30 vessels, destroyed $25,000,000 worth of the enemy property, almost paralyzed the commerce of the East, and had 19 war vessels of the enemy seeking her. She was finally compelled to run ashore on the Cocos Island by the *Sydney* on November 9.

The *Königsberg* was less successful. After a cruise of two months along the South African coast, in which she destroyed several British merchant ships and the small cruiser *Pegasus,* she was blockaded in the Rufiji River, German East Africa, where she was destroyed by a British expedition on July 11, 1915.

Of the German armed merchant steamers, the *Spreewald* was captured by the armored cruiser *Berwick* on September 12. The *Kaiser Wilhelm der Grosse* had a still shorter career, being sunk on Aug. 27, 1914, by the British cruiser *Highflyer.* On October 14, the *Cap Trafalgar,* which was beginning to interfere with the British trade to South America, was sunk by the British armed steamer *Carmania,* late of the Cunard line. The *Kronprinz Wilhelm* and the *Prinz Eitel Friedrich,* after long and successful cruises as commerce destroyers, entered United States waters and were interned at Norfolk.

Immediately after war was declared, the Entente Allies began perfecting arrangements for the capture of German colonies. On August 7, Togoland was seized by land forces. On August 27, Japan declared a blockade of Kiaochow, and on November 7, Tsingtao, the German stronghold in China, surrendered to the Allied forces, chiefly Japanese. Early in August, a New Zealand expedition sailed for Samoa. At Noumea, the convoy, which was a weak one, became strengthened by the battle cruiser *Australia* and the cruiser *Melbourne* of the Australian navy, and the French armored cruiser *Montcalm*. The expedition arrived at Apia on August 29 and the German governor surrendered at once, as he had practically no means of resistance. On its return from Samoa, the Australian squadron captured Herbertshöhe, the capital of the Bismarck Archipelago, and, on September 27, took possession of the town of Friedrich Wilhelm in Kaiser Wilhelmsland (German New Guinea). During September and October, Australian and Japanese expeditions seized the remaining German possessions in the Ladrone, Marshall, and Caroline Islands.

For a technical discussion see NAVIES; BLOCKADE, SUBMARINE; BOMB, DEPTH; MINE, SUBMARINE; ROSYTH; SCAPA FLOW; GUNNERY, NAVAL; MINE, SUBMARINE; VESSEL, NAVAL.

AËRIAL OPERATIONS

The outbreak of the War found the Great Powers of Europe ready and anxious to make immediate application of aëronautics to their respective military and naval operations. That all were inadequately prepared on the score of equipment and trained personnel the opening weeks of the war soon showed, and early the demands likely to be made on the aërial services were clearly indicated. But in no field did developments follow more rapidly, and as early as the Germans undertook the invasion of Belgium and France it was realized that aëroplane and airship had worked materially to change the nature and scope of military operations and to render obsolete tactics and movements that long had prevailed in warfare. By affording to scouts and intelligence officers a complete view of the enemy's territory, the disposition and movement of his troops and fleets, and his permanent or even most temporary defenses, surprise or flanking movements were rendered practically impossible. With both sides adequately informed as to the forces of their adversaries through constant aërial scouting and reconnoissance, the tendency towards trench fighting and the protracted sieges and bombardments of the Western front was as pronounced as it was inevitable. The direction and control of fire from an observation or kite balloon or aëroplane early became an indispensable feature of the work of the artillery. The tactical changes wrought by the use of aircraft were stupendous, and the service of security and information by aërial observers and range finding for the artillery became essential features of the everyday work of the forces in the field. In addition there were raids by aëroplane and airship to drop explosive or incendiary bombs on fortified positions, moving columns, railway trains, supply dépôts or munitions works, or on warships, submarines, and transports.

Such activities on the part of the airmen soon became so valuable in a military sense that the prevention of these efforts was essential, and this naturally led to the development of the purely combative side of aërial warfare, which soon passed from individual duels in the air to savage actions often at close range participated in by a number of aëroplanes of different types, where battle tactics of an elementary form were evolved as a result of training and drill to secure harmony of action.

Naturally this led to increased armament and armoring of the aëroplanes, and the calibre of the rapid-fire gun that soon took the place of the automatic pistol became greater, so that an air battle was indeed a serious matter, and the protection of fuel tanks and machinery and the design of machines to withstand as much penetration of the wings as possible figured prominently, as indeed did the entire question of design and construction for power, carrying capacity, speed, ease of manœuvring, and general reliability. Remarkable advances were realized, together with wholesale demands which taxed the facilities for manufacture in the belligerent nations as well as in America.

Flying corps existing in armies and navies on the outbreak of the War were greatly augmented and preparations made to train vast numbers of aviators. It was estimated that the various belligerent nations at the outbreak of the War possessed about 5000 aëroplanes and 109 dirigibles. Naturally Germany, where 12 Zeppelins and about 23 Parseval and Gross airships and about 1000 aëroplanes were available at the beginning of the War, was preëminent as regards numbers and trained pilots and observers; but here the policy of standardization and organization contributing so much to her efficiency in other fields was not of corresponding avail. A year's service, even less, demonstrated that much of the equipment so carefully assembled and standardized soon became obsolete and inferior with respect to the rapid developments that war conditions were bringing out for the Allies.

While the Germans had trained men in their aviation corps, the French, with perhaps 31 airships of nonrigid or semirigid types and possibly 1200 military aëroplanes of different designs, had fewer enrolled aviators at the outbreak of the War in actual service, but had a large number of expert civilians and their machines to call upon, so that soon there was organized a body of men whose equipment, both available and rapidly supplied, represented the note of progress ever peculiar to the French in this field. The organization and drill of the various units was done with remarkable military skill and care.

Great Britain, distinctly inferior in organization and equipment as well as numbers, for its aëroplanes hardly totaled 500 and its dirigibles but 15, at the beginning of the War endeavored speedily to repair these deficiencies, and while the defensive efforts to repel the Zeppelin raids were crowned with but moderate success, British aviators at the front and at sea achieved a good record. Russia, with 16 small airships and perhaps 800 aëroplanes, many of which were in poor shape, suffered from inadequacy of equipment, while in Austria and Italy from the outset aërial war was waged by both powers with a fair degree of preparation.

Aërial activities in war became not only important but indispensable under modern conditions, yet they did not have a direct and primary effect on the progress of the War itself, comparable, let us say, to the activities of the submarine. Indirectly the influence of aircraft on warfare proved enormous, but four years of experience indicated that there was but little direct military advantage in the attempts at wholesale destruction of noncombatants, buildings, and material, by airplanes and dirigibles. The numerous air raids over Great Britain resulted in little positive military advantage and the "frightfulness" that they were to inspire soon gave way to a feeling of intense irritation on the part of the invaded.

1914–15. In the early weeks of the War, a Zeppelin dropped bombs over Antwerp, and at the end of August and on Sept. 1, 2, and 3, 1914, Taube monoplanes made daily visits to Paris, where, as in London, all street and other lights were extinguished and means hastily improvised to defend the city by searchlight and anti-aircraft guns, as well as to organize special fire-fighting facilities to deal with the results of incendiary bombs. On Oct. 11, 1914, another raid was made on Paris and bombs were dropped, some of which fell on the Cathedral of Notre Dame, while others damaged streets, sewers, and the underground railway, besides causing the deaths of three persons and injuries to 14. In the meantime the aërial defense of the city was being developed, but on Mar. 22, 1915, another raid was made on Paris, which, while resulting in little damage, nevertheless emphasized the need of a more complete system of defense. This was organized under General Hirschauer, former chief of the aëronautical department, and after it had been developed, Paris was free from attacks for many months.

Naturally an air attack on the British Isles was the goal aimed at by the Germans. Various reconnoissances were made by the Germans in connection with the flights on the Western front and the observation of the British navy. The first serious raid on Britain was on the evening of Jan. 19, 1915, and was directed against Yarmouth, Sandringham, and other points of the Norfolk coast. This raid was but a beginning, for on the night of May 31, 1915, the metropolitan section of London was reached and considerable damage was done, 41 lives being lost, while on June 6, another raid attended by 24 casualties was made on the east coast of England, and again on June 15, on this last 18 persons being killed and 40 injured. The attacks of the Zeppelins reached, perhaps, a climax on September 8–9 when the heart of London was reached, and the Zeppelins flying over Trafalgar Square were distinctly visible from the streets. The casualties of this raid were given as 20 killed and 88 wounded. The material damage was considerable. These raids continued during September over parts of the eastern counties. On October 13–14, London was again attacked by Zeppelins which, fearful of searchlights and gun fire, flew very high with a corresponding effect on the accuracy of their bomb dropping. The roll of casualties included 71 killed and 178 wounded. For a few months there was a lull in the air attacks on Great Britain, but the most serious raid came on the night of Jan. 31, 1915, when nine Zeppelins passed over the midland counties, dropping over 300 bombs. Here 71 were killed and 101 injured.

1916. Beginning Mar. 31, 1916, air raids were made over Great Britain for five successive nights and not only the eastern counties but even Scotland and the northeast coast were visited and bombs dropped. In one of these raids the Zeppelin *L-15* suffered severely from gun fire and was forced to descend and was captured by the British.

The aërial defense of Great Britain came in for considerable criticism both within and without Parliament and unfavorable comparisons with that maintained in France were made. Many Englishmen urged that too much had been done for defense and not enough in the way of offensive movements against the Zeppelins in their home ports and stations.

Such raids as these described stand out apart from their actual military significance, but they must not be allowed to eclipse the daily routine and the ever-increasing number of frequent combats on all the battle fronts of this great War. What was remarkable at the beginning of the War, such as visits of the German Taubes to Paris in August, 1914, or the bomb dropping by a Zeppelin on Antwerp on September 1, of the same year, soon became commonplace as did the bombing of the German hangars at Düsseldorf and Cologne by the Allies later in the month. Attacks on Friedrichshafen by the British and on Freiberg by the French followed, while a British raid on Cuxhaven on Dec. 25, 1914, was an early example of a number of aëroplanes working together. Air attacks and reconnoissances in force became more frequent, ever on a larger scale and with more elaboration of organization as well as with more powerful and more heavily armored machines. Bombing raids by aëroplanes were organized on a large scale by the French, especially with their heavier machines, and many of these were very successful. While both sides continually lost many aëroplanes in actual fighting, the Germans suffered severely with respect to their Zeppelins by accident as well as by gun fire.

Along with brilliant feats of individual aviators there was developed a tendency towards tactical formations and the use of many machines. Aëroplanes were assembled for flight over the enemy lines, difference in speed and armament making possible tactical dispositions of the greatest advantage. The Germans for a time had some machines of superior armament, and from August, 1915, heavier guns and armored aëroplanes figured and operations by flotillas became more general, these including the use of powerful bombing machines accompanied by armored scouts for their protection, and swift flying machines for reconnoitring. Aircraft were also used at sea against warships. Aëroplanes were also in evidence in the south and east, for the Russians attacked Constantinople in August, dropping bombs on the harbor forts, and from this time both sides were in active aërial warfare until the close of the Dardanelles campaign. The Austrians were active against Italy, and bombing raids were made against Brescia, Verona, Venice, Udine, and other points while the Italians in turn made attacks on Austrian territory.

Everywhere there was aërial activity and damage wrought by aëroplanes, yet unavoidably this was accompanied by wholesale destruction of machines and lives of aviators. As samples of air attacks, and in fact but little more here can be attempted, mention may be made of the bombing of a poison gas plant at Dornach on Aug. 26, 1915, by a French aviator, and a bomb attack on the royal palace at Stuttgart, a step, it was announced, taken in retaliation for German bomb dropping on unfortified towns and civilians. In every kind of operations aircraft aided, as at the battle in the attack on Artois, Sept. 25, 1915, when the British airmen were prominent, and later at Verdun in the spring of 1916. Typical of a day's work for the airmen may be mentioned the British War Office report of Dec. 19, 1915, which announced 44 combats in the air on the Western front.

In 1916, everywhere there was increased aërial activity, a more active patrol service was maintained, and actions were frequent and serious. At sea aëroplanes were searching for submarines and scouting, and employment of airships and aëroplanes before and in a large naval battle for scouting and reconnoissance in a manner and on a scale somewhat corresponding to their use on land found a notable opportunity in the great fight off Jutland on May 31, 1916.

1917. In the battle of the Somme and during the great German retreat, General Haig depended on his air service to find out just what the Germans were doing and how far they had retreated. We find the aëroplane possibly used to its greatest advantage in the spring and summer campaigns on the Italian front and during their retreat to the Piave. Fleets of 150 or more machines would fly low to the ground and drop bombs on forming troops, lines of communications, munition dumps, or they would rake the enemy with machine-gun fire. One of the interesting outgrowths of increased air activity was the developing of the "camouflage" system. This means the covering of trenches, artillery and other things of military value with trees, painted scenes, etc., so that they could not be distinguished from the rest of the landscape from the air. This was of particularly great value because aëroplanes were compelled to stay 2 or 3 miles in the air as anti-aircraft guns were improved.

England was the scene of many raids during 1917. Only the more important will be noted here. Between May 23 and June 16, five air attacks were made. In almost all of these the Germans used aëroplanes instead of Zeppelins. In one attack, on May 25, 76 were killed and 174 wounded. The worst raid of the month was on June 13. It was carried out in broad daylight over London and resulted in the death of 159 persons and the wounding of 424. London was again attacked by a fleet of 24 aëroplanes which penetrated all the defenses (July 4); 37 were killed and 141 injured. On August 22, Yorkshire, Dover, Ramsgate, and Margate were raided. The Germans suffered heavily in this raid, losing eight Gotha machines. On the moonlight night of September 4, nine were killed and 62 injured in a raid on London. The defenses of London were now in much better shape and the Germans were compelled to give up their daylight attacks.

Raids were made on England on September 24, 25, 29, 30, and October 1. As a result of these, 52 were killed and 216 injured. The Germans carried them out with scarcely any loss to themselves, the British claiming only to have destroyed two machines. One of the most disastrous raids from the German point of view was made on the night of Oct. 19, 1917. At least 11 Zeppelins participated and on their way home, four were lost in French territory. One was captured undamaged at Bourbonne-les-Bains. On December 6, 25 Gotha planes attacked London, killing 10 and injuring 31. On December 18, 20 aëroplanes raided Kent, Essex, and London, killing 10 and wounding 70. In these last two raids, three planes were forced to descend, and their crews were taken prisoner.

The consensus of opinion among the Allied nations was that these raids were of no military value and were merely another form of Germany's "frightfulness." Public opinion in England demanded reprisals, but for physical reasons the government refused to heed the popular clamor. Instead they gave their attention to the air bombardment of purely military centres such as the submarine bases at Ostend and Zeebrugge and the Krupp works at Essen. France made one or two spasmodic attempts to retaliate by bombarding towns in Alsace and Lorraine, but met with comparatively little success.

With the entrance of the United States into the War, it was felt that as soon as her resources were available the supremacy of the air would pass once and for all to the Entente Allies. She devised the standardized Liberty motor which was supposed to contain in one engine all the best points secured by foreign designers.

1918. On the nights of Jan. 21 and 24, 1918, British aviators carried out successful raids over Belgium and in German Lorraine, dropping bombs on Mannheim, Treves, Saarbrücken, and Thionville. During the month of January the Germans and Austrians were particularly active in carrying out raids over the Italian lines. Treviso and Mestre were bombarded on January 26; Venice, Padua, Treviso, and Mestre, on February 4 and 6, and on the latter date Calliano and Bassano were also bombed.

London was attacked on the night of January 28 and 58 persons were killed and 173 wounded. Another raid the next night killed 10 and injured the same number. On the 30th, Paris was heavily bombarded; 45 persons were killed and 207 wounded. During a raid on Venice on February 26, the Churches of Santa Giustina, San Simeone, Piccolo, and St. John Chrysostom were badly damaged. Naples was attacked on March 11. This resulted in the killing of 16 and the injuring of 40. A raid on Paris on Mar. 8, 1918, resulted in the death of 13 and the injuring of 50. Another raid which occurred on March 11 caused the death of 34 and the injuring of 79. Four German machines were brought down and 15 Germans killed or captured.

Italian aviators coöperating with the Allies on the Western front bombed Metz on Mar. 17 and 23, 1918, and raided the railway station at Thionville on the night of March 24. Paris was again the objective on April 12, when 26 were killed and 72 wounded. Italians raided Pola, Trent, and Trieste on May 10, and British forces coöperating with them attacked the aviation grounds at Campo Maggiore (May 4) and destroyed 14 machines.

On May 3, 1918, the British bombarded Karlshütte and on May 16 brought down five German machines during an attack on Saarbrücken. British seaplanes attacked Ostend, Westende, and Zeebrugge successfully on May 6. London was again attacked on May 19, with a casualty list of 44 killed and 179 wounded; the British succeeded in bringing down five German aëroplanes. In an air raid over Cologne on May 18, 14 persons were killed and 40 injured. Raids were carried out by the Allies over railway stations in Lorraine and on a factory in Mannheim on May 21 and 22. The railway station was destroyed and 26 persons were killed in Liége on May 26.

On June 14, 1918, the first American bombing squadron to operate behind the German front raided the Baroncourt Railway and returned safely. A second raid was carried out the same day when Conflans was attacked. On the night of Oct. 9, 1918, an expedition of more than 350 planes bombarded many towns in the American sector, with the loss of only one man. American activity in the Argonne sector was particularly noticeable. During a six-month period before the signing of the Armistice it is estimated that the American fliers brought down over 500 planes with a loss of about 70.

German Zeppelins again appeared in the rôle of raiders on the night of Aug. 5, 1918, when they made an attempt to raid the east coast of England. One machine was brought down 40 miles at sea, another was damaged, and the third was compelled to return. On the 12th, a Zeppelin was destroyed off the English coast. It fell in flames.

During the War the air raids on England caused the death of 1413 people and the injury of 3407. The vast majority of these were civilians. One hundred and ten raids were carried out by airships and aëroplanes. For a general discussion of aëroplanes and airships see AËRONAUTICS.

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WORLD-WAR CASUALTIES. The loss of human life was greater in the War of 1914–18 than in any previous conflict recorded by history. Almost twice as many men were killed as in all the wars from 1790 to 1913 inclusive. Among the major belligerents, Germany and Russia suffered the greatest loss in men killed and wounded, but in proportion to population, France paid an even heavier toll than Germany. That the Allies collectively suffered so much more heavily than the Central Powers was due to the fact that at least during the early stages of the War, the Central Powers were much better equipped with machine guns and artillery, whereas Russia, the heaviest Allied loser, sent her men into battle ill equipped, often without artillery support and sometimes without ammunition. The accompanying table gives a summary of military casualties for all countries.

In a few cases, notably for Turkey and Russia, only approximate estimate can be given. The figures given in the column headed "Wounded" do not indicate the number of different individuals wounded, since many individuals were wounded several times and hence were repeatedly listed as casualties. A fairly high percentage, however, of wound casualties resulted in permanent and serious injury. In the case of France, for example, the *mutilés*, or war cripples, numbered 740,000. If France be taken as typical, it is obvious that the number of men killed, permanently crippled, or permanently injured by gas, must have been well over 12,000,000.

The proportion of war deaths to the total populations of the belligerent nations was estimated as follows: Serbia, 1 to 12; France, 1 to 28; Germany, 1 to 32; Austria-Hungary, 1 to 50; England 1 to 57; Italy, 1 to 79; Russia, 1 to 107; United States, 1 to 2000. The percentage of deaths per 100 men mobilized was undoubtedly the highest of any war for which records are available, with the possible exception of the Crimean War. More than four-fifths of the losses in the Crimea, however, were due to disease, while in the World War, disease deaths were inconsiderable, as compared with battle deaths.

Country	Men mobilized	Killed and died [a]	Wounded	Prisoners and missing	Total casualties	Casualties in percentage of total mobilized
Russia	12,000,000	1,700,000	4,950,000	2,500,000	9,150,000	76.3
France	8,410,000	1,357,800	4,266,000	537,000	6,160,800	73.3
British Empire	8,904,467	908,371	2,090,212	191,652	3,190,235	35.8
Italy	5,615,000	650,000	947,000	600,000	2,197,000	39.1
United States [b]	4,355,000	126,000 [c]	234,000 [c]	4,500	350,300	8.0
Japan	800,000	300	907	3	1,210	0.2
Rumania	750,000	335,706	120,000	80,000	535,706	71.4
Serbia	707,343	45,000	133,148	152,958	331,106	46.8
Belgium	267,000	13,716	44,686	34,659	93,061	34.9
Greece	230,000	5,000	21,000	1,000	27,000	11.7
Portugal	100,000	7,222	13,751	12,318	33,291	33.3
Montenegro	50,000	3,000	10,000	7,000	20,000	40.0
Total, Allies	42,188,810	5,152,115	12,831,004	4,121,090	22,089,709	52.3
Germany	11,000,000	1,773,700	4,216,058	1,152,800	7,142,558	64.9
Austria-Hungary	7,800,000	1,200,000	3,620,000	2,200,000	7,020,000	90.0
Turkey	2,850,000	325,000	400,000	250,000	975,000	34.2
Bulgaria	1,200,000	87,500	152.390	27.029	266,919	22.2
Total, Central Powers	22,850,000	3,538,315	8,388,448	3,629,829	15,404,477	67.4
Grand total	65,038,810	8,538,315	21,219,452	7,750,919	37,494,186	57.6

[a] Includes deaths from all causes, in army.

[b] Includes marines serving with army.

[c] Includes 14,500 who died of wounds.

Consult *Losses of Life Caused by War*, by Samuel Dumas and K. O. Vedel-Petersen (Oxford-Clarendon Press, 1923), and *The War With Germany*, by Colonel Leonard P. Ayres (Washington, D. C., 1919).

WORLD WAR DIPLOMACY. War has been defined as the last resort of diplomacy; it is also true that diplomacy is the handmaid of warfare. Diplomatic manœuvres, that is to say, are necessary to support armies and navies, and the inverted maxim, "In time of war prepare for peace," is truer than in its original form. The magnitude of the World War, its long duration, the number of belligerents, and its far-flung consequences necessitated diplomacy on a scale almost spectacular, and contrary to the experiences after previous conflicts, the world hardly had to wait at all for a tolerably adequate diplomatic history of the war years 1914 to 1918, for in fact many documents were made available during the actual period of hostilities. In addition to exchanges of views and other communications between nations during the War itself, then parliaments held secret sessions in order that executives might quiet the alarms of the legislative representatives not only as to military situations, but as to diplomatic policies. Following the peace settlement, all sorts of disclosures were made, in official collections of diplomatic documents published by Foreign Offices; in memoirs by diplomats and generals who were concerned about their own reputations and wished to increase their incomes by large royalties; and in the revelations of the Russian revolutionary governments which were anxious to discredit the secret diplomacy of Europe and to strengthen their own argument that modern parliamentary institutions are bankrupt.

Elaborate efforts were made during the War to bring neutrals into the conflict. Discussions were carried on between the members of each group of powers involved as to their war aims and peace terms. Territories in the possession of the enemy were allocated in secret treaties at the same time that there was a brave show of appealing to the people in order to persuade them to accept the ideals and aims which, in public, statesmen professed to be fighting for. Negotiations for peace were conducted while the military situation was stable, and neither group of powers approached exhaustion. Some of these negotiations have been adequately disclosed. Other informal conferences and whispered words were more vital to the world than speeches. In some such cases the pertinent facts have only been meagrely hinted. But it is certain that in the future the question whether peace was missed and whether the War could have been ended before 1918 will be debated as violently as the question of the responsibility for the outbreak of hostilities in August, 1914. Some declarations of war were made without negotiation but were nevertheless slightly delayed. Austria declared war on Serbia July 28 but remained at peace with Russia until August 6. France and Great Britain declared war on Austria on August 10 and 12, but until August 27 Austria was in peaceable relations with Belgium so far as a formal declaration was concerned. Turkey, Japan, and Italy at first remained neutral. They began hostilities later, after mature deliberation. At first, the other Balkan states too were not directly affected. Both the Central Powers and the Entente made strenuous efforts to win over these neutrals or at least to keep them from joining the other side.

Japan. The Anglo-Japanese Alliance, the terms of which were known, seemed to make Japanese support of England inevitable. When hostilities began, the British Ambassador to Japan asked Baron Kato, the Japanese Foreign Minister, whether Japan would aid England. The Cabinet Council was at once summoned, and the next day (Aug. 4, 1914) the Ambassador was told that Japan would not evade her responsibilities. Three days later the British Ambassador told Baron Kato that the situation had developed in such a manner as to require Japan's immediate entrance. The same day Premier Okuma called a meeting of the Genro, "the elder statesmen," and at this conference, it was said, Japan's policy was "definitely formulated" (Kawakami, *Japan in World Politics*, p. 256; New York, 1917). But on August 12 Marquis Okuma still talked of Japan's desire for peace and of the possibility of its being gratified. Japan issued an ultimatum to Germany on August 15, demanding the recession of Shantung, the dismantling of the Tsing Tau forts, and the departure of German warships from Chinese waters. A favorable answer to this ultimatum might have served to keep Japan out of the War, and in view of this possibility the phrase "in accordance with her obligations under the Anglo-Japanese treaty," which was used in the ultimatum, seems rather misleading. Germany rejected the demands, and war was declared. But Montenegro was brought in automatically by the attack on Serbia; the Russian threat against Austria determined Germany's position; the implication of Russia made France's course inevitable, so binding were the European alliances considered. On the other hand, Great Britain's entanglement only required an ultimatum by Japan to Germany, and Japan entered the War three weeks late. The delay had far-flung consequences, such as "the bombardment of Madras, the sinking of a new Blue Funnel liner with £1,000,000 worth of rubber in the Arabian Sea, the annihilation of Sir Reginald Craddock's squadron, with its gallant crews, and the Battle of the Falkland Islands." The Japanese Parliament was summoned in special session Sept. 3–9, 1914, to give its formal authorization for the expenses already incurred for the Tsing Tau expedition and to sign a blank check for additional outlays.

Turkey. The next power to come in was Turkey. There was no hope that the Young Turks would support the Entente, but on the other hand, there seemed a chance that war could be avoided with a power which had always considered one of its interests to be the maintenance of the Turkish Empire. England made promises. If Turkey would remain neutral, the status of Egypt would not be altered; the Entente would protect Turkish independence; the Capitulations would be abolished; and George V expressed to the Sultan his personal regret that Great Britain had commandeered (August 3) two battleships which were being built in England for Turkey. But on August 1 a treaty had been signed between Germany and Turkey. The latter was guaranteed territorial integrity against Russia. Mobilization proceeded, and on October 28 Turkey began naval operations. Three days later Russia declared war. Great Britain annexed Cyprus, and on December 17 she proclaimed a protectorate over Egypt. But the political effects of Turkish hostilities were much greater than these. The full participation of India was assured. Mesopotamia, Palestine, Syria, and Arabia became side shows for the main tent on the European front. In respect of Entente war aims, the entrance of Turkey was of tremendous importance. Russia saw the possibility of realizing her ambitions. As early as November, 1914, she was informed that she might have the Straits. On Mar. 4, 1915, Sazonoff demanded Constantinople, the western coast of the Bosphorus, the Marmora, and the Dardanelles; part of Thrace; the coast of Asia Minor between the Bosporus and the river Sakaria; and islands in the Sea of Marmora. France and Great Britain agreed in general, if their own claims were satisfied; and thus there began a long series of demands and counterdemands for compensations and satisfactions, which were embodied in the Secret Treaties. These agreements were of a piece with the *Realpolitik* against which the Entente professed to be fighting; the secret ambitions were quite inconsistent with the war aims which were publicly professed. They were, moreover, ambitions which had extremely bad effects in the Balkans. In the eyes of Greece, Bulgaria, and Rumania, Turkey might really stand for Balkan independence. The Entente protection of "small nations" apparently was applicable only to Belgium. The little states of the Balkans were to be devoured by Russia.

Italy. The resources of the Entente were greatly increased six months later when Italy entered the War. She had declared her neutrality on Aug. 1, 1914, on the ground that intervention was not demanded by the terms of the Triple Alliance. Vienna, pressed by Berlin, had consented to cede the Trentino and the west bank of the Isonzo. Concessions had also been promised in Trieste and Albania. But these were not sufficient. There was much Italian sympathy for Belgium and Serbia. Sonnino saw that he could make the Central Powers and the Entente bid against each other. Prince von Bülow was called from retirement and was sent to the scene of his former diplomacy to lend his efforts to keeping Italy neutral. Burian succeeded Berchtold as Austrian Foreign Minister, and the concessions were slightly increased. But Sonnino feared both a Teutonic and Jugoslav dominance in the Adriatic; one of these results seemed inevitable whether the Entente lost or won, and if the War ended in a draw, the veteran Italian statesman believed that more could be expected from the Entente, whose statesmen were continually increasing their demands. France and Russia considered the Italian claims exorbitant. The latter particularly objected to the sacrifice of Serbian designs on the eastern coast of the Adriatic. But the diplomacy which looked to the resettlement of Europe was so universally selfish that the Powers could hardly object, when their own interests were not involved, to selfishness in each other. The situation on the western front, moreover, operated in favor of Italy. The Allies were repulsed at Neuve Chapelle and Ypres; the shortage of high explosives was becoming known. Consequently the Entente and Italy on Apr. 26, 1915, signed the Treaty of London. It promised Italy, in addition to the Austrian sacrifices, the southern Tirol to the Brenner Pass, Gorizia, Trieste, Istria, and northern Dalmatia.

Ribot is said to have remarked after a conference with the Italian representatives: "We are lucky that they didn't take our clothes away from us." In return for the high price paid by the Entente, Italy promised to begin hostilities within a month and to prosecute them with all her resources. She pledged herself also to sign the Declaration of London of Sept. 5, 1914, by which the Allies promised that they would not make peace separately. Adhesion was not given until Nov. 30, 1915, although the Triple Alliance was denounced on May 3 and war was declared on Austria on May 23. Italy was technically at peace with Germany until Aug. 27, 1916. The terms of her entrance, furthermore, pledged the Allies to support Italy in preventing the Pope from acting to bring about peace or to settle any questions arising from the war. The only excuse for the treaty was "the familiar plea of necessity," according to Professor Gooch. "Though it increased the material strength of the Grand Alliance, it diminished its moral authority; and Serbia learned within a week of the pact which had disposed of Jugo-Slav territory behind her back." "The French and ourselves were fighting for our lives on the western front," Mr. Asquith said in apology; "and the treaty represented the terms on which Italy was prepared to join forces."

Bulgaria. Greece, Bulgaria, and Rumania now began to be drawn into the conflict. Immediately after the outbreak of the War, Venizelos promised that if the Entente would guarantee Greece against a Bulgarian attack, he would assist them in the event of Turkey's joining the Central Powers. King Constantine on the other hand announced that he would not attack Germany's allies before they attacked him. In December, 1914, the Entente offered South Albania, with the exception of Valona, and in January, 1915, Smyrna, in return for Greek intervention. Venizelos urged that an army corps be sent to Gallipoli; Constantine seemed to be willing. But he changed his mind on the advice of his General Staff, another example of the supremacy of military authorities over the politicians; and Venizelos resigned.

Meanwhile the Allies had been negotiating unsuccessfully for Bulgaria. Noel Buxton, an authority on the Balkans, told Sir Edward Grey early in August, 1914, that armed neutrality might be secured from Bulgaria by a revision of the Treaty of Bucharest and a loan. Sazonoff urged that Bulgaria be given territory in Macedonia, for her position was important. The Central Powers would get full benefit from the Turkish Alliance only if they were joined by Bulgaria. On the other hand if the Entente succeeded in luring Ferdinand, communication with Russia from the Mediterranean would be secured, and Turkey would be cut off. In 1915, when Russia suffered severe defeats in Poland and Galicia and the attack on the Dardanelles proved unsuccessful, the Entente saw that they must offer Bulgaria real compensations. On August 23, under pressure from the Entente, the Serbian *Skuptshina* consented to territorial "sacrifices indispensable for the preservation of the vital interests of her people"; but it was too late. Serbia, indeed, wished to attack Bulgaria; but this, in the opinion of the Entente, would absolve Greece from her treaty obligation to go to the support of Serbia if the latter were attacked by Bulgaria. Ferdinand had by now decided that the Central Powers would win, and he wished to be one of the victors. In

September a military convention was signed. Germany and Austria promised to send 12 divisions against Serbia. Belgrade was entered on October 9, and two days later the Bulgarians crossed the frontier. Venizelos, in office again, promptly asked Great Britain to send 150,000 men and proposed that Greece fulfill her obligations under the treaty with Serbia. Even though Great Britain offered Cyprus for Greek intervention, Constantine determined to maintain neutrality and dismissed Venizelos. Serbia regretted that she had not been permitted to attack two months before; she was in a desperate position and without the support of Greece. Allied diplomacy in the Balkans had certainly failed; Sir Edward Carson resigned from the British cabinet in protest, and Sir Edward Grey may have been correct but was hardly reassuring when he said in a speech on October 14 that diplomacy could succeed only if supported by striking military successes.

Rumania. A year later Rumania, the fifth Balkan state to forsake neutrality, added her forces to those of the Allies after two years' flirtation. Rumania was bound to the Central Powers by a treaty concluded in 1883, but when the Kaiser and the Austrian Emperor promised to assist in obtaining Bessarabia for Rumania if she would join, King Carol discovered that he would not be permitted to fulfill his pledges. In September, 1914, Rumania signed treaties with Russia and Italy and promised benevolent neutrality. In January, 1915, a British loan was negotiated; in February the Italian agreement was renewed. When Italy left the Triple Alliance in May, 1915, Rumania announced her territorial demands, but they were too high. A year later Brusiloff's smashing blow on Austria led Germany to press for concessions to Rumania as the price of her continued neutrality, but Burian refused to yield. Again the Western Front forced the Allies to engage in the Balkan auction. On August 18, a secret treaty gave Rumania the Banat, Transylvania, and the Bukovina to the Pruth—one of the most indefensible ethnical arrangements of the war. Rumania declared war on August 28, but the time was unfortunately chosen. Military secrets had been betrayed; Rumania disregarded Entente advice in attacking Transylvania instead of Bulgaria, although from her own standpoint there was some justification for this policy; the Entente underestimated the forces that Germany could spare; Russian support was meagre and ineffective. Rumania was crushed.

The United States. Immediately on the outbreak of the War, the use of sea power by Great Britain and Germany raised controversies with neutrals, particularly the United States. German commerce was practically driven from the seas, and the United States began to discuss questions of international law relating to British restrictions on American commerce with Germany, and the ever-increasing American trade in munitions, practically all of which went to the Allies. The United States' professed willingness to sell to Germany was only a gesture, since the British navy determined the identity of the purchasers. A war zone was declared by Great Britain on Oct. 13, 1914, when an Admiralty announcement said that His Majesty's government had authorized a minelaying policy in certain areas and that it would be dangerous for ships to cross these limits. Three weeks later notice was given that "the whole of the North Sea must be considered a military area." Ships were warned that they would "be exposed to the gravest danger from mines which it has been necessary to lay." Against this action the United States entered no protest, but England's command of the seas enabled her to afford pilots to American ships and to reduce to a minimum the possibility of disaster so far as the mines laid by her were concerned. The German "war zone" decree which marked the beginning of the controversy with the United States was of a more sinister character.

Submarine Warfare.—Late in 1914 Admiral von Tirpitz said that the submarine would be used to sink merchant vessels in British waters, but the rules of international law enumerating the exceptional cases in which prizes might be destroyed, the safety of passengers and crew always being a sine quâ non, were so definite, and the considerations of humanity so potent, that such a method of warfare seemed highly improbable. On Feb. 4, 1915, Germany issued a proclamation declaring "the waters surrounding Great Britain and Ireland, including the whole English Channel," to be a "war zone," and threatening the destruction of "every enemy merchant ship in the said war zone . . . without its being always possible to avert the danger" to passengers and crews. Neutral ships were also given a warning. This proclamation was justified as a retaliatory measure for Great Britain's interferences with German trade. Later (March, 1916) the ground of defense was shifted, and it was claimed that the use of the submarine against merchant vessels could not be illegal, because, the weapon being a new one, there were no rules on the subject. Against this announcement the United States, with other neutrals, protested vigorously. There was sent to Germany the celebrated "strict accountability" note of Feb. 10, 1915. Then followed a discussion of points of international law. Germany threw out the hint that if the Allies could be persuaded to adhere to the Declaration of London, she might withdraw her submarine and war zone order, and it is likely that at any time during the War she would have been willing to make this concession if permitted to import foodstuffs and if the trade in munitions between the United States and the Allies had ceased. Accordingly Secretary of State Bryan sent on February 20 to Great Britain and Germany identical communications, asking for mutual concessions so that an international modus operandi might be achieved which would not be fraught with such menaces to neutrals. No agreement proved possible.

The Lusitania.—American rights were first infringed by Germany on Mar. 28, 1915, when the British steamer *Falaba* was sunk by a German submarine, and an American citizen was drowned. On May 1 the American vessel *Gulflight* was torpedoed by a submarine, and three American citizens met their death. Finally, on May 7, the *Lusitania* was sunk without warning, and more than 100 American citizens lost their lives. Before a protest could be made, two communications were received from Germany. The first expressed "deepest sympathy at the loss of lives on board the *Lusitania*" but maintained that the responsibility rested with the British government, which, through its plan of starving the civilian population of Germany, had forced Germany to resort to retaliatory measures. The practice of arming British vessels made it impossible to treat them as merchant ships; and Germany regretted that Americans felt "more inclined to trust to English promises than to pay attention to warnings from the German side." In the second communication Germany explained that instructions had been issued to avoid attacks on neutral ships, and that in the event of an unfortunate accident regret would be expressed and damages afforded. On May 13 the United States sent Germany the first of a long series of notes. The legal questions were argued; the German excuses were answered, and the United States promised that it would not "omit any word or act necessary to the performance of its sacred duty of maintaining the rights of the United States and its citizens and of safeguarding their free exercise and enjoyment." Whether the *Lusitania* was armed, the principles of humanity involved, and the justification of the submarine warfare as a reprisal for England's extensions of international law were argued. Against the English orders in council to extend contraband lists and to intercept shipments destined for neutrals because of a possible ultimate German destination, the United States was protesting at the same time that it carried on the submarine controversy with Germany. As Ambassador Page's letters and Count Bernstorff's despatches showed, President Wilson would have made these protests stronger if the German infractions of international law, causing loss of life, had not always kept American public opinion from being singly concerned with interferences with trade.

While the *Lusitania* case was being argued, the American steamer *Nebraskan* was torpedoed off the coast of Ireland; several Americans on the British steamer *Armenian* lost their lives on June 28; two Americans were killed when the *Arabic*, bound for New York and hence carrying no contraband, was torpedoed without warning on August 19. Finally, on September 1, Ambassador Bernstorff gave this pledge: "Liners will not be sunk by our submarines without warning and without safety of the lives of noncombatants, provided that the liners do not try to escape or offer resistance."

Trade in Munitions.—The *détente* resulting from this was used for a discussion of the trade in munitions, which had grown to large proportions. Germany's record in the past as an exporter of munitions and her controversy over submarines made it inadvisable for her to protest; so in June the Austro-Hungarian government sent the United States a strong note against the continued trade in munitions. Secretary Lansing answered on August 12 with an able argument covering all phases of the question, but by this time the American attitude was being influenced by considerations other than international law. Impeccable legality was supported by sympathy with the Allies. The invasion of Belgium, the *Lusitania* and other sinkings, the alleged atrocities, and Germany's evasive answers to Wilson's submarine notes, all helped to determine the American position.

Austria-Hungary now entered the submarine controversy. The Italian liner *Ancona*, bound from Naples to New York, was torpedoed in the Mediterranean without warning, and American lives were lost. After several interchanges, Germany's ally accepted the principle that "hostile private ships, insofar as they do not flee or offer resistance, may not be destroyed without the persons on board having been placed in safety." But satisfaction with the theoretical agreement was short-lived. Three other passenger steamers were sunk in the Mediterranean, and Count Bernstorff, on Jan. 7, 1916, came to the fore with renewed pledges. Ships would be destroyed "only after passengers and crew have been accorded safety." Now the controversy shifted again, this time to the question of armed merchantmen. In the early part of 1916, Italian and British ships were armed on account of the ruthless submarine warfare which was being waged in the Mediterranean. On Jan. 18, 1916, Secretary Lansing proposed that the practice of arming vessels be abolished. His object was to have such vessels considered as auxiliary craft, to keep Americans off them, and to have a clearer case against Germany if submarines sank unarmed vessels and caused loss of lives. This proposal was unanimously rejected by the Entente Allies, who insisted that arming ships was justified by international law. Figures announced later by the British Admiralty showed that more than 75 per cent of all armed vessels escaped destruction by submarines, while of the unarmed only 24 per cent escaped when attacked. Germany took advantage of the proposals made by Lansing and announced that after March 1 all armed merchantmen would be sunk without warning. The diplomatic position of the United States had been weakened, and discussion of the matter began in Congress, where a resolution was introduced warning Americans to keep off armed merchant ships of belligerent nationality. The Administration interfered, and the resolution was tabled. But another element had been introduced into the submarine controversy.

Sinkings continued throughout 1916. An outstanding outrage was the case of the Channel steamer *Sussex*, an unarmed passenger boat, which was sunk without warning on March 24. After six weeks of talk, Germany declared that the submarine commander had made a mistake; his judgment of the character of the vessel had been too hurried, and it followed therefore that "the assurance given to the American government in accordance with which passenger vessels were not to be attacked without warning has not been adhered to in the present case." Sinkings in the next few months did not specifically involve American rights. On November 6, the *Arabia* was torpedoed in the Mediterranean without warning; all the 450 passengers were saved. Six Americans had been killed on October 30. The two cases were coupled in Wilson's protests to Germany. The British admiralty announced that from May 5, the date of Germany's *Sussex* pledge, to October 28, 22 British merchant ships had been torpedoed without warning, and 131 noncombatants had lost their lives.

In spite of these cases, there was a feeling that Germany was standing by her pledges, barring unfortunate accidents or enthusiastic commanders' exceeding their instructions. There was a public discussion of the possibility of peace (December, 1916), but on Jan. 31, 1917, came the thunderbolt of Germany's decree of unrestricted submarine warfare. The "illegal measures" of Germany's enemies were to be met by "forcibly preventing after Feb. 1, 1917, in a zone around Great Britain, France, Italy, and in the eastern Mediterranean all navigation, that of neutrals included, from and to England, and from and to France, etc. All ships met within that zone will be sunk."

"Overt Acts."—President Wilson announced his policy on February 3 in an address to the two houses of Congress in joint session. He quoted the solemn warning of his *Sussex* note, that unless Germany immediately abandoned her use of submarines contrary to international law and "the universally recognized dictates of humanity," the United States would sever diplomatic relations, and the German pledge in reply, that vessels would not be sunk in the war zone "without warning and without saving human lives, unless these ships attempt to escape or offer resistance." Ambassador Bernstorff had therefore been given his passports; Ambassador Gerard had been recalled. Only "actual overt acts" would make Wilson believe that the German government would go through with its plan, but if "American ships and American lives should in fact be sacrificed by their naval commanders in heedless contravention of the just and reasonable understandings of international law and the obvious dictates of humanity, I shall take the liberty of coming again before the Congress to ask that authority be given me to use any means that may be necessary for the protection of our seamen and our people in the prosecution of their peaceful and legitimate errands on the high seas."

Armed Neutrality.—President Wilson did not have to wait long for "overt acts." Two American vessels were sunk, and an attack on the French steamer *Athos* caused the death of an American missionary. More serious was the virtual embargo on the mails and shipments of various sorts to Europe. With no protective measures decided on by the Wilson administration, American vessels were fearful of braving the submarine menace. At the end of three weeks it seemed clear that the threat of Wilson's address to Congress in breaking off diplomatic relations would have no effect, and so on February 26 he again addressed Congress, this time to ask for the authority which he deemed necessary to safeguard the rights of the United States. He desired "armed neutrality, which we shall know how to maintain and for which there is abundant American precedent." He was not "contemplating war or any steps that need lead to it." He asked for authority "to supply our merchant ships with defensive arms." A measure was immediately prepared by the Foreign Relations Committee and introduced in the Senate to carry out President Wilson's policy of armed neutrality. The resolution passed the House on March 1 by an overwhelming vote, but the rules of the Senate which failed to limit debate permitted a "group of willful men," in the Wilson phrase, to filibuster and prevent action before the time set for the Congress to come to an end. On March 9 Wilson issued a proclamation calling Congress in special session for April 16; the reason assigned was the necessity for a great variety of emergency legislation, but preparations for armed neutrality went on without legislative authorization. An old statute was relied on, and on March 12 it was announced that the United States had determined "to place upon all American merchant vessels sailing through the barred areas an armed guard." Meanwhile Germany continued to commit "overt acts." The *Laconia* was sunk on February 25, and two American lives were lost. On March 12 the American steamship *Algonquin* was sunk, and 14 American members of the crew had to spend 26 hours in open boats. On March 19 the sinking of three American ships was announced. There were others also. These sinkings showed that armed neutrality was inadequate. On March 21 the President summoned Congress for special session on April 2, "to receive a communication by the Executive on grave questions of national policy which should be immediately taken under consideration;" steps were at once taken to mobilize the country for the prosecution of a war. It was practically a foregone conclusion that President Wilson intended to ask Congress to declare the existence of a state of war. The pretense of armed neutrality was anomalous and inadequate.

Entry into the War.—Four days after the President's address, both Houses of Congress passed the joint resolution formally recognizing the state of war which had been forced on the United States. It was the fifth formal declaration of a war with a foreign power. "We have no selfish ends to serve," said Mr. Wilson in his address. "We desire no conquest, no dominion. We seek no indemnities for ourselves, no material compensation for the sacrifices we shall freely make." The United States, at least, was not brought into the conflict by secret treaties.

Other Neutral States. In his message to Congress on February 3, President Wilson took it for granted "that all other neutral governments will take the same course" of breaking off diplomatic relations. This was not the case with European states, but the Latin American countries did follow the lead of the United States. Cuba and Panama joined the United States on April 7 and 8. Brazil broke off diplomatic relations on April 11 and declared war on October 26. Intercourse with Germany was also severed by Bolivia (April 13), Guatemala (April 27), Honduras (May 17), Nicaragua (May 19), Haiti (June 15), Costa Rica (September 23), Peru (October 6), Uruguay (October 7), and Ecuador (December 9). The Argentine, Chile, and Venezuela remained more or less neutral. Liberia declared war on August 7 and China on August 14. Siam entered the conflict on July 22. Others which came in in 1918 were: Costa Rica (May 23), Guatemala (April 22), Haiti (July 15), Honduras (July 19), and Nicaragua (May 24).

Greece also came in, but because of Allied pressure rather than on account of the submarine warfare. Venizelos had been dismissed in October, 1915, and from then until May, 1916, Constantine, strongly pro-German in his sympathies, tried to be a monarch who governed as well as reigned. He desired premiers of his way of thinking and called to the office Zaimis and then Skoloudis. In May, with the consent of Constantine, the Greek commanders allowed the Bulgarian troops to occupy Fort Rupel, the key to the Struma Valley. In August, Seres and Kavalla were also surrendered to the Bulgarians and the Greek troops were interned in Germany. Venizelos intervened. He established at Saloniki a provisional government which was recognized by the Allies, and he declared war on Bulgaria. The authority of the King was repudiated by Crete, Samos, and other islands, but the mainland remained under his control. Both Italy and Russia were reluctant to have the Allies intervene drastically. Italy feared the rivalry of a Greece made strong under Venizelos, and Russia, on dynastic grounds, objected to the deposition of Constantine. In June, 1917, after the Russian revolution, the Entente at last intervened. Constantine was removed and sent to Switzerland. Venizelos returned to Athens, and on June 30 Greece broke off diplomatic relations with Germany and Austria.

The Secret Treaties. In order to get Italy and Rumania into the War and to arrange for a division of the spoils in the event of victory, the Entente entered into a series of secret treaties which were hardly consistent with their publicly professed war aims. Some of these treaties have already been referred to in discussing the negotiations which the Allies carried on in order to oppose to Germany a united diplomatic front. The secret agreements were so important, during the War and particularly at the Peace Conference, that they should be enumerated here. Most of them saw the light after the Bolshevik revolution. In publishing the documents which were found in the Russian Foreign Office, Trotsky said that "secret diplomacy is a necessary weapon in the hands of a propertied minority, which is compelled to deceive the majority in order to make the latter obey its interests." He declared that "the Russian people, as well as the peoples of Europe and of the whole world, must know the documentary truth about those plots which were hatched in secret by financiers and industrialists, together with their parliamentary and diplomatic agents."

The more important agreements were the following:

(1) Anglo-French agreement on Togoland, Sept. 13, 1914, and Kamerun, 1916.

(2) The Anglo-French-Russian agreement of Mar. 20, 1915, regarding Constantinople, the Straits, Persia, and oil. Britain consented to the annexation by Russia of the Straits and Constantinople in return for a similarly benevolent attitude on Russia's part toward the political aspirations of Britain in other parts.

(3) The pledge to Italy (the Treaty of London, Apr. 26, 1915) regarding the territories she should receive: the Trentino, the Southern Tirol, Trieste, Gorizia and Gradisca, Istria, Dalmatia, islands off the Dalmatian coast, northern Dalmatia, 12 islands off the coast of Asia Minor, a share in the partition of Asiatic Turkey, an addition to her colonial territory in Africa, and a share in the war indemnity. The treaty contemplated cutting Austria-Hungary off from the sea.

(4) The Russo-French agreement of Apr. 26, 1916, regarding the partition of Asiatic Turkey; Britain to obtain southern Mesopotamia, with Bagdad and two ports in Syria, France to obtain Syria, the Adana vilayet, and western Kurdistan, Russia to obtain Trebizond, Ezerum, Bitlis, Van, and territory in southern Kurdistan.

(5) The Sykes-Picot (Anglo-French) agreement of May 9, 1916, regarding the partition of Asiatic Turkey.

(6) The Rumanian treaty (Aug. 18, 1916) regarding the partition of Austria-Hungary. Rumania was to receive Transylvania up to the river Theiss, the Bukovina up to the river Pruth, and the Bánát.

(7) The Franco-Russian agreement of February-March, 1917, regarding Alsace-Lorraine, the Saar Basin, the left bank of the Rhine, and Russia's western frontier. France recognized "Russia's complete liberty in establishing her western frontiers."

(8) The pledges to Japan, February–March, 1917, regarding German possessions in the Far East. This treaty was imperfectly known before the Peace Conference.

(9) The St. Jean de Maurienne Agreement, April, 1917, regarding Italy's prospective share in Asiatic Turkey. Italy was given complete possession of nearly the entire southern half of Anatolia, including the cities of Adalia, Konia, and Smyrna, together with a "zone of influence" northeast of Smyrna.

It is difficult if not impossible to reconcile these secret treaties with the public war aims of the Entente Allies. Certainly the agreements were inconsistent with the promise that the Turkish portions of the Ottoman Empire should have "a secure sovereignty," and with the more general pledge of "free, open-minded, and absolutely impartial adjustment of all colonial claims, based on a strict observance" of the principle that "the interests of the populations concerned must have equal weight with the equitable claims of the government whose title is to be determined." The Russian archives were opened just about the time that Wilson was announcing his famous Fourteen Points. Not the least curious feature of the preparedness which was being attempted for the Peace Conference was Wilson's apparent ignorance of both the fact and the contents of these secret agreements. They were published in England in the *Manchester Guardian* and in the United States in the *New York Evening Post*, which said that if there was "one man who has profited by the publication of the secret documents given out by the Russians" it was Woodrow Wilson. Ray Stannard Baker's volumes on Wilson at the Peace Conference make it clear that he was inadequately informed, and, indeed, Wilson confessed as much in his conference with the Senate Committee on Foreign Relations when the Treaty of Versailles was under discussion. Had he known in advance of the Conference of the existence of the secret agreements, it is possible that there would have been some cancellation of them. Allied dependence in the summer of 1918 on the United States for money and men was so great that selfish territorial aspirations would have been sacrificed. The safety of the state would have been a more pressing consideration than territorial aggrandizement in the event of a victory at that moment quite uncertain.

Peace Feelers. The historian of the future will have to deal minutely with the question whether the War in Europe could have been brought to an end sooner than Nov. 11, 1918. He will have to consider whether the statesmen, for refusing to agree to an earlier settlement, must not suffer greater condemnation than the generals who at particular moments were found wanting. The verdict to be rendered will be influenced by the hypnotic effect which a sweeping victory has on those who witness it and which it will always have on the historians who discuss it. Consequently, it is natural to expect that German historians will be chiefly interested in the problem. Indeed, one of the first acts of the Reichstag was to appoint a commission to determine whether peace was missed at the time of President Wilson's proposals in the autumn of 1916. The speeches of statesmen for the period 1916–18 and the published correspondence cover 250 closely printed pages (G. Lowes Dickinson, *Documents and Statements Relating to Peace Proposals and War Aims* [*December, 1916–November, 1918*], New York, 1919), and this collection does not include revelations which have since been made in various quarters. These secret discussions were by all odds the most important. The historian will surely say that the public pronouncements, apart from Wilson's speeches and a half dozen flashes from other Allied voices, were hasty, insincere, artificial, and forced. Rarely did they rise to the dignity and elevation which would have been worthy of the great issues involved, and which, indeed, were due the millions risking their lives.

Wilson's Attempts.—On Aug. 5, 1914, President Wilson made his first attempt at mediation. He sent an identical message to Emperor William of Germany, Emperor Francis Joseph of Austria-Hungary, Emperor Nicholas of Russia, King George of Great Britain, and President Poincaré of France. He said: "As official head of one of the powers signatory to The Hague Convention, I feel it to be my privilege and my duty, under Article III of that Convention, to say to you in a spirit of most earnest friendship that I should welcome an opportunity to act in the interest of European peace, either now or at any other time that might be thought more suitable, as an occasion to serve you and all concerned in a way that would afford me lasting cause for gratitude and happiness." The belligerents made only formal acknowledgment of this offer. After the German retreat from the Marne, President Wilson, on unofficial suggestions by Count Bernstorff, had Ambassador Gerard sound out the German Chancellor, who replied that since the War had been "forced" on Germany, the President should first appeal to the Entente. Colonel House went abroad for the President during the winter 1914–15 and on his return reported that the moment for peace had not yet come. On June 2, 1915, in discussing the *Lusitania*, President Wilson told Bernstorff that if Germany would give up the use of submarines, he could persuade the English cabinet to agree to abandon the attempt to starve Germany, and he "hoped that this would be the beginning of peace action on a great scale." In January, 1916, Colonel House again went to Europe. He found the chief opposition to peace in Paris and a certain willingness in Berlin and London. Many discussions were held between Bernstorff and Colonel House, in New York City, in order to avoid the publicity which White House conferences would have entailed. "House told me," Bernstorff later reported, "that Wilson no longer had the power to oblige England to obey the practices of international law [this was just after the *Sussex* affair]; American trade was so intimately tied up with the Entente that Wilson could not possibly disturb these trade relations without evoking a terrific storm. On the other hand, he was in a position to obtain a peace without victory, and he intended to do so as soon as an opportunity offered itself. But seeing that such a step would now be universally called pro-German in America, he could only do it when public opinion about relations with Germany had somewhat calmed down. He proposed a pause and hoped without fail to be able to make a beginning of peace mediation toward the end of the summer." Rumania entered the War; the Entente became more certain of victory; and intervention was deferred.

Meanwhile, Bethmann-Hollweg had been thinking of the possibility of peace discussions. Paléologue's memoirs record evidences of approaches, some probably unauthorized, from Berlin, Darmstadt, and Vienna. Russia also had taken soundings. In October, 1916, the Emperor transmitted through Ambassador Gerard a memorandum to the effect that he was willing to entertain a peace offer, but the approaching presidential election caused a delay. Bernstorff endeavored to delay the German overture until Wilson could act, but on Dec. 12, 1916, a few days after the fall of Bucharest, Bethmann-Hollweg issued a note which said that the resistance of the Central Powers could not be broken but that animated "by the desire to stem the flow of blood and to bring the horrors of war to an end, the four allied Powers propose to enter even now into peace negotiations." On December 18 President Wilson issued his famous appeal for peace. He was "somewhat embarrassed to offer it at this particular time, because it may now seem to have been prompted by the recent overtures of the Central Powers. It is in fact in no way associated with them in its origin." To the popular mind this was difficult to believe, but it was true. As Bernstorff later told the Reichstag investigating committee, "the peace note which Wilson despatched on December 18 had been composed as far back as the middle of November but had been thrust by Wilson into his writing-table, because another wave of anti-German feeling swept through the country on account of the Belgian deportations. Colonel House told me that the peace offer which was already drawn up by the middle of November was not sent off by Wilson because he could not be responsible for it in the state of public feeling." On November 24 Bernstorff had telegraphed: "Wilson has commissioned Colonel House to tell me in the strictest confidence that he would undertake an effort for peace as soon as possible, presumably between now and the New Year. But meanwhile he made it a condition that we should discuss peace as little as possible, and that we should allow no new submarine controversies to spring up, in order to prevent a premature refusal by our enemies."

Allied Sentiment.—All the Allies vigorously denounced the German offer as an attempt to divide them. The general feeling was well expressed by the British note: "To enter, on the invitation of Germany proclaiming herself victorious, without any knowledge of the proposals she has to make, into a conference, is to put our heads into a noose." On December 25, while waiting for the Allied reply to her proposal, Germany made an answer to President Wilson's appeal for a definition of war aims and peace terms. The note said nothing at all about terms; it proposed instead "an immediate meeting of delegates of the belligerent states at some neutral place." When the German reply was received, Bernstorff "telegraphed that Lansing had begged him at any rate to communicate our peace terms to him in confidence." The Allies, however, seized the opportunity which President Wilson's appeal offered them. They had not as yet drawn up any coherent programme. They had divided up the spoils in the secret treaties, but their public pronouncements had been general and not particular. The Allied reply pledged wholehearted support of "a League of Nations to ensure peace and justice throughout the world" and then went on to enumerate the essential elements of a satisfactory settlement: the restoration of Belgium, Serbia, and Montenegro, with compensation; the evacuation of French, Russian, and Rumanian territories, with reparation; the liberation of Italians, Slavs, Rumanians, and Czecho-Slovaks from foreign control; the expulsion of Turkey from Europe, and the restitution of provinces previously torn from the Allies by force and against the wishes of their inhabitants.

German Conditions.—On Jan. 11, 1917, Germany and Austria sent notes to the neutral states declaring that the Entente must bear the responsibility for continuing the bloodshed. Meanwhile preparations were proceeding in Germany for unrestricted submarine warfare; Wilson made his famous "peace without victory" speech to the American Senate (Jan. 22, 1917) and pressed Germany for a statement of her conditions. According to Bernstorff, President Wilson was quite hopeful of the successful outcome of the negotiations. The German Ambassador reported to his government on Jan. 27, 1917, that "Wilson was convinced that he would be able to bring about both peace conferences" and that the Entente note was a bluff. The Chancellor, in a frantic effort to win the race from the military leaders who were insisting on submarines rather than peace talk, did telegraph some terms on January 29. He refused to allow them to be published, "for they would look like weakness." But the documents printed in the report of the Reichstag committee show that the military leaders were not modest in the demands which they proposed to make of the Allies, and it was they, rather than Bethmann-Hollweg, who really governed Germany. The Chancellor, before he could even talk to Baron Burian about Austria's terms, had to obtain the consent of the General Field Marshal and the Emperor. The terms discussed included the annexation of Courland and Lithuania; the retention of Briey and Longwy; the return of the colonies with the exception of Kaiochow, the Carolines, and the Marianna Islands, and in compensation therefor the acquisition of the Congo State or a part of it; the indemnification of Germans living abroad, and the incorporation of Luxemburg into the German Empire. In January the Emperor became even more severe and said that the German war aims must be recast. He was then unwilling to allow King Albert to return to Belgium and declared that the coast of Flanders must belong to Germany. But it was too late. Germany would have to fight for these results on the battlefield rather than in the conference room. The U-boat campaign could not be postponed; 21 boats had left for their stations and could not be communicated with. The submarine was to bring the United States into the War, and "force without limit" instead of "peace without victory" was thereafter to be Wilson's hope.

The Year 1917.—Meanwhile peace discussions were beginning in another quarter, and they continued through 1917. The time was not unfavorable, and the public manœuvres furnished a not inappropriate screen for the backstairs pourparlers. In July the Reichstag passed its famous "majority resolution" calling for "a peace of understanding and the permanent reconciliation of the peoples." Bethmann-Hollweg had resigned in favor of Michaelis, who in turn was to be replaced in October by Hertling and a semiparliamentary combination which accepted the Reichstag's programme. August found the Pope publicly appealing for peace; Count Czernin made speeches emphasizing disarmament; Russia was demanding a discussion of war aims; the Socialists in the belligerent countries were attempting meetings, and even a Conservative like Lord Lansdowne cried out to stop the slaughter and save European civilization. During the summer of 1917 the morale of France was at its lowest point, and Caporetto, Byng's failure at Cambrai, and the Bolshevik revolution were hardly encouraging to the Allies. President Wilson seemed to be willing that, while no compromise could be made with Prussia, the Allied cause should be strengthened by a diplomatic offensive which might affect the peoples of the Central Powers; and since Austria-Hungary was obviously war-weary, he and Lloyd George thought of the possibility of a separate peace. Any agreement with Germany at this time would have meant Prussian hegemony in the East; the Allies needed no proofs of this, even before Brest-Litovsk. Hence there was an effective veto on an "unclean" peace, and a military offensive on the western front, however horrible and uncertain, was not too high a stake to risk for the defeat of Germany's eastern ambitions.

The Austrian Attempts.—This, in brief, was the situation when Austria sued for peace. Emperor Karl, on coming to the throne in November, 1916, had expressed his desire to end the conflict and had called attention to the fact that he had had no share in its beginning. The emissary now employed was Prince Sixtus of Bourbon, the brother of Empress Zita. In January the Prince learned from his mother in Switzerland that the Emperor was ready for a secret armistice with Russia and that he was also willing for the restoration of Alsace-Lorraine and the creation of a Jugo-Slav kingdom. In March the Prince, going to negotiate with Poincaré, took with him an autographed letter from the Emperor. The dossier of the Prince has now been published, and it is a document of great interest, both in the facts which it discloses and in the revelations which it makes concerning the mental attitudes of the statesmen who during the War had peace or a continuance of the conflict within their discretion. They consulted no one. It appears from the dossier that Lloyd George, with whom the Prince had several interviews, was sincerely anxious to deflect Austria but was hampered by obligations toward France, Italy, and Russia. President Poincaré, on the other hand, was almost willing to abandon Italy. "France's interest," he declared, "is not only to maintain Austria, but to aggrandize her at the expense of Germany." In a later interview he was almost willing to desert Poland and Rumania; too much had been promised the smaller allies. Ribot appears always to have been a bitter-ender, but if there had been complete willingness on the part of England and France, Italy would have proved a stumblingblock. Sonnino, in Lloyd George's phrase, was "obstinate, difficult, and troublesome." Austria did not propose sufficient territorial concessions to satisfy Italy. Austria's position, indeed, was hopeless. Defeat would mean her dissolution, and victory would mean complete German dominance. Russia and the United States were only imperfectly informed of these transactions. It seems possible that if the decision had rested with Poincaré and Lloyd George, Germany in the spring of 1917 might have found herself separated from her Allies. Austria and France, from time to time, continued their discussions, through meetings between Count Revertera and Count Armand in Switzerland.

The Pope's Efforts.—Other unpublished conversations are alluded to in the Prince Sixtus document. Mention is made of one between Bulgaria and England, one between Austria and Italy, and several between Austria and Russia. On Aug. 14, 1917, the Pope issued a peace note, to which President Wilson replied that the rulers of Germany could not be trusted. At the same time the Vatican was making private efforts; it did secure Germany's consent to the restoration of Belgium, but the German government took the position that conversations were possible only if the conflict ended in a draw.

Germany.—Meanwhile, also, Germany herself was "feeling out" France. Proposals were made in June and August by Baron Lancken, the political director of the German government in Brussels, that Briand, who was in Ribot's cabinet, should go to Switzerland to meet Lancken or even the German Chancellor himself. The territorial suggestions were not dissimilar to those in the Sixtus negotiation. Austrian territory, Trieste and Trentino, was to be ceded to Italy, just as in the Sixtus attempt Austria was free with Alsace-Lorraine. Germany, according to Briand's later explanation in the Chamber, was willing to discuss the restoration and even compensation of Belgium and was willing to compromise on Alsace-Lorraine. Briand asked permission to meet Lancken, and in this he was supported by Belgium and Rumania; but Ribot refused. Briand then asked that the Allies be consulted, and to this Ribot consented, but Briand later expressed his opinion that the proposals were presented in such a way that their rejection was probable. President Wilson and Kerensky were informed only after the incident had been concluded. In the following month there was a new French Cabinet; Painlevé became Prime Minister, with Ribot as Minister for Foreign Affairs. There was a secret session of the Chamber of Deputies at which Briand revealed the proposals made by Germany and assailed Ribot for his rejection of them without further investigation. Ribot was forced to resign. Villalobar, the Spanish Minister at Brussels, inquired in London as to the British attitude toward the integrity of Germany, indemnities, and economic boycotts. A conference of Allied ministers agreed that this was another attempt to separate them. In January, 1918, the Allies' aims were more explicitly defined in Wilson's Fourteen Points as well as speeches by Lloyd George. Discussions behind the scenes still proceeded. General Smuts and Count Mensdorff met secretly in Switzerland; Armand and Revertera met again; the Bavarian Törring-Jettenback and the Belgian Minister at Bern saw each other, and the King of Denmark asked Germany for her terms.

Final Austrian Attempt.—One other overture demands special mention, since, in the opinion of R. W. Seton-Watson, a leading authority on eastern European politics, it alone had any serious prospect of success. In February, 1918, the late Professor Lammasch, known to Americans for his service on The Hague Court and his connection with the Carnegie Endowment for International Peace, made a direct appeal to Washington in the name of Emperor Karl. President Wilson was asked to make a pronouncement that the United States regarded Germany and Austria-Hungary in different lights, and that Austria-Hungary would receive favorable terms if she granted her subject nationalities autonomy. The speech was made to Congress on Feb. 11, 1918. "Count Czernin," said President Wilson, "seems to see the fundamental elements of peace with clear eyes and does not seek to obscure them." Lammasch then introduced an autonomy bill in the Austrian Herrenhaus, but he was bitterly attacked. Germany got wind of the scheme and the Austrian deflection was checked.

Most of the disclosures made up to 1924 as to these peace feelers appeared in private memoirs. One motive for publication has been to accuse various personalities of their responsibilty for continuing the struggle, and both the source and the tendencious character of the documents invalidate them as trustworthy evidence for the judgment of Allied statesmen. Although the official documents of the British, German, Russian, Austrian and other European Foreign Offices bearing upon the origins of the War had either been published or were in process of publication in 1929, it was realized that comparatively little of an official nature had been disclosed concerning the peace feelers. It seemed likely that this material, or at least many of the more important documents, would be withheld until after the death of the outstanding personalities concerned. It was nevertheless strikingly evident that a few statesmen of both the Allied and Central Powers held the decision of peace in their hands, subject to no check except a vague and on occasion controllable public opinion.

War Aims. Late in 1917 and early in 1918 the increasing war-weariness, the knowledge of the imperialistic character of the Allied Secret Treaties, and the failure of the peace moves to hasten the end of the War, quickened the impatience of the Allied peoples. This attitude manifested itself in the statement of war aims incorporated in the British Labor Memorandum of December, 1917. Founded on Wilson's precept that "the world must be made safe for democracy," and taking a stand categorically against a war for conquest, the Labor statement called for the establishment of a League of Nations, restoration of Belgium, self-determination for Alsace-Lorraine and the Italian peoples in the Dual Monarchy, civil and political liberties for the Jews, the reorganization of the Balkans, and recognition of the national claims of the Czecho-Slovaks and the Jugo-Slavs. This was followed by the speech of Lloyd George on Jan. 5, 1918, which accepted the Labor position in substance. The following specific items are interesting to note. The Allies were not fighting against the German people and were not seeking to destroy or disrupt the German people or Germany; they were not fighting to destroy Austria-Hungary or to seize Constantinople and Thrace, "which are predominantly Turkish in race." But it was President Wilson's famous speech of January 8, before Congress, that overshadowed all other such statements. This contained the Fourteen Points that served as the basis for the German Armistice. These points were:

I. Open covenants of peace, openly arrived at; after which there shall be no private international understandings of any kind, but diplomacy shall proceed always frankly and in the public view.

II. Absolute freedom of navigation upon the seas, outside territorial waters, alike in peace and in war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants.

III. The removal, so far as possible, of all economic barriers and the establishment of an equality of trade conditions among all the nations consenting to the peace and associating themselves for its maintenance.

IV. Adequate guarantees given and taken that national armaments will be reduced to the lowest point consistent with domestic safety.

(1919–20), Minister without Portfolio (1920–21), Secretary of State for War (1921–22 and 24–29), and Postmaster General (1923–24).

WOUNDS, Treatment of. The experience of the World War presumably made some changes in the treatment of wounds in civil and industrial surgery, which were summed up by a Viennese surgeon, Professor Albert, as follows: Mere asepsis or surgical cleanliness was found to be quite insufficient to control war wounds after these had had time to become infected. In other words, the original Listerian doctrine of antiseptic treatment, once sidetracked, again took the lead. It was learned that, while chemical agencies are unable to arrest infection by destruction of bacterial life, they are still able to antagonize the latter by stimulating the natural defensive forces of the body. As for tissues hopelessly infected, they may be cut away bodily to a certain extent. Ultra-violet light and tincture of iodine are able to destroy a certain number of bacteria. Mechanical resources, such as proper drainage and irrigation, are incidentally of benefit; gauze dressings exert a suction on the wound surfaces and thus reinforce irrigation. Any wound over eight hours old is regarded as already infected. Wounds which have failed to unite and so become known technically as granulating surfaces may be treated by ointments. In other words, from military experience, it was learned that the best treatment of wounds is one which encourages the tissues to fight thei rown battles. The Carrel-Dakin treatment of wounds by irrigation with a weak sodium hyposulphite irrigation should be one of the best resources for this purpose, although it does not seem to be adapted to cases in which crippling is threatened, for under such circumstances immobilization is desirable, and this can hardly be obtained if the dressings have to be changed frequently.

WRANGEL, vrängʹĕl, Peter Nicholaievitch (1879–1928). A Russian general, born at St. Petersburg, the oldest son of a Baltic nobleman of Swedish descent. He finished a brilliant academic career at the Mining Institute of St. Petersburg but later entered the army as a private soldier, and rose until in 1915 he commanded a Cossack Regiment and later a Cossack Division. From its beginning, he resisted the Bolshevik Revolution. With a volunteer army operating in the Crimea, he severely defeated the Soviet forces, and when finally overwhelmed by superior numbers in 1920, he managed to retreat in good order. After the collapse of the counter-revolution, General Wrangel and a remnant of his men found refuge in Jugoslavia, where he established his headquarters in 1922. By 1926 he gave up active opposition to the Soviet régime, and became a mining engineer in Belgium, where he died. In compliance with his dying wish, his body was removed from Brussels to Belgrade and reburied there Oct. 6, 1929, with elaborate ceremonies, which were attended by Russian emigrés from all parts of Europe.

WRANGEL, rănʹgĕl, **ISLAND.** Named after the Russian explorer, Ferdinand von Wrangel, this island is located some 80 miles from the Siberian coast at 71° north latitude and 180° west longitude. Difficult of access due to the surrounding ice pack and possessing no natural resources except its strategic position, Wrangel Island has been a bone of political contention. Sighted from a distance by Captain Kellett in 1849 and in 1867 by the American, Captain Long, who named it Wrangel Island, it was believed to extend across the Arctic until the *Jeannette* under De Long drifted just to the north of it. Men from the *Corwin* and the *Rodgers* of the *Jeannette* Search Expedition landed and mapped the island in 1881. In 1914 the *Karluk* of Stefansson's Canadian Arctic Expedition was crushed by the ice and her crew occupied Wrangel Island until rescued. In 1916 Russia announced her claim to the island. In order to reëstablish British occupation, Stefansson in 1921 sent a private expedition of four men and one Eskimo to the island. Ice conditions prevented relief in 1922 and in 1923 the visiting ship found only the Eskimo woman alive. An American group under Wells was then left there whence they were forcibly removed by a Soviet Expedition in 1924. In 1926 a number of Chukchee families from Northern Siberia and three Soviet officials were placed on the island. Efforts to reach them with supplies in 1928 proved unavailing because of ice conditions.

WRESTLING. Professional wrestling, formerly fairly popular in the United States, appears now to have but little appeal to the sport-loving public. Some of the smaller cities in the Middle West evince some interest when their local favorites compete on the mat, but in the larger centres, the attendance at the few matches held is small. The dethronement of Ed "Strangler" Lewis as world champion in 1928 by Gus Sonnenberg, a product of the Dartmouth College wrestling team, is the only significant event in the recent history of the mat game. Amateur wrestling, in direct contrast to the professional sport, seems to be steadily gaining in popularity. Intercollegiate tournaments are held annually and the Y. M. C. A.s and other organizations pay considerable attention to this sport.

WRIGHT, Sir Almroth (1861–). A British physician (see Vol. XXIII). During the World War, Wright was consulting physician to the Allied Armies in matters relating to infection, preventive vaccination, etc. In 1915 appeared his monograph, *Wound Infection.* In collaboration with Colebrook, he published *Technique of the Teat and Capillary Glass Tube* (1921).

WRIGHT, Joseph (1855–). A British philologist (see Vol. XXIII). He was professor of comparative philology at Oxford until 1925, when he became professor emeritus. His later publications include *Elementary Old English Grammar* (1923); *Elementary Middle English Grammar* (1923, 2d ed., 1928); and *Elementary Historical New English Grammar* (1924).

WRIGHT, J(oshua) Butler (1877–). An American diplomat. He was born at Irvington-on-Hudson, N. Y., and graduated from Princeton in 1899. After engaging in banking in New York City for six years and in farming and stock raising in Wyoming for two years, he entered the diplomatic service in 1909. While secretary of the American Legation at Brussels, Belgium, in 1913, he served as secretary to the American delegation to the Opium Conference at The Hague. During the next two years, he was secretary to the Embassy at Rio de Janeiro. In 1915 he was assigned as acting chief of the Division of Latin-American Affairs in the State Department. He served as counselor to the Embassy at Petrograd, (Leningrad) 1916 and held a similar position at the London Embassy (1918–21). In 1921 he was an expert assistant to the American Commissioners at the Washington Conference on the Limitation of Armament. He was United States

Commissioner to the Brazilian Centennial Exposition in 1922; secretary of the United States delegation to the Fifth Pan-American Conference at Santiago, Chile, in 1923; third Assistant Secretary of State (1923–24), and Assistant Secretary of State (1924–27). Since 1927 he has been Minister to Hungary.

WRIGHT, Orville (1871–). An American inventor and aëronautical engineer (see Vol. XXIII). He won the Elliot Cresson Medal of Franklin Institute (1914), the John Fritz Medal, the bronze medal of the International Peace Society (1920), the John Scott Medal (1925) and the Washington Award (1927). He was appointed chairman of the contest committee of the National Aëronautic Association, succeeding Col. F. P. Lahm, in 1924. He was made an officer of the Legion of Honor in 1924. On Dec. 17, 1928, the anniversary of the first flight of a heavier-than-air machine was observed at Kitty Hawk, N. C. A commemorative tablet was placed there, recording the achievement of Orville and Wilbur Wright.

WU, Chao-Chu (1887–). A Chinese diplomat, who was born in Hsinhui, Kwangtung, the son of Dr. Wu Ting-fang, and educated in the public schools of Washington, D. C., where his father was Minister, and in Atlantic City, N. J., and at the University of London (LL.B., 1911). He entered upon his public career in 1912 as commissioner of foreign affairs for Hupeh Province and in 1913 served as a member of both the newly established Chinese Parliament and the committee appointed to draft a constitution. Becoming councilor to the Ministry of Foreign Affairs and the cabinet in 1915, he resigned in 1917 and joined the Canton constitutional government as Vice Minister of Foreign Affairs. In 1919 he represented the Canton government at the Paris Peace Conference, in 1924 he was Minister of Foreign Affairs in Sun Yat-sen's Canton government, and upon the establishment of the Nationalist government in 1925, he became a member of the Government and Military Councils, chairman of the Council of Judicial Administration, and Mayor of Canton. Elected to the Central Executive Committee of the Kuomintang in 1926, he shortly afterward severed his connections with the Canton government because of its relations with the Communists, and in 1927 he was appointed Foreign Minister of the Nationalist government at Nanking. He resigned in 1928 and went on a special mission to the United States, to which country he was named Minister in the same year. In 1929 he also represented China at the sessions of the League of Nations.

WUNDT, vunt, Wilhelm (1832–1920). A leading German philosopher and psychologist of the last generation (see Vol. XXIII). During his last years, he terminated his 10-volume *Völkerpsychologie* (1901–20). During the World War, he used his pen to defend his fatherland against what he considered the unjust accusations of Western writers. He wrote a number of articles, notably in *Scientia*, and also a volume in which he dissected the national psychologies of the warring groups (*Die Nationen und Ihre Philosophie, ein Kapitel zum Weltkrieg* (1915). Wundt's death was internationally mourned. In the United States, a large group of psychologists who had been trained in his Leipzig laboratory published testimonials in honor of their master.

WURTTEMBERG, vụrt'tĕm-bĕrk. A constituent republic of the German Reich in southwestern Germany, lying between Baden and Bavaria. It has an area of 7530 square miles and a population (1925 census) of 2,580,235. Stuttgart is the principal city. With its suburbs, it had a population of 341,967 in 1925. Other cities, with their 1925 populations, are Ulm, 59,357; Heilbronn, 45,520; Esslingen, 40,562; Reutlingen, 30,501; and Ludwigsburg, 30,023. Primarily an agricultural state, Württemberg has 3,023,357 acres, or 64 per cent of the entire area, under cultivation, and 1,058,755 acres, or 31 per cent, under forest. The principal crops, with the 1927 yield in metric tons, are wheat, 104,876; rye, 25,572; barley, 131,114; spelt, 66,595; oats, 122,367; potatoes, 820,854; hay, 2,793,855; hops, 886. Wine production was 1,964,006 gallons (1927); beer, 53,323,798 gallons in 1926.

There were 2212 schools for middle and elementary education which were attended by 269,537 pupils in 1926–27; 199 boys' higher schools with 8346 pupils; 112 modern schools with 18,377 pupils, and 24 high schools for girls with 6930 pupils. There are also technical and agricultural high schools and Tübingen University. The state expenditure for education in 1928 was 54,158,655 marks. For the fiscal year ending Mar. 31, 1928, revenues were estimated at 150,008,004 marks and expenditures at 157,945,665 marks; for 1928–29 at 150,000,000 marks and 157,900,000 marks, respectively. The public debt on Apr. 1, 1928, was 1,600,100 Reichmarks.

Württemberg became a republic Nov. 11, 1918, following the abdication of King William II. A constitution adopted Sept. 25, 1919, vests the supreme power in the Landtag of 80 members elected by universal suffrage for four years. The Landtag appoints the State Ministry. The head of the ministry bears the title of State President. The composition of the Diet elected May 20, 1928, follows: Right, 20; Centre, 17; Social Democrats, 22; Communists, 6; Democrats, 8; Volkspartei, 4; Christlicher Völksdienst, 3. Due to the existence of a large middle class and the state's democratic traditions, the bourgeois parties have largely controlled the government since 1919 and Württemberg has been comparatively free from violent political disturbances. For this reason, the Republican government of the Reich sought refuge there during the Kapp Putsch in March, 1920. The constitution provides for dissolution of the Diet by popular referendum, the formatioin of a new ministry after each election of the Diet, and the attachment to the ministry of councils representing the various classes of the population. The Minister President appoints the members of the cabinet in conformity with the wishes of the Diet, but the administration of the state is conducted individually by the ministers. See Germany.

WYETH, George Austin (1877–). An American surgeon, born in St. Louis, who has become well known through his introduction into operative surgery of the electric knife as a substitute for the ordinary cutting instrument. The method is also known as endothermic or electrothermic surgery. He received his degree in arts from Vanderbilt University and in medicine from the University of Pennsylvania, and after taking post-graduate courses in Europe, he settled in New York, publishing his first results on the new method in 1921 and his monograph, *Surgery of Neoplastic Diseases by Electrothermic Methods* in 1926. Although the method was devised primarily for the removal of accessible cancer, it doubtless has a much broader future.

WYLIE, Elinor Hoyt (Mrs. William Rose Benét) (1886–1928). An American poet and novelist, who was born at Rosemont, Pa., and attended private schools. She married William Rose Benét in 1923, after having divorced her first husband, Horace Wylie. After 1919 she lived in New York, contributing literary reviews to magazines and for a time serving as an associate editor of *Vanity Fair.* Her first book of poems, *Nets to Catch the Wind* (1921), won the Julia Ellsworth Ford Prize. Her other books of verse were *Black Amour* (1923); *Trivial Breath* (1928); and a posthumous volume, *Angels and Earthly Creatures* (1929). She also wrote four novels that were well received: *Jennifer Lorn* (1923); *The Venetian Glass Nephew* (1925); *The Orphan Angel* (1927); and *Mr. Hodge and Mr. Hazard* (1928).

WYNN, Ed(ward) Leopold (1886–). An American comedian, born at Philadelphia. He ran away from home at 15 and went into vaudeville. During 1914–15 he acted in Ziegfeld's *Follies* and in the next year appeared at the Winter Garden in New York City. He wrote music, lyrics, and book of the *Ed Wynn Carnival* (1919); *The Perfect Fool* (1921); *The Grab Bag* (1924). In 1927 it was announced that he would enter the moving-picture field.

WYOMING. The eighth State in size (97,914 square miles) and the forty-seventh in population; capital, Cheyenne. The population increased from 145,965 in 1910 to 194,402 in 1920, or by 33.2 per cent. In 1925 it was 206,381, by State census. The estimated population, 1928, was 247,000. The white population increased from 145,965 in 1910 to 194,402 in 1920, the number of Indians decreased from 1486 to 1343, and of Negroes, from 2235 to 1375. The native white population rose from 113,200 to 164,891; the foreign-born white fell from 27,118 to 25,255. Both urban and rural populations mounted, the former from 43,221 to 57,348; the latter from 102,744 to 137,054. There are only two important cities in the State, Cheyenne and Casper. The former increased from 11,320 in 1910 to 13,829 in 1920, and the latter from 2639 to 11,447.

Agriculture. Wyoming has experienced an increase in agricultural activities in recent years. The number of farms increased 43.3 per cent, or from 10,987 in 1910 to 15,748 in 1920; it dropped slightly to 15,512 in 1925. The acreage in farms increased 38.2 per cent, from 8,543,010 in 1910 to 11,809,351 in 1920, and rose still farther to 18,663,308 in 1925. The improved land in farms totaled 2,102,005 acres in 1920. The percentage of the total land area used for agricultural purposes increased from 13.7 in 1910 to 18.9 in 1920, and 29.9 in 1925. The total value of farm property doubled; $167,189,081 in 1910, it rose to $334,410,590 in 1920, but shrank to $240,396,413 in 1925; the average value per farm was $15,217 in 1910, $21,235 in 1920, and $15,497 in 1925. In interpreting these values, the inflation of the currency incident to the War is to be taken into consideration. Of the total number of farms in 1925, 12,545 were operated by owners; 191, by managers, and 2776, by tenants. The corresponding figures for 1910 were 9779; 311; and 897. White farmers in 1910 numbered 15,579: 13,306 were native and 2273, foreign born. There were 169 colored farmers, of whom 134 were Indians. In 1910 the white farmers numbered 10,922 (9019 were native and 1903, foreign born); and in that year, 44 of the 65 colored farmers were Indians. Farms reported as under mortgage, 5513 in 1920, numbered 6088 in 1925. The acreage under irrigation increased from 1,133,302 in 1909 to 1,207,982 in 1919. The number of dairy cows was 41,615 in 1920; 32,882 in 1925; "beef" cows, numbered 307,189 in 1920; 313,143 in 1925; sheep, 826,565 in 1920; 2,507,912 in 1925. The estimated production of principal farm crops in 1928 was as follows: Corn, 3,006,000 bushels; wheat, 4,098,000; oats, 4,092,000; barley, 2,310,000; potatoes, 2,352,000; and hay, 1,645,000 tons. Comparative figures for 1913 are corn, 493,000 bushels; wheat, 2,250,000; oats, 8,360,000; barley, 396,000; potatoes, 1,680,000; and hay, 912,000 tons.

Mining. Wyoming has very valuable mineral resources which have not yet been fully developed. The most important products in point of value are petroleum, coal, natural gas, and natural-gas gasoline. The growth of the petroleum industry since 1914 is indicated by the following production figures: 1914, 3,560,375 barrels; 1916, 6,234,137; 1917, 8,978,680; 1918, 12,596,287; 1920, 16,831,000; 1921, 19,332,800; 1922, 26,715,000; 1926, 25,776,000; 1927, 21,307,000; 1928, 21,461,000. The output of coal was fairly maintained; in 1914 it was 6,475,293 net tons; 1916, 7,910,647; 1917, 8,575,619; 1918, 9,438,688; 1920, 9,630,271; 1921, 7,200,666; 1922, 5,971,724; 1926, 6,512,288; 1928, 6,571,683. The State produced also a large amount of natural-gas gasoline: in 1920, 8,711,037; 1926, 40,625,000 gallons. Among other mineral products are gypsum, iron ore, sand and gravel, and stone. The total value of the mineral production in 1926 was $78,988,066, compared with $83,034,397 in 1920; $41,097,209 in 1919; $42,595,812 in 1918; and $12,417,753 in 1914.

Finance. State expenditures in the year ending Sept. 30, 1927, as reported by the U. S. Department of Commerce, were: for maintenance and operation of departments, $5,406,591 (of which $2,238,532 was for local education); interest on debt, $142,360; permanent improvements, $2,152,488; total, $7,701,439 (of which $2,432,313 was for highways, $760,226 being for maintenance and $1,672,087 for construction). Revenues were $8,823,564; of this, property and special taxes formed 17.7 per cent; departmental earnings, 4.3 per cent; and receipts from licenses 14.6 per cent. Assessed property valuation was $461,685,564; State taxation thereon, $1,970,843. Net State debt on Sept. 30, 1927, was $1,612,833.

Education. The immense area and largely rural population of Wyoming bring with them the educational problems associated with these conditions. Recent educational development has had particular reference to such problems. In 1913 the Superintendent of Education was directed to prepare a course of study for the elementary schools. In 1915 a law was passed requiring physical examination of school children; the State Institute was established; and a law was enacted providing for a school code committee to arrange for a survey by the Federal Bureau of Education. The report of this survey was rendered in 1916. In the following year, the Legislature adopted a school code, providing for the State Board of Education, and greatly enlarging the duties and powers of the department; this code was amended in 1918. A director of special classes devoted special attention to the elementary, rural, and high schools of the State and examined children, conducted mental surveys, and reorganized rural schools.

The director of vocational education had general charge of this work. The efforts of the Department of Education was centred in later years largely on the rural schools. In July, 1918, a movement was launched for so-called standard rural schools; this resulted in greatly improved conditions. In secondary education, the Department of Education aimed at the maintenance of accredited four-year high schools wherever the number of students and the financial support available made it possible. In 1922 there were 38 such schools. Vocational education, including courses in agriculture, industrial occupations, and home economics, was carried on with success in spite of great difficulties. It was the desire of the Department of Education to extend vocational education to every young person desiring to enter agriculture, business, or home-making without university training. Work also was being carried on under the Federal Vocational Rehabilitation Law of 1920; a State enactment provided coöperation. The total enrollment in all the schools of the State in 1912 was 26,502; in 1925–26, 50,138. The high-school enrollment in the latter year was 9664. Expenditure for public day schools in 1925–26 was: current, $5,337,027; outlays, $1,501,226. Illiteracy in the State decreased from 3.8 per cent in 1910 to 2.5 in 1920. In the native white population, it remained at 0.4 per cent; among the foreign-born, it decreased from 9.5 to 9.2 per cent; among the Negro, it increased from 5.3 per cent to 6.1.

Political and Other Events. In 1914 the Democratic candidate for governor, John B. Kendrick, was elected. In 1916 Governor Kendrick, Democratic nominee, was elected to the Senate. For president, Wilson received 28,316 votes; Hughes 21,698. The Republicans, in 1918, elected Robert D. Carey governor; Senator Warren, Republican, was reëlected. In 1920 Harding received 35,091 votes for President; Cox, 17,429. The Democrats in 1922 elected W. B. Ross governor; Senator Kendrick was reëlected. The leasing of oil reserves in the Teapot Dome Naval Reserve to H. F. Sinclair, by Albert E. Fall, Secretary of the Interior, in 1922, gave rise in 1924 to investigations and prosecutions of nation-wide bearing, extending over several years. For President, in 1924 Coolidge received 41,858 votes; LaFollette, 25,175; Davis, 12,868. Nellie Tayloe Ross, widow of Governor Ross who had died in office, was elected governor of the State in 1924, and continued his policies. In 1928 Hoover received 54,748 votes for President; Smith, 29,299. Frank C. Emerson, Republican, was elected governor in 1926.

Legislation. In 1917 the Legislature amended the laws relating to elections. The Legislature in 1919 passed a measure providing for a budget and made provisions for the eight-hour day on public work. In 1921 the Legislature created the State Farm Board and the State Game Commission. It authorized the Board of Education to promote Americanism. Measures passed in 1923 aimed to extend the taxing power of the State to mineral, oil, and natural-gas mines. Activities relating to agriculture were placed under a department. The hours of labor for women were limited, and child-labor laws were amended. The inheritance-tax law was altered in 1925.

WYOMING, UNIVERSITY OF. A State institution of higher education at Laramie, Wyo., founded in 1886. The student enrollment increased from 508 in 1914 to 1176 in 1928; the faculty from 66 to 108 in the same period; the library from 35,000 to 70,000 volumes; and the income from $192,534 to $971,657. In 1917 the music department building and a small model country school were built. In 1921 additional dormitory facilities for women students were provided by the completion of Hoyt Hall. A central heating plant on the campus also was completed in that year. In 1923 a $200,000 library was opened and in 1925 a $500,000 gymnasium-armory. In the following year, an engineering building was completed and in 1928 a residence hall for men was first occupied. President, Arthur Griswold Crane, Ph.D.

X-RAYS. See PHYSICS.

Y

YACHTING. The United States, Great Britain, and the Scandinavian countries are the nations that display the greatest enthusiasm for yachting. International competition has been afforded chiefly by boats of the six-meter class since 1920, the year the last races for the famous America's Cup were held. In the International Gold Cup Races of 1928, the *Fegaro* of Norway defeated the *Saleema* of the United States; while in another contest for six-meter boats, England won with 83 points as against a total of 59 for the United States. A race across the Atlantic from New York Harbor to Santander, Spain, for trophies offered by the King of Spain, attracted an entry of 12 yachts in two divisions. The *Elena,* a schooner owned by William B. Bell, led the first division fleet, covering the 3055 miles in 17 days. The *Nina* won in the second division, her time being 24 days.

Motor-boat and long-distance outboard racing are gaining much attention in the United States. In 1928 Gar Wood's *Miss America VII* set a new world record for motor boats by averaging 92.8 statute miles an hour.

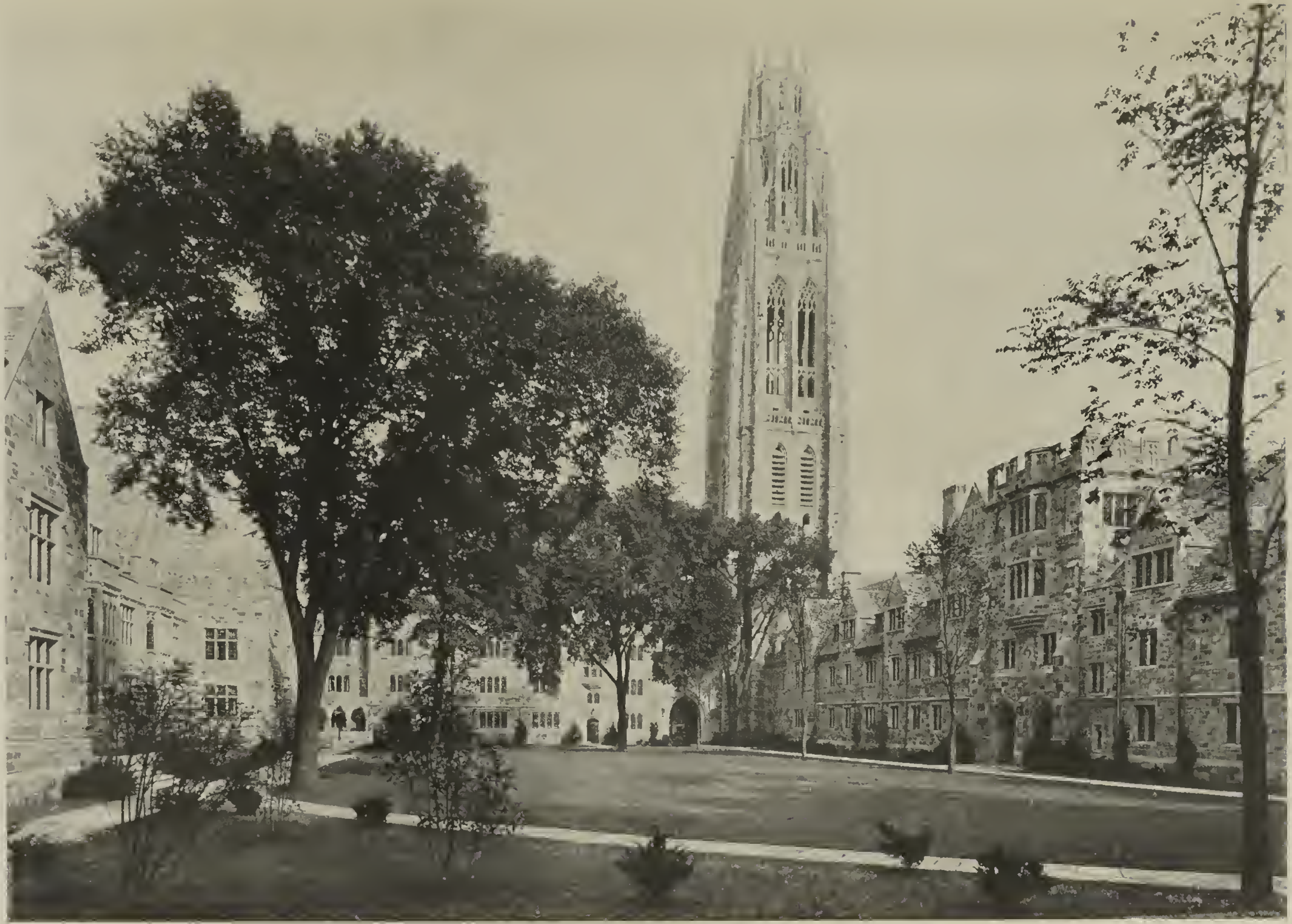
YAKUTSK AUTONOMOUS SOCIALIST SOVIET REPUBLIC. See SIBERIA.

YALE UNIVERSITY. A nonsectarian institution of higher learning at New Haven, Conn., founded in 1701. Student enrollment increased from 3289 in 1914 to 5743 in 1928. During the same period, the faculty increased from 460 to 1186, the library from 1,000,000 to 1,901,512 volumes and pamphlets; and productive funds from $15,379,363 to $58,024,459.36. In this period, many reorganizations in administration were adopted. All graduate work not given under the professional schools was concentrated in the graduate school under four groups of faculties. A common freshman year for both the college and Sheffield Scientific School was established in 1920 under a special dean and faculty, and the Sheffield course was lengthened from three to four years and became purely scientific. Building operations carried on during this period included the Harkness Memorial Quadrangle of dormitories for upper classmen, which covers an entire city block, given by Mrs. Stephen V. Harkness in memory of her son. The Sterling Chemistry Laboratory ($2,000,000) and the Sterling Hall of Medicine ($1,500,000) were completed in 1922 and 1923. These buildings were erected with part of the large trust fund left by John W. Sterling in 1919 to be used for building, scholarships, fellowships, and lectureships, and for the endowment of professorships, and the establishment of special funds for prizes. Sage Hall, containing offices and lecture rooms for the school of forestry, was opened in 1923 and the Lapham Field House in 1924. In that year a gift from Edward S. Harkness provided for the building of a university theatre and the establishment of a department of the drama in the school of fine arts. Professor George Pierce Baker, formerly of Harvard, was appointed to the chair of the history and technique of the drama and director of the theatre.

The Peabody Museum was dedicated late in 1925 and Edwin McClellan Hall, a dormitory, was opened for residence. An 18-hole golf course was laid out to occupy 120 acres of the Ray Tompkins Memorial, which comprises 700 acres to be developed for athletic uses, and the Carnegie Corporation appropriated $1,500,000 for added facilities in the history of arts in the school of fine arts. In 1926 the law school raised entrance requirements, admitting from another law school only those who had attained a B average, and introducing a system of honors courses. Construction of an art museum was begun through a gift of $1,000,000 from two anonymous donors, and the trustees of the Sterling estate provided funds for the erection of the Sterling Memorial Library to contain eventually 5,000,000 volumes with accommodations for special collections and seminars. Construction of the William L. Harkness Educational Building and of Charles W. Bingham Hall, a dormitory, was begun. A colonnade with an altar of liberty in the centre, a memorial to Yale men who lost their lives in the World War, was provided by gifts from alumni.

In 1926 the school of medicine instituted changes compatible with graduate education and designed to increase the student latitude of choice and opportunity to study in selected fields, abolishing the year system with its resultant division of the student body into classes. Buildings for the summer engineering courses of the Sheffield Scientific School at East Lyme, Conn., were completed in 1927. Athletic facilities were augmented by gift of funds for the Phipps Polo Field and for the Charles E. Coxe Memorial (Yale Field Gymnasium). Additional laboratory facilities were made available for the medical school in 1928 by the completion of the Brady Memorial Laboratory, Lauder Hall, and Farnam Memorial Building in the grounds of the New Haven Hospital. The Walter Camp Memorial Gateway was dedicated in 1928. In the autumn of 1929, work was begun on the new building for the Institute of Human Relations to cost $2,000,000. It was planned to be a part of the Human Welfare Group in which the university aims to study man from the mental, social, and physical standpoints with a view to correlating scientific knowledge in these fields. President James Rowland Angell, Ph.D., Litt.D., LL.D.

YAMAMOTO, COUNT GOMBEI (1852–). A Japanese naval officer and statesman, of the Satsuma clan. By 1896 he was a vice admiral, and he became a full admiral in 1904, when he was Minister of the Navy (1898–1906). In 1913–14 he was Premier, resigning because of naval scandals, and again in 1923, when the first cabinet meeting took place in the open air, in the midst of the smoking ruins made by the earthquake of September 1, and the new Government had to take immediate measures to relieve the unprecedented situation. On Dec. 29, 1923,



YALE UNIVERSITY

BRANFORD COURT, MEMORIAL QUADRANGLE, SHOWING THE HARKNESS MEMORIAL TOWER

Yamamoto and his cabinet resigned because of an attempt on the life of Prince Hirohito. He was created a baron in 1902, a count in 1907, and was made a Knight Grand Cross of St. Michael and St. George by Great Britain.

YAP (yäp) **ISLAND.** One of the Caroline group of islands, situated in the Pacific north of the Equator, and before the World War belonging to Germany, but since 1919 under a Japanese mandate. In 1916, by a secret agreement with Great Britain, Japan laid claim, in the event of Germany's defeat, to all of Germany's islands north of the Equator, while recognizing the British claims to those south of it. On this basis, the Supreme Council on May 7, 1919, allocated the islands north of the Equator, including Yap, to Japan as mandatory Power, although not without President Wilson's disapproval. The American interest was plain: Yap was nearer the Philippines than any other of the islands; it was, too, an integral point in the American system of communications in the Pacific, for here were to be found stations of the Pacific cable of the Commercial Cable Company from Hawaii, of an American-British cable extending north to the Bonin Islands, and of British lines to the Chinese coast, as well as a wireless station. During 1920–21, the American point of view was repeatedly stressed, to the discomfiture of Japan and Great Britain and to the greater straining of the bonds of the Allied unity. The American contentions centred in the facts that the United States government had served notice during the Peace Conference that it reserved the right to object to exclusive Japanese control of the cable landings, that as the German islands had been ceded to the Allies by the Peace Conference their disposition was a concern of the United States, and that in view of the property interests of other nations, Yap, so far as it was a cable landing station, ought to be internationalized. The Japanese insisted that Yap was theirs by the edict of the Supreme Council and that therefore the administration of the island was their exclusive concern. On Feb. 21, 1921, the American government dispatched to the Council of the League of Nations a note outlining its position and requesting a reopening of the question. On March 2, the Council admitted the claims of the United States but declared its inability to act, on the ground of the previous decision of the Supreme Council. This, too, represented the opinion of Great Britain and France. The solution of the difficulty rested on the meeting of the Washington Conference. On Dec. 12, 1921, finally, representatives of Japan and the United States signed an agreement by which the Japanese mandate was recognized by the United States. Japan, on the other hand, accorded the United States free access, on an equal footing with Japanese and other nationals, to the present cable between Yap and Guam and to any other cables which might be laid by Americans; the right to use the Japanese wireless service, and in case of suspension of this right, to build American stations; and freedom of entry and exit for persons and property. On Mar. 1, 1922, the United States Senate ratified the treaty affecting Yap, and the matter was formally closed. The island has a population of 7418, including 7230 natives, 171 Japanese, and 17 foreigners. See JAPAN; WASHINGTON CONFERENCE.

YEATS, yēts, WILLIAM BUTLER (1865–). An Irish writer (see VOL. XXIII), recipient of the Nobel Prize for Literature (1923) and a Senator of the Irish Free State since 1922. He was a fervid Nationalist and wrote much tropical verse, as well as *Responsibilities* (1914) and *Reveries over Childhood and Youth* (1916). In his poetry, he tried to carry out Synge's idea of the poet as one who "uses the whole of his personal life as his material." His poems are therefore very imaginative and individual. *The Wild Swans of Coole* (1919) reveals his interest in esoteric doctrine; *Michael Robartes and the Dancer* (1921) deals with the Ireland of 1916. He was one of the first in England to appreciate the poems of Rabindranath Tagore. Another Oriental preoccupation was the Noh drama of Japan. Under Japanese influence, he wrote *At the Hawk's Well* (1917) and *Two Plays for Dancers* (1919). He was deeply interested in the little theatre movement in Dublin, and worked for an aristocratic theatre for a small audience modeled somewhat on the Noh drama of Japan. Other later works were *Per Amica Silentia Lunæ* (1918); *The Cutting of an Agate* (1919); *Seven Poems and a Fragment*; *Later Poems* (1923); *Essays* (1924); *A Vision* (1926); *Estrangement; being some Fifty Thoughts from a Diary of 1909* (1926); *The Pot of Broth* (1926) and *Resurrection* (1927), plays; *October Blast* (1927) and *The Tower* (1928), poems; and Sophocles' *King Œdipus* (1928). In 1923 the publication of a new edition of his works was begun. Consult *William Butler Yeats; The Poet of Contemporary Ireland*, by J. M. Hone (1915), and *The Early Poetry of William Butler Yeats*, by Patty Gurd (1916).

YELLOW FEVER. Knowledge of this affection seemed for awhile greatly to have advanced. In 1918 the foci of the disease were limited to Ecuador and Guatemala. The outbreak in Guatemala was serious, with 550 cases and 200 deaths, but the disease was soon stamped out by the local health authorities in coöperation with the U. S. Public Health Service. At the same time, the Rockefeller Foundation sent Dr. Noguchi to study the cases of the disease at Guayaquil in Ecuador; in 1917 this was the only active focus of the disease in the entire world, prior to the Central American outbreak. In 1920 the Rockefeller Foundation formally announced that Dr. Noguchi's discovery of the exciting cause of the disease, a spirochæte, the *Leptospira icteroides*, had led to the preparation of a preventive and curative serum. Already, people going into yellow-fever districts were being immunized in the Broad Street Hospital in New York City. The disease was stamped out in South America, and in 1919 the world was for a time entirely free from it. In 1920 it broke out anew in Yucatan, and Dr. Noguchi was sent to the infected area. Several shipments of the Rockefeller vaccine also were forwarded. Specimens of the spirillum culture were sent from Yucatan to Havana for study, and it was ascertained that the dog can be inoculated with a disease which closely resembles human yellow fever. In 1921 Dr. Howard Cross, who was to have taken charge of the bacteriological laboratory at Vera Cruz, fell a victim to the disease.

During the brief space of two years, however, our views of the nature of this affection, themselves so recent, have had to recede in favor of others which differ radically. Although the disease in meridional America had apparently been conquered for the time, largely through the efforts of Noguchi who had seemingly discovered the cause and devised a technic for immunization, it reappeared in 1926 in its original homestead, the West Coast of Africa, from Senegal to the Gold Coast. The Rockefeller Commission dispatched Prof. Adrian Stokes to Lagos and, after he had succumbed to the disease, Noguchi himself followed and met the same fate. Other scientist martyrs followed, and it is now regarded as too hazardous to study this disease in its native habitat. It can be conveyed to monkeys and the preserved infected organs of these animals are being studied in the temperate zone. A large body of data has been accumulated which tends to show that the disease is due to a filter-passing virus and not to any visible organism (the original belief before Noguchi's supposed discovery). For the time being, through the coöperation of the Rockefeller Commission and the local governments in French and British territory, the disease has been brought to arrest. It is unfortunate that Noguchi did not survive to adjust his results in the Western Hemisphere with those in Africa.

YEMEN. See Arabia.

YERKES, Robert Mearns (1876–). An American experimental psychologist (see Vol. XXIII). He was the organizer of the psychological tests for the U. S. Army during the World War. In 1915 he had prepared a point scale for mental ability, and it was this scale, rather than the Binet mental-age tests, which was found practicable for the stupendous task of cataloguing the abilities of more than 1,000,000 men. Major Yerkes edited the publication of the test results under the titles, *Army Mental Tests* (1920) and *Psychological Examining in the United States Army* (1921). He also edited a volume on *The War and Science* (1920). He was chairman of the Research Information Service of the National Research Council (1919–24). Since 1924 he has been professor in the Yale Institute of Psychology. He was coauthor of *Chimpanzee Intelligence and Its Vocal Expressions* (1925), and author of *Almost Human* (1925) and *The Mind of a Gorilla* (1927). He is editor of the *Journal of Comparative Psychology*. See Mental Measurement.

YESHIVA COLLEGE. The first college of liberal arts and science in the United States under Jewish auspices. It is for men only and aims to afford its students a harmonious combination of secular and Jewish studies, a union of the culture and faith of Israel's age-old heritage with the culture and knowledge of the present-day world. The Rabbi Isaac Elchanan Theological Seminary (the Yeshiva) was chartered in New York, in 1896, and later absorbed the Etz Chaim Talmudic Academy, the oldest Jewish day school in the United States, chartered in 1886; and by amendment to the charter, in 1928, the Yeshiva became known as the Rabbi Isaac Elchanan Theological Seminary and Yeshiva College, and was authorized to offer courses leading to the baccalaureate degree. The freshman year of the college began its work in the autumn of 1928, with an enrollment as follows: Senior seminary, 142; junior seminary, 235; teachers' institute, 135; college (freshman year), 31. The faculty numbered 31. The income for the year was $142,000. The library contained 17,000 volumes, and a collection of manuscripts. On Dec. 9, 1928, a group of buildings, including the main building, the auditorium, and the dormitory, with accommodations for 1500 students and 200 resident students, was dedicated at Amsterdam Avenue and 186th to 188th streets, New York. The next group to be erected provided for a new library and a museum of Jewish art and archæology. A building campaign yielded over $2,700,000 and additions were made to the endowment fund. President of the faculty, Bernard Revel.

YON, Pietro Alessandro (1886–). An Italian organist and composer, born at Settimo Vittone in Piedmont. At the age of six, he began his musical studies with A. Burbatti at Ivrea. In 1900 he entered the Conservatory of Milan, but winning a scholarship in the following year at the Conservatory of Turin, he continued his studies there under da Venezia (piano), Redmondi (organ), and Bolzoni (composition). He then attended for one year the Accademia Santa Cecilia in Rome, where his teachers were Bustini and Sgambati (piano), Renzi (organ), and de Sanctis (composition). He graduated in 1905 as winner of the first prize and of a medal awarded by the Minister of Public Instruction. From 1905 to 1907, he was assistant to his teacher Renzi, organist of St. Peter's, and even then his recitals began to attract attention. In 1907 he settled in New York as organist at St. Francis Xavier's, where he remained until 1927, when he accepted a call to St. Patrick's Cathedral in that city. Frequent and extensive tours of the country soon established his reputation as one of the greatest living organists. In 1921 he was honored by the appointment as honorary organist at St. Peter's in Rome. This was the first time that this distinction had been conferred. His works consist of 17 masses; *Concerto Gregoriano*, for organ and orchestra; a concerto for oboe and orchestra; brilliant organ compositions, mostly in larger forms; motets (a cappella and with organ); piano pieces; and songs.

YORK, Archbishop of. See Temple, Most Rev. William.

YOUNG, Allyn Abbott (1876–1929). An American economist, born in Kenton, Ohio, and educated at Hiram College and Wisconsin University. During 1902–06 he taught economics at Wisconsin, Western Reserve, and Dartmouth universities and then became professor of economics at Stanford. In 1911 he accepted a call to a similar chair at the University of Washington and two years later went to Cornell, where he remained until 1920, when he was called to Harvard. After 1927 he also held a professorship of political economy at the University of London. During the World War, he was director of the bureau of research of the War Trade Board and then was chief of the division of economics and statistics of the American Commission to Negotiate Peace. He was a member of the Massachusetts Commission on Pensions, 1923–24, and president of the American Economic Association, 1925. In addition to many articles and papers on economic subjects, he was one of the authors of *Outlines of Economics* (1908, 1916). Subsequently he also wrote *Economic Problems, New and Old* (1927) and *An Analysis of Banking Statistics* (1927).

YOUNG, Clarence Marshall (1889–). An American lawyer and public official, born in Colfax, Iowa, and educated at Drake University and the Yale Law School. Admitted to the Iowa bar in 1910, he practiced at Des Moines until 1917 when he joined the U. S. Army Air Service and spent 18 months in Europe, including five months as a prisoner of war in Austria. He became a major in the Air Corps Reserves. Appointed to the aëronautics branch of the U. S. Department of Commerce in 1926, he became chief of the Division of Air Regulations in 1927, then director of aëronautics, and in September, 1929, was appointed Assistant Secretary of Commerce for Aëronautics.

YOUNG, The Rt. Hon. Sir (E.) Hilton (1879–). A British authority on finance. He was educated at Eton and at Trinity College, Cambridge, and called to the Bar (Inner Temple) in 1904. Enrolling as a naval lieutenant for the World War, he served on the *Vindictive* at Zeebrugge Mole in 1918, was severely wounded, and promoted to lieutenant commander. In the Archangel campaign, he commanded an armored train, winning membership in the Distinguished Service Order. He was a Liberal member of the Parliament for Norwich in 1915–23 and after 1924. He left the Liberal and joined the Conservative Party in 1926. He served as Financial Secretary to the Treasury (1921–22), attended The Hague Conference on International Finance in 1922, was on financial missions to India (1920), Poland (1924), and Iraq (1925), and was a delegate to the Assembly of the League of Nations in 1926 and 1927. He was also a member of the Royal Commission on Indian Currency and Finance (1925) and of the East African Commission (1926). In journalism, he served an apprenticeship as assistant editor of the London *Economist*, and later became financial editor of the *Morning Post* and editor-in-chief of the *Financial News*. He is the author of *Foreign Companies and Other Corporations* (1911); *System of National Finance* (2d ed., 1924); *A Muse at Sea* (1919); and *By Sea and Land* (2d ed., 1924).

YOUNG, Francis Brett (1884–). A British novelist and poet who was educated at Epsom College and the University of Birmingham, and started his career as a doctor. He made a lecture tour of the United States in 1926 and in 1928 gave the Frances Bergen Memorial Lecture at Yale University. He was a major in the Royal Army Medical Corps during the World War, serving in German East Africa. *Marching on Tanga* (1918) was a description of the spirit of the forest campaign there, and *The Crescent Moon* (1918) and *Five Degrees South—Poems* (1917) grew out of the same experience. His other works include: music for the *Songs of Robert Bridges* (1912); *Robert Bridges, A Critical Study* (1913); *The Dark Tower* (1914); *The Iron Age* (1916); *The Young Physician* (1919); *Poems* (1919); *Captain Swing*, a play (1919); *The Tragic Bride* (1920); *The Black Diamond* (1921); *Pilgrim's Rest* (1922); *Woodsmoke* (1924); *Sea Horses* (1925); *Portrait of Clare* (1927), which won for him the James Tait Black Memorial Award, and was published in the United States as *Love is Enough*; *My Brother Jonathan* (1928); and *Black Roses* (1929).

YOUNG, Hugh Hampton (1870–). An American surgeon and urologist, born in San Antonio, Tex. He was graduated from the University of Virginia in arts and medicine (1893), studied at Johns Hopkins (1894–95), was pathologist and resident physician at the Thomas Wilson Sanitarium (1895–98), and after specializing in urology was placed at the head of the urological department of Johns Hopkins Hospital and made clinical professor of the same branch in the college faculty. He was also made director of the J. B. Brady Urological Foundation at Johns Hopkins. During the World War, he was director of urology of the A. E. F. Dr. Young has been president of each of the two national urological societies and of the International Congress of 1927. He founded and edits the *Journal of Urology* and recently published a standard work, *The Practice of Urology*, in 2 vols. He has contributed over 200 papers to periodical literature on urological subjects. In 1928 he published (with Waters) *Urological Radiology*.

YOUNG, John Wesley (1879–). An American mathematician, born in Columbus, Ohio, and educated at Ohio State University and at Cornell. After teaching at Cornell, Northwestern, and Princeton universities, he was head of the department of mathematics at Kansas University (1908–10) and was then called to Dartmouth, where he has since remained. Algebra and geometry have been the subjects of his special studies and he has published a number of books and many papers on these subjects. He was editor of the *Bulletin of the American Mathematical Society*.

YOUNG, Levi Edgar (1874–). An American lecturer and professor of history, born at Salt Lake City, Utah, and educated at Utah, Harvard, Strassburg, and Columbia universities. He was professor and head of the department of Western history at the University of Utah (since 1900). Professor Young lectured widely in American universities on the history of that State. He was a member of many historical and scientific societies and of the First Council of 70 of the Church of Jesus Christ of Latter-day Saints. He wrote *History of the Mormon Tabernacle* (1918) and *The Founding of Utah* (1923).

YOUNG, Mahonri (Mackintosh) (1877–). An American sculptor and etcher, born at Salt Lake City, Utah. He is a grandson of Brigham Young. He studied at the Art Students' League, New York City, and the Julian Academy, Paris. He was for some years instructor in drawing at the Art Students' League and more recently at the American School of Sculpture. He is known chiefly for his figures of laborers, usually small in size, but depicted in an interesting and virile manner. Among his best-known works are "Man with Pick" (Metropolitan Museum, New York); Hopi and Apache groups, in the Museum of Natural History, New York; "A Laborer" and "The Rigger," Free Public Library, Newark, N. J., and the sea-gull monument in Salt Lake City. He is a National Academician (1923) and a member of the National Sculpture Society.

YOUNG, Owen D. (1874–). An American lawyer and financier, born at Van Hornesville, N. Y., and educated at St. Lawrence University and the law school of Boston University. Beginning the practice of law in Boston in 1896, he went to New York in 1913 to become counsel for the General Electric Company and vice president in charge of policy. In 1922 he was elected chairman of the board. He also organized the Radio Corporation of America, becoming chairman of its board and a director in numerous corporations. In 1921 President Harding appointed him a member of the Conference on Unemployment and he was a member of the Second Industrial Conference (1922) and the International Distribution Conference (1924). As a member of the first Committee of Experts appointed by the Reparations Commission in 1924 to investigate the financial condition of Germany, he was credited with much of the responsibility for the Dawes Report and upon the adoption of the Dawes Plan was appointed Agent General for

Reparation Payments *ad interim.* In 1929 he was chairman of the second Committee of Experts which formulated at Paris the Young Plan, subsequently adopted in place of the Dawes Plan, at a reparation conference of European statesmen in Brussels. Mr. Young is a member of numerous American and European legal and scientific societies and holds honorary degrees from 11 American universities.

YOUNG, Stark (1881-). An American author, born at Como, Miss., and educated at the University of Mississippi, where he taught English from 1904 to 1907. He afterward taught English at the University of Texas and at Amherst College (1915-21). He was a member of the editorial staff of the *New Republic* (New York), 1921-24 and since 1925. He was also dramatic critic of the *New York Times,* 1924-25. His writings include: *The Blind Man at the Window,* verse (1906); *Guenevere,* a play in verse (1906); *Madretta, Addio, The Twilight Saint, The Seven Kings and the Wind, The Queen of Sheba, The Dead Poet,* and *The Star in the Trees,* one-act plays in prose and verse (1911); *Three Plays* (1919); and *The Three Fountains* (1924), a book of colorful sketches with American and European settings; *The Saint,* a play produced by the Provincetown Players (1924); *Heaven Trees,* a novel (1926); *The Theatre* (1927); *River House,* a novel (1929).

YOUNG MEN'S CHRISTIAN ASSOCIATION. This movement, to advance the educational, social, physical, and spiritual interests of men and boys, having national organizations in 33 countries, continued to expand in activities and membership during the years 1914-1929. Its work received great impetus, particularly in Europe, as a result of the war work of the North American associations, and the years 1919-1924 saw an increase of nearly 400 local associations in Europe. During the War period, the association conducted nine-tenths of the welfare work among the American forces in Europe. Its actual war service began in 1914 when assistance was rendered to those in prison camps and in the Allied camps in France and the Near East, and was extended later in the United States to training camps, army and navy posts, and transport ships. This work at home and abroad was carried on by 25,925 men and women, and involved the expenditure of over $61,000,000 for free welfare services for the American Expeditionary Forces alone. Before the Armistice, the Y. M. C. A. operated 1397 stations in France and 2029 in the following winter during the period when the soldiers were waiting to go home. The Association opened 425 centres for the Army of Occupation in Germany and served 83 out-stations by rolling canteens. The service between 1917 and 1920 was directed by the National War Work Council, composed of some 200 business and professional men, with William Sloane, Chairman, and Cyrus H. McCormick and George W. Perkins in charge of the budget and finance committees. Contributions in America to the council totaled $167,000,000, of which $155,000,000 had been expended when the council disbanded, the remaining funds being distributed for relief work and educational purposes in the Army and Navy and to ex-service men. Between 1919 and 1924, the Y. M. C. A. had furnished educational assistance to more than 100,000 ex-service men studying in colleges, and technical and correspondence schools. Under the association's educational commission, 900,000 soldiers studied in army schools, 6300 in French universities, and 1956 at British universities. Thousands of prisoners gathered in Siberia awaiting transport were served, and assistance was given to Russian prisoners to enable them to return home from France and Germany.

In 1928 the work of the association was carried on in 32 foreign countries by 869 local and national secretaries partially supported by a budget of $1,986,200 from associations in North America. The world membership on June 1, 1929 totaled 1,589,508, of whom 63 per cent were in North America; there were 7856 employed officers; and association property was valued at $264,155,415. The North American movement involved 1582 local organizations with 87,890 volunteer directors and committee leaders, 5282 paid officers, and a total membership of 1,002,356, of whom 276,702 were boys 12 to 17 years of age. Of the members, 50,392 are in the various associations in Canada, with 18,830 boys. The endowment fund in 1929 amounted to $29,321,000 and operating expenditures to $60,682,200, or more than $1,165,000 per week. The Y. M. C. A. carried on several hundred distinct features and lines of service during 1929, including physical training and service with an enrollment of 716,742 men and boys; educational features attracting 280,000; college courses of two to four years length with an enrollment of 71,800; Bible courses with an enrollment of 218,076; and religious meetings with an attendance of 4,361,100. Three colleges were maintained for the professional training of secretaries and paid workers, at Springfield, Mass., Chicago, Ill., and Nashville, Tenn. The association was reorganized Jan. 1, 1925, to consist of the National Council of Canada and the National Council of the United States, which supervise and promote local and State activities, and the International Committee, a holding organization for the two councils which retained an active interest in foreign work. The headquarters and officers of the foregoing were as follows in 1928: The International Committee, 347 Madison Avenue, New York, James M. Speers chairman, and Dr. John R. Mott, general secretary; the National Council of the United States, 347 Madison Avenue, New York, F. W. Ramsey, general secretary; and the National Council of Canada, 40 College St., Toronto, Ont., H. Balantyne, general secretary.

YOUNGSTOWN. A city of Ohio, ranking second as a steel centre in the United States. The population increased from 83,044 in 1910 to 132,358 in 1920 and to 174,200 in 1928, by estimate of the U. S. Bureau of the Census. The city government was changed in 1924 to the federal form under home rule. A city-planning and zoning system was inaugurated, controlling the heights of buildings, parking districts, and building lines; and the transit system came under municipal control on a service-at-cost franchise. In 1918 a $2,000,000 building was erected in which to house the Butler Art Institute, founded by Joseph G. Butler, Jr.; in 1924 an additional 800 acres were acquired so as to extend Mill Creek Park south along upper Mill Creek from Lanterman's Falls to the Boardman-Canfield Road; and in 1928 the Stambaugh Memorial Auditorium, erected through a bequest from Henry H. Stambaugh, was completed at a cost of $5,000,000. By 1928 Youngstown had 120 churches; among those erected since 1920 were: the Mahoning Avenue Methodist Episcopal, Unitarian, First Baptist, Third Reformed, St. Luke's

Lutheran, and St. Dominic's Roman Catholic churches. Other important structures erected since 1920 included the Armory, First National Bank, Central Savings and Loan, Realty Trust, Mahoning Bank, and Palace Theatre buildings.

In 1929 a joint water-supply system for Youngstown and Niles was under construction at an estimated cost of $9,500,000. The principal feature was an impounding reservoir with a capacity of 10,000,000,000 gallons on Meander Creek, a tributary of the Mahoning River. An additional storage reservoir at Lake Milton, 15 miles west of the city, had a capacity of 10,000,000,000 gallons and was one of the largest artificial lakes in the world. The municipal airport, Lansdowne Field, was established in 1927.

In 1928 Youngstown had 43 grade schools and several high and junior high schools, among which were the South, the East, and the Rayen, and the Lincoln Junior high schools. In addition, there were nine parochial schools, several private academies, and the Youngstown Institute of Technology. The school enrollment in 1928 was 39,000. The capital invested in manufacturing increased from $123,000,000 in 1915 to $425,000,000 in 1928 and the value of products manufactured, from $92,111,000 in 1914 to $475,000,000 in 1928, according to local estimates. The U. S. Census of Manufactures placed the value of manufactured products in 1927 at $207,378,620. Bank clearings in 1928 amounted to $305,766,000. The assessed valuation of property in 1927 was $364,669,000; the net debt was $9,641,000.

YOUNG WOMEN'S CHRISTIAN ASSOCIATION. A social-religious organization whose purpose is to advance the physical, social, intellectual, and spiritual interests of young women and to promote growth in Christian character and service. The majority of associations in different parts of the United States are united under the National Board, with headquarters at 600 Lexington Avenue, New York. Representatives from these affiliated organizations meet in convention every two years, make and adopt policies, and elect members to the National Board, which serves as the executive committee to which is entrusted the work of the national body during the interim of conventions. It works under six main divisions: general administration, field, finance, education and research, business, and the national student council.

The work of the Young Women's Christian Association since 1914 has covered many activities and has been of great importance. Immediately following the entrance of the United States into the World War, the association appointed a war council and, after raising a war fund of $5,000,000, entered on an active campaign in the interest of girls and women in the War. Features of this work were the erection of hostess houses in the army camps throughout the United States, emergency housing for women and girls in military and industrial centres, the formation of the Patriotic League for younger girls, and club and recreation centres for white and for colored women, and work with foreign-born women. The Association also instituted industrial clubs for the women of France and of Russia and organized social centres for American nurses in France. Work was extended into Czechoslovakia, Poland, Italy, Belgium, Rumania, and the Near East, and during 1921 and 1922, there was maintained certain work of post-war significance, financed from the balance of funds originally designated for war work. Distinguishing features of the association's work since the War has been the adoption of the social ideals formulated by the Federal Council of the Churches of Christ in America and the development of a spirit of international and interracial tolerance. Through its foreign division, the national board participates in the work of the World's Young Women's Christian Association in London, carrying on association work for women and girls in the Baltic states, the Near East, the Orient, South America, and the Philippine Islands.

In 1928 this department sponsored work in 12 countries, with a staff of 107 American secretaries.

In 1928 there were in the United States 48 rural associations doing work in 880 communities, 146 associations in towns, 264 associations in cities, and 680 student associations in colleges and universities. Of these, 969 associations were affiliated with the national organization. In addition, there were approximately 1000 branches and centres, owned and managed by city associations, in which particular attention was paid to work among colored and foreign-born girls and women. The membership of the organization increased from 364,673 in 1916 to approximately 600,000 in 1928. Of this total, 200,000 were Girl Reserves, the organization's teen-age members; 45,000 were industrial girls; 125,000 were business and professional women; 108,000 were students; and 560 were corresponding members. The total expenditures of local associations in 1928 amounted to $25,900,000, while the value of real estate owned by these organizations was $66,700,000. The book value of the national board's property in 1928 was $4,402,290, and its gross expenditures amounted to $2,230,876. Contributions to the national board for general budget and special work totaled $1,102,552; the income from endowment amounted to $140,166 and the income from income-producing units, to $970,923. In 1928, 161,174 girls and women obtained positions through the employment bureaus of local associations; 122,973 were assisted in finding rooms; 592,709 were housed in association residences; and 390,228 were registered in educational classes. The number of workers, both professional and volunteer, in 1928 was 57,698; of these, 3473 were employed secretaries. Volunteers served as board and committee members, assisting in management, raising funds, and aiding professional staffs, and acted as club advisers. The president of the national board in 1928 was Mrs. Robert E. Speer and the general secretary was Miss Anna Rice, who was appointed following the death of Miss Mable Cratty in 1928.

YPRES, ē'pr', BATTLES OF. See WORLD WAR, *Western Front.*

YPRES, FIRST EARL OF. See FRENCH, JOHN DENTON PINKSTONE.

YSER, BATTLES OF THE. See WORLD WAR, *Western Front.*

YUDENITCH, NIKOLAI (1862–). A Russian general, educated at the General Staff College. He saw service in Turkestan and in the Russo-Japanese War. At the beginning of the World War, he rendered great service to the Allied cause as commander of Russian forces in the Caucasus, and when in 1917 the revolution caused a complete breakdown of Russia's military organization, Yudenitch by a masterly retreat succeeded in extricating his men from a difficult position. From the Baltic provinces in 1920, he attempted to overturn the Soviet régime, but was defeated.

YUGOSLAVIA. See Jugoslavia.

YUKON, yo͞o′kŏn. A Territory of the Dominion of Canada, bordering on Alaska. Total area, 207,076 square miles. Population in 1921, 4157, and in 1929 officially estimated at 300. In 1911 it was 8512; and in 1901, during the gold boom, 27,219. Capital, Dawson City, with a population of 975 in 1921, as against 3013 in 1911. Mining is the chief occupation. In 1927–28 the gold output was valued at $568,231. Other minerals produced in the latter year were silver, lead, and coal; copper production was not reported after 1920. In 1928 the total mineral production was valued at $2,683,270. In 1913 the mineral production totaled $6,276,737 and in 1907, $3,335,898. The fisheries continue to be of some importance. There were 21 fur farms in 1923. Fur exports for 1926–27 were valued at $382,261. Prior to 1920, the Yukon was governed by a gold commissioner and a territorial council of 10 elected members. After that date, the membership of the council was reduced to three. The territorial revenues in 1928 were $211,331 and expenditures, $213,589.

Z

ZAGHLOUL, Saïd Pasha (1856–1927). An Egyptian Premier, educated at the Mohammedan University at El Azhar. In 1884 he began to practice law, in 1906 he became an able Minister of Education, and in 1910, Minister of Justice. When his charges against Khedive Abbas Hilmy were not proved, Lord Kitchener forced him to resign (1912) and he became bitterly opposed to the British. After the Armistice in 1918, he asked for recognition of Egyptian independence by the withdrawal of the British protectorate. When he was not allowed to go to London to urge this cause, he and his friends exhibited so hostile an attitude that three of them were arrested and deported to Malta. This action aroused the country, and many were killed in the subsequent outbreaks.

Zaghloul Pasha was released after a time, and continued his propaganda from Europe. When he returned to Egypt in 1921, rioting took place and he was again arrested and deported to Ceylon. In 1922, when the British declared Egypt independent, except for certain "reserved points," Zaghloul and his followers demanded complete independence, and in the election of January, 1924, for which he was allowed to return, they received a large majority. Zaghloul was made Premier early in 1924, but after loss of prestige due to fruitless conversations with Ramsay MacDonald, the British Premier, and the assassination of Sir Lee Stack, the Sirdar, in November, 1924, he resigned. In 1926 he was again Premier for a short period, and afterward continued to direct Nationalist policy even though he held no office.

ZAHN, tsän, Ernst (1867–). A Swiss novelist (see Vol. XXIII). His later publications include: *Einmal Muss wieder Friede werden!* (1916); *Stephan der Schmied* (1917; Eng. trans., 1920); *Johannes A Pro*, a war play (1919); *Schweizer* (1920); *Lotte Esslings Wille und Weg* (1921); *Das Licht*, short stories (1922); *Die Hochzeit des Gaudens Orell* (1927); and *Brettspiel des Lebens* (1928). Consult *The Modern German Novel*, by H. W. Hewett-Thayer (1924).

ZAIMIS, Alexander. See Greece.

ZANG'WILL, Israel (1864–1926). A British author (see Vol. XXIII). He was active as a speaker in Great Britain and Ireland, Jerusalem, Holland, and the United States. During the World War, he was a pacifist. His attempt to combine all the Jewish organizations in a plan to secure the Highlands of Angola as the Jewish national home was unsuccessful, and he later declined to work with the Zionists when the British government supported a plan to set apart Palestine for the Jews. He published *The War for the World* (1916); *The Principle of Nationalities* (1917); *Chosen Peoples* (1918); *Jinny the Carrier*, a novel (1919); a volume of essays, *The Voice of Jerusalem* (1920); *Flutter-Duck*, fiction (1923), and *Ibn Gabriol's Poems*, from the Hebrew (1923). He also wrote the comedies *Too Much Money* (1918); *The Cockpit* (1921); *The Forcing House, or the Cockpit Continued* (1922); and *We Moderns*, a post-war comedy in three movements (allegro, andante, adaigo) (1926). Consult *Israel Zangwill, a Biographical Sketch*, by Harry Schneiderman (1927).

ZANZIBAR, zän'zĭ-bär. A Brtish protectorate of East Africa comprising the island of Zanzibar (640 square miles), the island of Pemba (380 square miles), and several islets. The population of the protectorate in 1924 was 216,790. By the 1921 census, there were 24,125 inhabitants not native, including 270 Europeans, 10,000 Arabs, and 12,900 British Indian subjects. Zanzibar town has 38,700 inhabitants. Cloves and copra continue the most important articles of trade. Others are rice and grain, ivory, and raw cotton, all of which entered into the transit trade. Export values in 1913, 1921, and 1927 were £1,048,366, £3,246,405, and £1,828,258. Import values for 1913, 1921, and 1927 were £1,103,348, £3,223,295, and £1,771,124. Leading articles of import are cotton piece goods, rice and grain, sugar, motor spirits, and petroleum. In 1913, 1,502,920 tons of shipping entered; in 1923, 1,602,640 tons; in 1926, 1,238,892. Of late years, the importance of Zanzibar port as a point of transshipment and as a distributing centre decreased, owing to the development of the mainland, the establishment of direct steamer communication between coast ports and Europe, and the growing importance of Aden. The local traffic was retained. Revenues increased from £275,126 in 1913 to £540,345 in 1927. For the same years, expenditures were £248,000 and £606,301. The public debt at the end of 1927 was £100,000. In July, 1913, control over the affairs of the protectorate was vested in the Colonial Office. The reigning Sultan, Seyyid Khalifa bin Harud, whose influence over the natives of East Africa was great, aided considerably in keeping the country well disposed toward Great Britain during the World War.

ZECKWER, Camille (1875–1924). An American composer, born at Philadelphia. He received his early training from his father at the Philadelphia Musical Academy, then studied for two years (1893–95) under Dvorák at the National Conservatory in New York, and later under Schadwenka in Berlin. In 1915 he became director of the Germantown branch of the Philadelphia Musical Academy. In 1922 he was the first recipient of the newly established $1000 prize awarded annually at the North Shore Festival (Evanston, Ill.). His works include a symphonic poem, *Sohrab and Rustum; Jade Butterflies* (North Shore Festival Prize); *Swedish Fantasy*, for violin and orchestra; a piano concerto; a piano trio, a piano quartet, a piano quintet; a string quartet; and two violin sonatas; *Sérénade Mélancolique* for violin, 'cello, and piano; *The New Day*, cantata for soli, chorus, and orchestra; piano pieces; choruses; and songs. A three-act opera, *Jane and Janetta,* had not yet been produced in 1929.

ZEMGALS, Gustav (1871–). A President of Latvia, who was educated at Moscow University and entered upon a legal career in 1899. He was Lord Mayor of Riga in 1917 and 1919, vice president of the National Council which proclaimed the Latvian Republic in November, 1918, and a member of the Constitutional Assembly. He was elected President of the Republic Apr. 8, 1927, for the term ending in 1930.

ZEMSTVOS, All-Russian Union of. See Russia, *History.*

ZIEGFELD, Florenz (1869–). An American theatrical producer. He was born at Chicago, received high-school training, and at the age of twenty-three entered the theatrical business. During the World's Fair at Chicago in 1893, he brought military bands from Europe for that enterprise, and managed the Chicago Trocadero. He became manager and lessee of theatres in New York and Boston. Since 1907 he has produced *Ziegfeld's Follies.* He married Billie Burke, the actress, in 1914.

ZEPPELIN AIRSHIPS. See Aëronautics.

ZIMMERMANN, tsĭm'ĕr-män, Arthur (1859–1925). A German public official, born at Frankenstein. He entered the Foreign Office in 1902 in a subordinate capacity and in 1910 was made director of the political section. In November, 1916, he became Foreign Secretary and as such attempted to incite Mexico to an attack on the United States and suggested that Mexico should be rewarded by the gift of New Mexico, Texas, and Arizona. Disclosures concerning his activities and those of Bethman-Hollweg caused the downfall of the latter, and Zimmermann was forced to retire on Aug. 5, 1917.

ZINC. Since 1914 the zinc-producing industry of the world has passed through several interesting phases. Particularly is this true of the industry in the United States, where, for a time, there was extraordinary developments in production and where most of the refinements in ore-dressing and metallurgical practice have originated. In 1870 the United States produced about 7000 tons of zinc, but by 1928 its output amounted to 583,210 tons. In that country, there are three principal kinds of zinc ores; first, the lead-zinc ores of the Missouri, Kansas, Oklahoma, and Wisconsin districts; secondly, the oxidized ores from the remarkable mine of the New Jersey Zinc Company in New Jersey; and thirdly, the complex-sulphide ores, chiefly copper-zinc and silver-lead-zinc, of the Rocky Mountains. It is in this latter field that the most important new metallurgical developments have been made in recent years, for practicable methods of concentrating the ores by the selective flotation process have been worked out, and the electrolytic process for the production of high-purity zinc has been successfully applied to the zinc concentrates produced by the selective flotation process.

There were two electrolytic zinc plants in operation in the United States in 1928—that of the Anaconda Copper Mining Company, at Great Falls, Mont., and that of the Sullivan Mining Company at Kellogg, Idaho. Construction of a third plant was started in 1928 at East St. Louis, Ill., by the Evans-Wallower Lead Company. The high-purity zinc produced by the electrolytic zinc process is slowly displacing the zinc produced by the retort, or furnace, process in most of the important outlets for zinc metal.

Beginning with 1926, the zinc-producing industry in the United States entered its second period of readjustment since the World War. The first period had marked the bringing of war-time production down to a peace-time consumption basis. The second period of readjustment marked a shifting of the supply sources of zinc concentrates and zinc metal. The importance of the Missouri, Kansas, and Oklahoma production began to decline in 1926 and it appeared that further refinements in the operation of the selective flotation process of the Rocky Mountain States would mark a growing increase in importance of that section as a zinc producer. Overproduction characterized the zinc industry of the United States in 1927 and the price of zinc metal declined sharply. Zinc exports from the United States also have shown a downward trend in recent years and the domestic producer has been forced to depend more on consumption at home.

The American Zinc Institute was organized shortly after the close of the War for the purpose of popularizing the use of zinc, and of conducting research for developing new uses for the metal.

Production of zinc in Europe and in Canada has shown remarkable increases in recent years and it is this condition that has brought about the decline in exports from the United States. In 1928 there was formed the International Zinc Cartel for the purpose of preventing overproduction. The electrolytic zinc process has been adopted by several companies in Europe and it appears likely that the proportion of electrolytic zinc produced in Europe will increase at a rate corresponding to that in the United States.

Although most of the zinc produced is utilized in the manufacture of brass and in the galvanizing or coating of sheet iron and steel, nevertheless there has been a considerable increase in recent years in the manufacture of rolled and sheet zinc, and by the die-casting industry. In addition to its uses as a metal, zinc oxide is one of the most important mineral pigments and is also largely used in the production of automobile tires. Zinc chloride is used by railroad companies, for the preservation of ties, and by other consumers of timber.

AVERAGE PRIME WESTERN GRADE ZINC PRICES AT EAST ST. LOUIS, ILL.
(From *Engineering and Mining Journal*)
(In cents per pound)

1923	6.607
1924	6.344
1925	7.622
1926	7.337
1927	6.242
1928	6.027

ZINC PRODUCED IN THE UNITED STATES
United States Bureau of Mines
(In short tons)

	1925	1926	1927
Arkansas	27,145	32,716	26,317
Illinois	109,672	110,381	102,768
Kansas	25,765	33,671	33,144
Oklahoma	138,906	136.560	120,801
Pennsylvania	99,899	100.538	106,099
Other states	92,555	92,964	90,758
Electrolytic	79,004	111,596	112,629
Total primary	572,946	618,422	592,516
From domestic ore	555,631	611,991	576,960
From foreign ore:			
Canada	7,997	......	......
Mexico	9,318	6,431	15,556
Total foreign	17,315	6,431	15.556
Total primary	572,946	618,422	592.516
Redistilled secondary	39,181	40,799	42,784
Total	612,127	659,221	635,300

ZINGHER, Abraham (1865–1927). An American physician and bacteriologist. He received his degree in medicine at Cornell University in 1908 and was later appointed professor of bacteriology and hygiene at the university and the Bellevue Medical School. He was also associated with the chair of pediatrics at the New York Post-Graduate School and Hospital and, as an attending physician, with the Willard Parker Hospital, New York, where he did notable work in 1916 during an epidemic of infantile paralysis. During the World War, he served at Base Hospital 69 in France. He worked with Schick of Vienna in perfecting anti-diptheritic serum and was engaged in experiments on various sera when he was accidentally asphyxiated by escaping gas.

ZINOVIEV, Grigori Ovsei Gershon Aron (1883–). A Russian Communist leader. In 1907 he attended the London Conference of delegates of the Russian Social Democratic Labor Party, of which he was an active member. In 1908 he served a term in prison for his revolutionary activities, but in 1909 he made his way abroad and edited *The Social Democrat,* chief organ of his party. After the revolution, Zinoviev became a member of the Leningrad Soviet and in 1918 its President. He became the first president of the Third (Communist) International and also president of the Leningrad Extraordinary Commission for combating counter-revolution. As a member of the Cheka (Central Committee), he took a leading part in the effort, begun in 1924, to obtain more freedom of judgment and action within the ranks of his party. Aligning himself with Trotsky and Kamenev in their opposition to the polices of the majority led by Joseph Stalin, secretary general of the Central Executive Committee, he was deposed as president of the Communist International, and as President of the Leningrad Soviet, and expelled from the party (1927). In December, 1927, he publicly announced that he was willing to submit unreservedly to the will of the majority and applied for reinstatement. He was placed on probation for six months and then readmitted.

ZINOVIEV LETTER. See Russia, under History; also Great Britain.

ZIONISM. The outbreak of the World War ended the gradual influx of Jewish settlers into Palestine and cut off the funds which had enabled them to maintain themselves and their institutions. The Jewish population, which had reached 100,000 in 1914, began gradually to diminish because of emigration. A Provisional Committee for Zionist affairs was hurriedly organized in America, under the chairmanship of Louis D. Brandeis, to prevent the disintegration of the settlements already made in Palestine and to assist the settlers until the ending of hostilities. In the meantime, an intensive propaganda was instituted among American Jews in the effort to raise sufficient funds to compensate for the complete breakdown of the Zionist organization in Europe. In 1916 conversations began between the leaders of the Zionist organization, headed by Dr. Chaim Weizmann, a Russian-born Jew, who had attained a position of prominence in the University of Manchester (England), and the leaders of the British government, relative to the creation of an autonomous Jewish settlement in Palestine. Actuated by the double motive of winning the united sympathies of the Jews for the Allied cause and the creation of a friendly population in Palestine, which borders on the Suez Canal, Lord Arthur Balfour, in November, 1917, declared that the British government looked with favor upon the restoration of Palestine as the Jewish national homeland. A special Jewish battalion was organized, under the leadership of Col. John H. Patterson, to assist in the reconquest of the Holy Land. A Zionist commission was sent to assist the British authorities in the administration of the Jewish homeland. In the meantime, preparations were begun for creating a large Jewish university on Mt. Scopus, where the language of instruction was to be Hebrew, which had been revived by the incoming settlers.

In 1920 in London, the first Zionist Congress after the War was held. Plans were drawn up for the reorganization of the Jews of the world for work in Palestine and for the raising of a fund, called the Keren Hayesod, to begin the work of financing the new settlements. The Balfour Declaration, originally an enunciation of the policy of Great Britain only, was ratified by the Allied statesmen at the Conference of San Remo and in 1922 by the League of Nations. These two decisions marked the stabilization of the Zionist political position and the beginning of a period of intense activity. In the summer of 1921, Sir Herbert Samuel, an English Jew of Zionist sympathies, was appointed by the Lloyd George government to the position of High Commissioner of Palestine with the responsibility of maintaining the rights of the various contending parties. Jewish immigrants, chiefly from eastern Europe, at the rate of 1000 a month, were beginning to enter the country; they were financed by the World Zionist Organization. In the meantime, a break occurred between the adherents of Judge Louis D. Brandeis, in America, and those of Dr. Weizmann. The official organization, however, remained under control of the international leaders.

Following the War, the political history of Zionism was stormy. Two efforts were made to overturn the administration of Louis Lipsky, who had succeeded Brandeis as the president of the Zionist Organization of America. At the 1927 annual meeting of the organization, Lipsky's administration was severely criticized for extravagant expenditures and unfortunate investments; at the 1928 annual meeting, there took place a struggle that was even more bitter. Mr. Lipsky finally triumphed when the opposition brought charges of dishonesty against him and his friends rallied to his support as a personal issue. Similar diputes characterized the meeting of the Fifteenth Zionist Congress at Basel, Switzerland, in the summer of 1927. It was in this city, 30 years before, that the official Zionist movement had been born, yet the scene was one of turmoil when the congress met. Attacks were made on the administration of the mandatory power (England) and on the decision to include non-Zionists in the Jewish Agency, which was to be the official representative of Jewry in the administration of Palestine. Weizmann received a vote of confidence, was reëlected the president of the World Zionist Organization, and the scheme for the Jewish Agency was approved. The following persons were chosen members of the agency: Miss Henrietta Szold of the United States, Harry Sacher of Palestine, and Col. Frederick Kisch of England.

The settlement of Palestine by Jewish immigrants began auspiciously. Large tracts of land were purchased from the Arabs, the Rutenberg scheme for the electrification of the country was put under way, a model town inhabited completely by Jews (Tel-Aviv), was laid out, schools and institutions were opened; but there was not enough statesmanship exercised. By 1926 it began to be seen that the country, in its still undeveloped economic state, was not in a position to support the population that was seeking entry. In fact, in 1927 a serious economic crisis threatened, and the Zionists were compelled to seek the assistance of the non-Zionists among whom, in the United States at least, were to be found the wealthier persons. There followed the creation of the Joint Palestine Survey Commission with the following leading non-Zionists on it as its members: Lord Melchett of England, Oscar Wasserman of Germany, and Lee K. Frankel, and Felix M. Warburg of the United States.

Late in 1928, the survey findings, prepared by a notable corps of economic experts, were released. They pointed to the necessity for rigorously controlling immigration and for the concentration of all energies on the economic life of the country. Among the latter activities were cited the need for the afforestation of more waste lands; the exemption from taxation for five years of all new farming enterprises; the encouragement of coöperative purchasing and marketing; protection of certain local industries by tariffs; the establishment of agencies for the encouragement of manufacturing in the country; the assumption by the Government of a larger responsibility in matters of health; the acceptance by labor of the principle that industry and agriculture can be encouraged only by the offering of a suitable return for capital invested. A minimum budget of $5,000,000 annually was found to be necessary. The commissioners felt very strongly that a policy which did not allow of further development and the acquisition of new territory, the founding of new colonies and the initiation of broader economic schemes must be considered entirely unsatisfactory.

The commission called upon the Jewry of the world to assist in the redemption of the Jewish National Home. This report led to the declaration of peace between the Zionists and the non-Zionists, with the latter promising the financial assistance that was so sorely needed. The price to be paid by the Zionists was the inclusion, as full partners, of the non-Zionists in the new Jewish agency.

In the summer of 1929, meeting at Zurich, the Sixteenth World Zionist Congress formally accepted the pact, though not without many misgivings on the part of the individual members. Many felt that Zionism was being surrendered to the non-Zionists, who for years had fought the idea of Jewish nationalism. The labor representatives feared the domination of American capitalists. Others thought that the appearance of the Agency would mean the decline of the authority of the World Zionist Congress. A feeling was general that the American non-Zionists might not be able to fulfill their pledge of adequate financial assistance.

The Revisionists, the extreme nationalistic group, rather than accede to the Agency agreement, announced their withdrawal from the Zionist Congress; but despite all this, the Congress gave its president, Chaim Weizmann, carte blanche with respect to the Agency arrangements simply because the Zionist Organization was at the end of its rope as far as fund-raising was concerned. It would appear that even Zionism had been compelled to capitulate to philanthropy. The final ratification of the Agency pact took place also at Zurich in August, 1929. Its establishment meant the submergence of the American Zionist group, for in point of representation they were allotted fewer seats than the American non-Zionists. The Council of the Jewish Agency closed its sessions with the election of Baron Edmund de Rothschild as honorary president; Chaim Weizmann, president; Louis Marshall, chairman; Lord Melchett, associate chairman; and Felix M. Warburg, chairman of the administrative committee. Steps were taken toward the formation of an economic corporation to bring more capital into Palestine with the subscription of $500,000 each by Lord Melchett and Mr. Warburg. The death of the leader of the whole movement in the rapprochement, Louis Marshall, in the fall of the year, made Mr. Warburg the outstanding non-Zionist of America and the person to whom the Jewish world looked for the fulfillment of the pledge that the economic rehabilitation of the country would be realized.

It was not going to be an easy matter, as the events of the late summer at once indicated. Beginning on August 23, sporadic attacks by Arabs on Jewish settlements, that increased in intensity and that met with vigorous defence by Jews, threw the whole Zionist situation before the world's attention. The British Palestine government was slow to start and for a time it seemed that the whole of the Near East would break into flame. It was not until September 7 that British forces had the situation in hand. By that time, the number of slain had reached more than 200 and the number of wounded 300, more than half the casualties being Jewish.

Beginning in Jerusalem, the disorders had spread to Hebron where an attack on the rabbinical college resulted in the death of 70 Jews. Safed suffered similarly. Here, 20 persons were killed and homes were looted and burned. Though the massacres were precipitated by the dispute over the use of the Wailing Wall in Jerusalem, a holy place sacred to both the Jews and the Mohammedans, the uprising was undoubtedly political in origin. The Jews were buying Arab lands at high prices; they were building roads, reclaiming waste areas, and developing the natural resources of the country; their public health measures redounded to the benefit of Arabs, as well as Jews.

The Arabs, sought, however, to make Palestine an Arabian land with a legislative assembly made up for the most part of Arabs. They were interested in exactly the sort of nationalistic aspirations that the Fourteen Points had given the stamp of approval to. The fact is, religious and racial differences had nothing to do with the ill-feeling, for Arabs and Jews had lived together in amity in the Near East during all those centuries that Jews were being persecuted in Christian Europe; but the Arabs sought: 1. The revocation of the Balfour Declaration. 2. Restriction of Zionist immigration to Palestine. 3. Establishment of a national representative assembly. 4. The administration of all the holy places according to the *status quo*.

The Jewish position centred in these contentions: 1. The political discontent was due to the agitations of a small band of self-seeking malcontents. 2. The great majority of Arabs and Jews were living in peace. 3. The economic betterment of the country was benefiting the Arabs. 4. Jews had a right to Palestine because of their long historical connection with the land. 5. The

Balfour Declaration was a clear-cut pledge that could not be disowned. 6. The British Palestine government had in many important matters, such as employment policy, taxation, and budgetary allotments, favored the Arabs.

England's position was difficult. The MacDonald government, while it was indicating its intention to get out of Egypt and Iraq, and in the face of a strong public opinion that demanded the relinquishment of the Palestine mandate, announced that it would stand by the Balfour Declaration. There were decided evidences that the imperialism that Joseph Chamberlain had fathered was being abandoned as no longer necessary for the prosecution of foreign trade and the exploitation of backward markets. Great Britain appeared to be desirous of liquidating its Near Eastern policy. To stay in Palestine, because of the Jews, would mean a danger spot in British foreign affairs; but late in 1929, Great Britain was still committed to staying. A commission of inquiry was sent to the country; trials were immediately called for those arrested for murder and robbery; and the local government began to feed the Jewish refugees. In a month, American Jewry contributed almost $2,000,000 for the relief of the Palestinian sufferers.

All this was bound to have serious repercussions on Zionism. The collection of emergency funds was bound to harm cultural programmes and the University budget already seemed to suffer. Differences of opinion with regard to tactics soon resulted in divided counsels. The Revisionists withdrew from the World Zionist Congress because of the mildness of the policy being pursued, among other reasons. In November, 1929, Chancellor Judah L. Magnes of the Hebrew University precipitated a storm when he favored the creation of a representative assembly and began private conversations with certain Arab leaders to effect this result. Most serious of all, the world at large was again weighing the pros and cons of nationalism and many persons were deciding that yielding to nationalist aspirations, which precipitated all sorts of crises, was not quite worth the candle. In short, Zionism was bound to suffer as opinion strengthened that nationalism had about run its course with the signing of the Peace Treaties. See Palestine; Jews and Judaism.

ZIPS. See Teschen, Zips, and Orava Questions.

ZIVKOVITCH, Pera Z. (?–). A Serbian soldier who was appointed military dictator of Jugoslavia by King Alexander on Jan. 6, 1929, and Premier and Minister of the Interior in the cabinet named by the King at the same time. He was a general of division in the Jugoslavian Army and commander of the Royal Guard. He adopted severe measures against the Croat autonomist movement and in the months following his appointment numerous Croat leaders escaped in disguise to other European countries in an effort to arouse sympathy with their protest against Serbian rule. In October, 1929, it was unofficially announced that the King planned to terminate the dictatorship with the proclamation of a new constitution early in 1930.

ZOGU, Ahmed Bey. See Skanderbeg III.

ZONING. See City and Regional Planning.

ZOÖLOGY. Since Neolithic man had a considerable number of domesticated animals, it may be said that the study of zoölogy began very early in human history, and during the following centuries man must have accumulated considerable information concerning the structure and habits of the animals which he encountered. Of these earlier observations, naturally, no records are preserved except insofar as they became incorporated in the folklore and tribal histories of the race, and zoölogy as a science begins with the work of Aristotle (384–322 B.C.) in his *History of Animals.* This *History* is a compilation of what was known about animals up to that time combined with the results obtained by the large number of field naturalists whom Aristotle was able to employ through the financial assistance given him by Alexander the Great. In addition, and this gives the *History* the character of something more than a mere compilation of information, Aristotle attempted a classification of animals, in which he arranged them in groups based on their structural agreements and differences.

In the following centuries, zoölogy shared in the fortunes of the other sciences, showing advances when freedom of thought and investigation were allowed, and a degeneration into mere repetition of traditional dogmas when, as in the Dark Ages, conditions were unfavorable for independent investigation. During most of this time, zoölogy was closely bound up with medicine; anatomy was of much importance to physicians, and many important advances in zoölogy were made by them. By the middle of the eighteenth century, a considerable body of information had been accumulated, but this was in a very chaotic condition. Notable as the first successful attempt to reduce these facts to some order is the work of Linnæus (1758) to whom we largely owe the concept of a "species," as well as the system of nomenclature for species universally employed since then. The Linnæan concept was that at some time in the past there were independently created pairs of individuals, male and female, differing from all other animals in certain definite structural characteristics, and that the descendants of each pair retained from generation to generation the essential specific characters given to their first parents at the time of their creation. Linnæus noted further that the differences between species are not uniform but greater in some cases than in others; the dog and the fox, for example, resemble one another much more closely than either resembles a cow; so it is possible to arrange species into groups of a higher order, the species in each group resembling one another more than they resemble species in any other group. Each of these higher groups he called a genus. According to Linnæus, this grouping of individuals into species and of species into genera was a part of the original plan of creation. For convenience of reference, he proposed to give each animal a double name, of which the first word should indicate the genus, the second the species, to which it belongs. Thus the scientific name of the dog, *Canis familiaris,* indicates that it belongs in a genus *Canis* to which also belong the fox and the wolf, while its structural differences from them are indicated by its assignment to a distinct species, *familiaris.* This "binomial" system proved to be a tool of the greatest importance for the zoölogist, and, in the century following Linnæans, an immense number of genera and species were described and named. On the assumption that each of these species represented a distinct act of creation, this recognition and description seemed a sufficient end in itself.

The next date to be considered is 1859, when Darwin published *The Origin of Species*, and the universal acceptance of the evolution hypothesis which followed completely revolutionized zoölogy. Belief that animals have a blood relationship to one another naturally made the recognition of boundaries between species seem of less importance, and taxonomy, or the classification of animals, accordingly fell more or less into disrepute, while morphology, combining the study of adult structure with the embryonic history of the individual, became the chief line of investigation. See below, *Embryology*.

The next important change in the point of view of the zoölogist was the development of the experimental method. No precise date can be assigned to the beginning of this development, but during the last two decades of the nineteenth century and through the first quarter of the twentieth, there has been an increasing use of this method, so that, from being largely an observational science, zoölogy is rapidly becoming experimental. New fields of research have been opened up, each demanding its own special technique, its own vocabulary, and in many cases its own special journals, so that at the present time few zoölogists are able to claim intimate acquaintance with more than a very limited portion of the field. Points of contact also have been established with other sciences. The zoölogist interested in the study of heredity finds that his interests lie very close to those of the botanist working along the same lines, and he is apt to affiliate with the latter rather than with zoologists in general; this new affiliation he calls a society of geneticists. (See HEREDITY.) In another direction, the zoölogist finds that chemical reactions accompany and probably cause certain life activities, and to understand these he must affiliate with the biochemist. (See BIOCHEMISTRY.) In still other directions, the zoölogist finds important openings for research: along economic lines, as in the relations, especially among the protozoa and the insects, to the causation and transmission of disease, or in the control of plant-feeding insects which offer a serious problem to the agriculturalist. As a result, zoölogy at the present time may almost be considered a group of closely related sciences rather than a distinct science. In all of these, there is the unifying principle that all living matter is in the last analysis composed of protoplasm having similar structure and subject to certain fundamental laws wherever it occurs. It will be convenient to consider separately some of the more important of these subdivisions.

Taxonomy. This is the classification of animals. According to the older notion, species are independent created groups. According to the theory of evolution, they are related to one another in that they all have descended from a common ancestor, and the degree of structural resemblances between them is, within certain limits, an indication of the nearness of that relationship. Working on this hypothesis, it is obviously of less importance than was formerly thought that we should endeavor to trace the limits of species; the knowledge of a few thousand specific names is no longer the mark of a great zoölogist, and taxonomy has lost its relatively high position among the subdivisions of the science. Where taxonomy still has valuable work to do is in determining the arrangement of animals according to their relationships, and in describing new forms which are constantly being discovered.

While it is difficult to formulate an adequate definition of species, no one doubts that groups exist to which this name properly applies, and it seems certain that differences of a fundamental nature (possibly chemical) underlie these visible external differences which are found among species. If this be true, it follows that the experimental zoölogist should know the species with which he is working, and that a confusion of species may introduce as many errors into his results as would follow the use of impure reagents by a chemist. As an illustration of the practical value of the work of the taxonomist may be cited the case of the sanitarian interested in the control of insect-borne diseases. Yellow fever is carried by one genus of mosquitoes and malaria by another, while a third is harmless so far as disease-carrying is concerned. Obviously, an accurate diagnosis of these genera is essential to the sanitarian, and for this information he must look to the taxonomist.

In modern classifications, the entire animal kingdom is divided into a series of phyla. As might be expected from the theory of evolution, some animals have developed along peculiar lines so that their relationships to others are obscure, and they are grouped differently by different taxonomists; but aside from some minor differences of this sort there is general agreement as to the following classification:

Phylum: Protozoa.	One-celled animals.
Phylum: Porifera.	The sponges.
Phylum: Cœlenterata.	Hydra and hyrdoids, jellyfish, and corals.
Phylum: Plathelminthes.	The turbellarians, liver flukes, tapeworms, and nemerteans.
Phylum: Nemathelminthes.	The threadworms, trichina, hookworm, etc.
Phylum: Trochelminthes.	The rotifers.
Phylum: Annulata.	The segmented worms, earthworm, marine annelids, leeches, and gephyreans.
Phylum: Molluscoidea.	The bryozoa and brachiopods.
Phylum: Arthropoda.	Crustacea, insects, spiders, scorpions, and centipedes.
Phylum: Mollusca.	Clams, snails, and cuttlefishes.
Phylum: Echinodermata.	Starfish, sea urchins, and crinoids.
Phylum: Chordata.	Balanoglossus.
Subphylum: Enteropneusta	The “sea squirts” and tunicates.
Subphylum: Tunicata.	
Subphylum: Cephalochorda	Amphioxus.
Subphylum: Vertebrata.	Vertebrate animals.

Each phylum is further subdivided into classes and these into orders, etc. For the smaller subdivisions, the reader should consult textbooks. See below, *Bibliography*.

Physiology. This is a study of the functions and activities of the organs of the animal body, and thus a dynamic, as distinguished from the purely static, study of anatomy. Originally quite distinct from zoölogy, except in so far as a knowledge of the structure of an animal is an essential preliminary to a study of its activities, the distinction between the two has largely disappeared with the development of the experimental method. When the embryologist applies the experimental method to the analysis of the process of fertilization of the egg or the form-changes going on in the developing embryo, he is using the methods of the physiologist. The physiologist must, on the other hand, rely on the biochemist for aid in answering many of his problems, thus these three meet here on common ground. Important contributions of physiology to zoölogy are, first, the study of the enzymes, a series of organic substances which seem to be similar to if not identical with the catalytic agents of the chemist and which accompany most if not all of the fundamental physiological processes. This similarity to catalytic agents in their mode of working has led to the belief that they are practically the same, and thus that life is merely a series of these catalytic activities. This leads to the mechanistic conception of life as really nothing but a physicochemical process, a theory opposed by the vitalistic school, who hold that the regulative powers possessed by animals and often exhibited in their ability to adjust themselves to new and unusual conditions indicate the presence of a regulative mechanism independent of any chemical or physical activities going on in the protoplasm. This regulative mechanism is admittedly beyond the reach of any scientific analysis, but the vitalist believes that, without the assumption of its presence, it is not possible to explain animal activities. At present (1929), it seems probable that the mechanistic hypothesis is the more generally held, though some believe that "emergent evolution" offers a solution of the problem, as occupying a satisfactory middle ground between the extremists of both positions. See *Bibliography,* below.

Another physiological contribution, of especial importance in medicine but having definite applications in zoölogy, is the discovery of the important part played by the glands of internal secretion, i.e., the endocrine glands. The presence in the animal body of gland-like organs possessing no definite ducts has long been recognized, and they have generally been grouped together as the "ductless glands." Until quite recently, their function was largely a matter of conjecture, although it was recognized that disease of these ductless glands was correlated with definite bodily defects. It is now known that some of these glands, possibly all, secrete into the blood, substances known as "hormones" which are carried by the blood to other parts of the body and which govern the proper development or functioning of those parts. Thus, if the pituitary body does not send off the proper amounts of its peculiar hormone, an abnormal development of the skeleton results. The development of a tadpole into a frog may be prevented by removing the thyroid from the tadpole, while on the other hand metamorphosis will be hastened if extra thyroid material be fed to the animal. The development of secondary sex characters at the time of puberty seems to be dependent on the hormones formed in the maturing sex organs at this time and discharged into the blood to be carried to other parts of the body; the effects of castration or removal of the sex organs in hindering the development of secondary sex characters are due to the loss of the hormones caused by the operation. In addition to hormones which produce these easily recognizable characters, evidence is accumulating which makes it seem probable that any organ in the body is capable of producing hormones which may exert some influence on any other organ in the same body. This possibility has been considered in recent discussions of the inheritance of acquired characters (see HEREDITY), for experimental evidence has been presented to show that changes set up in certain organs may produce changes in the sex cells through the action of hormones and in this way may set up changes in the next generation.

The widespread phenomenon of luminescence in animals has evidently been solved by physiology. A large number of animals, of which the firefly is the most familiar example, are able to produce light often of very considerable intensity, a form of light production different from any artificial methods known to man in that there is no appreciable loss of energy as heat. This has made the study of animal luminescence of interest to practical engineers, in the hope of applying the method to the problem of reducing the cost of the present wasteful methods employed in all artificial lighting. It has been shown that animal light production is due to the oxidation of a substance called luciferin, apparently a protein, by the action of luciferase, an enzyme. This light in the firefly is used as a sex call, while some deep-sea fishes seem to employ it as a flash light to illuminate the dark bottom of the ocean or to attract other animals on which they feed.

Tropisms. The study of animal behavior is of interest from two points of view. One is that of the ecologist who considers the purposive character of many animal activities and the way in which these activities relate the individual to its environment, the other that of the physiologist whose problem is to explain the mechanisms employed in these processes. An influential school of physiologists explain animal behavior by the theory of tropisms. As a starting-point in the exposition of this theory, we may follow Jacques Loeb, who until his death in 1924, ranked as its leading exponent, in calling attention to what are known as "forced movements," or peculiar behavior shown by animals in which a portion of the brain is injured or diseased.

If food be held at a distance in front of a normal dog he will, naturally, go directly toward it. If this experiment is repeated on a dog in which a portion of one cerebral hemisphere has been removed, he will no longer go directly toward the food, but in attempting to do so, will continually turn toward the injured side and thus will move in a circle. The explanation is that while in the normal animal forward movement is produced by the equal contraction of the leg muscles on the two sides of the body, these equal contractions in turn being due to equal stimuli reaching them from the two cerebral hemispheres, in the injured animal, stimuli from the abnormal part of the brain are more or less suppressed and so lead to a lesser stimulus on one side than on the other. As a result, the stronger leg movements on one side bend the body toward the injured side. The animal does not circle from any desire to do so, but because if it moves at all its muscles force it to go in this direction.

In the well-known tendency of some insects to go toward a light, the tropism theory recognizes a precise analogy to the forced movements of the injured dog. If the common fruit flies, *Drosophila*, are put in a tube and the tube turned so that only one end is lighted, or one end turned toward the window so that light rays strike that end before they do the other, the flies, if they move at all, will go directly to the end toward the light. If the tube is turned through 180 degrees, they will again go toward the lighter end. According to the tropism interpretation, these movements are produced as follows: If the insect is facing the light at the beginning of the experiment, light rays fall with equal intensity on the two eyes, equal stimuli are sent from the eyes to the central nervous system and from there to the leg muscles, the muscles of the two sides are equally stimulated, and the animal moves directly forward. Should the insect be standing so as not to face the light directly, one eye will receive a stronger stimulus than the other; this unequal stimulus leads eventually to a stronger contraction of the muscles on one side of the body than on the other and thus turns the body toward the less stimulated side. As the body is turned, the eyes are eventually brought to a position where they receive stimuli of equal strength, and the animal then moves toward the direction of the light rays. This is then a forced movement resulting from the action of the light rays on the physicochemical make-up of the animal's body and has nothing analogous to an intelligent desire to go to the brighter region. Similarly, the moth, when it flies into a candle flame, does so because the physicochemical composition of its body responds in a precise, mechanical fashion to light stimuli; and the moth if it moves at all, is forced to go in that one direction.

In the illustrations given, the tropism is known as "positive" because the animal moves toward the source of the stimulus. Other animals show a "negative" tropism in that under these same conditions they collect at the place farthest from the source of the stimulus. A reversal of this tropism may appear, however, in that a "positive" animal may become "negative," and vice versa. This reversal was explained by Loeb as due either to a modification of the photochemical processes or to an effect on the nervous system and may be experimentally produced in the laboratory by subjecting the animals to chemical or mechanical treatment. It also frequently occurs in nature as when the larvæ of a barnacle are strongly positive to light at the time of hatching and become equally strongly negative when they are a little older. This reaction to light is called heliotropism. Other tropisms are known as chemotropism, galvanotropism, thermotropism, rheotropism, anæmotropism, stereotropism, and geotropism, according as the stimulating agent is chemical, electrical, heat, current of water, current of air, contact with solid bodies, or force of gravity. The responses of animals to these various stimuli are frequently quite marked and are all, according to the tropism theory, purely forced, mechanical movements resulting from the stimuli acting on the physicochemical composition of the complex of structures making up the body of the animal.

Some experiments on insects are difficult to explain on this theory. According to it, the constantly acting influence of the light rays keeps an animal turned in the proper direction, and, so to speak, steers it in the way it should go; but a firefly on receiving a flash from his mate will turn and go directly to her, even though the flash is but temporary in duration and the greater part of his journey is carried on in the dark. This observation was recorded by Mast, who also, as a result of a reëxamination of the "orienting" reactions of insects, has concluded that even in these cases the effective stimuli are not symmetrically applied as the tropism theory maintains, and the process of adjustment is really a reflex action. A similar explanation would be given of all the other tropisms. Students of behavior also, notably those who have worked with the higher *hymenoptera* such as the wasps, are generally agreed that it is impossible to explain their activities as tropisms, in the sense in which the word has been defined above. The term tropism with the appropriate prefix is convenient as a descriptive term and is often so used without necessarily implying the tropistic interpretation of the mechanisms employed. In the recent development of physiology, this tropistic concept has been of very great value as a stimulus to investigation, and its importance as such would not be lessened even if its final conclusions were overthrown.

Sex Determination. For practical as well as sentimental reasons, the subject of sex determination has received an immense amount of attention. The breeder of cows or the breeder of chickens for egg production could greatly increase his profits if he could control the sex of his animals so as to produce a large excess of females, and in human society desire is often expressed for offspring of one sex rather than another. The generally accepted explanation at the present time is based on the number of chromosomes in the sex cells. In the nucleus of each cell in the body is a substance called chromatin, which, at the time the cells divide, groups into bodies known as chromosomes. The number of these chromosomes is constant in any one species and is generally even. The exceptions to this rule are where in a number of animals one sex is found to have regularly one more chromosome than the other. In the best-known cases, those of some of the insects, the female has an even number and the male one less, or an odd number. Ordinarily, the chromosomes occur in definite pairs, and this odd one, in the case cited, is recognizable as equivalent to one of a certain pair in the female. These are known technically as the "X" chromosomes, so that the female has two X's, the male only one. In other cases, the number in the male is even, due to the presence of a "Y" chromosome, which, however, does not act as a mate to the X, so that, so far as the X is concerned, its presence or absence is a matter of indifference. In the peculiar series of processes known as maturation through which the sex cells pass before they unite, division is such that each mature egg cell contains only one X, while among the spermatozoa one-half have one X, and the rest have none. If a spermatozoön with one X fertilizes an egg, the result is a cell with two X's, and a female results. If the egg is fertilized by a spermatozoön having no X, the resulting individual is male. If this explanation is correct, it follows that sex is determined at the time of fertilization of the egg and not by later agencies operating on the developing embryo. In some other animals, this chromosomal action is reversed in that it is the male who has the even number, one more than the female. Recent work indicates that this is not due either to a greater or less quantity or to peculiar quality of the X chromatin but rather to a certain proportion between the number of chromosomes and the other chromosomes or "autosomes." Observations by Bridges on the fruit fly show a positive correlation between the varying numerical proportions of these two kinds of chromosomes and the normal and abnormal sex condition in the adult flies.

Crew has recorded the case of a hen which laid fertile eggs in a normal fashion but which, with advancing age, developed rooster plumage and functional male sex organs and became the father of a brood of chickens. This indicates that while sex determination by the X chromosome may be the ordinary method, this determination is not irrevokable, but may be upset by later occuring conditions.

Embryology. Reproduction in animals is accomplished by both asexual and sexual methods. In the former case, there is either a growth of a bud from the surface or a division of the body into two parts, followed by a growth of the bud or separated portions until the full adult size is reached. Sexual reproduction is the development of a new individual from a specialized cell, the ovum or egg, derived from the ovary of the female, and this egg either develops without further treatment, a condition known as parthenogenesis and of frequent occurrence among insects, or as in the vast majority of cases, fuses with a spermatozoön derived from the testis of the male, and this product, the fertilized ovum, is the starting-point of the new individual. By repeated divisions of this fertilized egg and its descendant cells, a many-celled body is formed in which differentiations arise, and finally the completed animal with its complex of organs appears. Observations on the developing embryo in the hen's egg are easily made and were described as early as 1621 by Harvey, whose dictum, "*Omne ovum ex ovo*," dates from this time. The foundation of modern embryology was laid by von Baer, who discovered the mammalian ovum in 1828. In his completed work, published in 1834, von Baer demonstrated the existence of the primary "germ layers" which occur in all of the metazoa. In this same work, he announced the discovery, since known as von Baer's law, that in passing from the egg to the adult state the embryo of a higher form goes through stages in which it resembles the embryo of lower forms.

Louis Agassiz pointed out that in thus passing from the one-celled egg to the adult condition, an embryo passes through a series of stages in which it resembles a series which would be formed if we arranged adult animals in order of increasing structural complexity from the simple protozoa to the higher metazoa, and he argued that this and the series of von Baer were prearranged by the Creator at the beginning in order to demonstrate his plan of creation. A different interpretation was later put on these facts by the evolutionists, who recognized in these series of embryonic stages a recapitulation of the ancestral history of the race. The German zoölogist, Haeckel, was the most prominent advocate of this theory, and largely through his influence it was generally believed that a fairly accurate history of the ancestry of an animal could be obtained through a study of its embryonic stages. During the seventies and eighties, this belief was the inspiration of a great deal of descriptive embryology, but this phase of the subject has been very largely given up, partly because of the discovery that many embryonic characters are newly acquired and not ancestral, and partly because of the shifting of interest to the experimental method. This law of von Baer is by no means abandoned, but embryologists generally recognize that its application is limited to more generalized characters and does not extend to the finer details.

By the end of the nineteenth century, embryologists were divided into two groups, descriptive and experimental. The descriptive embryologists, following the lines laid down by von Baer, were studying with constantly improving technique the normal development of animals and had accumulated much information of a purely descriptive character. A speculation as to the real composition of the fertilized egg arose from this work. The egg appears to be perfectly homogeneous, but out of it, after repeated divisions, arises a differentiated body. Is the homogeneity merely apparent and does the egg contain materials of different kinds which are separated from one another by the division processes, or is it real and does differentiation depend on the position of the cell in the complex and its relation to surrounding cells? One answer to the question was sought through the method of cell lineage. This consists in following the developing egg cell by cell until different regions or organs of the adult body are outlined. From learning in this way the origin and fate of each cell, it was found that in many cases the pattern of the cleavage is so regular and the relation of certain cells to certain organs so definite and certain as to indicate that cleavage is really a separation of different kinds of material from one another. In some animals, this conclusion seems the more certain, because from the beginning certain portions of the eggs differ from the remainder in color and apparently follow definite and prearranged paths until they give rise to definite organs in the new individual. Even where there is not this visible distinction, the regularity of the divisions indicates a similar, though invisible, condition.

A second line is more definitely experimental. Developing eggs are mutilated in various ways, as by the separation of the cells from one another in the early cleavage stages, and a study is made of the behavior of the resulting separated blastomeres. Others are treated chemically in such a way as to alter the osmotic pressure or the chemical nature of the environment. In this fashion, an experimental analysis of the forces at work in and on the embryo may be made. In later stages, operative interference with normal developmental processes is employed for the same purpose. These later methods are such as removing the spinal cord of an amphibian embryo and replacing it end for end, or removing arms from similar embryos and grafting them into other parts of the body. The general purpose of all of these experiments is to secure data bearing on the question of how far an organ is self-differentiating, and how far its differentiation is a result of influences brought to bear on it from neighboring organs. For a discussion of the results obtained by these experiments, consult titles given in the bibliography.

Some eggs, as in many insects, develop parthenogenetically, while others normally require fertilization by a spermatozoön. In many eggs of this latter type, it has been found possible to induce parthenogenesis by artificial means. The agent employed may be a change in the chemical composition of the surrounding medium; for example, adding certain chemicals to the water in the case of water-living animals, or by mechanical means such as shaking; and Loeb succeeded in producing parthenogenetic development in the frog up to sexually mature individuals by simply pricking the egg with a needle. It would appear that one function of the spermatozoön is to stimulate the egg to develop, and this function may be replaced by other agents. There is reason to believe that, even in the mechanical stimuli, a chemical change is the ultimate cause of the development, and Lillie has recognized this chemical process in the working of a substance called fertilizin which is secreted by the egg and which when it comes in contact with a spermatozoön sets free a substance acting as a stimulus to development. Loeb, on the other hand, considered that anything which can produce an egg membrane is an efficient stimulus and will start the developmental process.

Histology. With increasing perfection of microscopic technique, anatomists studied more and more thoroughly the finer details of animal and plant structure, and this microscopic investigation eventually developed into a distinct subdivision of anatomy called histology. This concerns itself very little with the structure of protoplasm or of the undifferentiated cell but deals mainly with the differentiated condition of cells as they appear in combination to form the various tissues of the body. This study may be directed toward the normal structure of tissues, or it may deal with their appearance under abnormal or diseased conditions. In the diagnosis and treatment of many diseases, a comparison of the normal with the diseased condition is often of very great practical importance.

Cytology. More recently, cytology, or the division of miscroscopic anatomy which studies especially the undifferentiated protoplasm and the structure of the simple cell, has received especial attention. While the earlier cytologists thought they recognized visible structures in protoplasm, the later tendency was to regard most of these structures as artefacts or abnormalities resulting from the manipulation to which the material must necessarily be subjected in order to study it, and to think of protoplasm as a complex colloidal compound which may in whole or in part change from a sol to a gel condition and back again, these changes being in some way connected with the life manifestations of the protoplasm. Two kinds of material are recognizable in the cell, the nucleoplasm inside and the cytoplasm outside of the nucleus, differing from one another in their physicochemical composition and containing different kinds of materials. In the nucleus is the chromatin which has been shown to have very great importance in the life of the cell and is an important agent in the transmission of hereditary qualities. More than any other portion of the cell, the behavior of this chromatin during cell division by mitosis has attracted the attention of cytologists. Still later, attention was turning to the study of cytoplasmic inclusions known as chondriosomes and Golgi apparatus, structures which lie in the cytoplasm and which, owing to concentration of attention on the chromatin, were largely ignored by earlier cytologists. Opinions differ as to whether these are merely temporary structures in the cytoplasm or permanent organs with some possible function in heredity.

Ecology. This is a study of the living organism in its natural environment with especial reference to the reasons why it should be in that environment rather than in some other. In the environment of an animal would be included climatic conditions, chemical composition of the water or soil in or on which it lives, location of its food, presence or absence of enemies, and conditions governing mating and care of the young. Adams divides the subject into three aspects: individual, in which a particular kind of animal is studied throughout its range of distribution; aggregate, where the taxonomic unit or family is traced throughout its early history; and associational, in which the animal or group of animals is studied with reference to its association with other organisms. Ecology as thus defined has received little consideration as compared with the amount of research devoted to morphology, embryology, and physiology. A rather cheap criticism, frequently expressed in this connection, is apparently based on the assumption that studying an animal under a microscope or in a laboratory in some way alters its character, so that what is there seen is unnatural and abnormal. The absurdity of this extreme position is sufficiently obvious, but it is certainly true that the point of view of the old-time naturalist has been too much ignored and that its reappearance under the newer name of ecology is a sign of progress.

It seems probable that associational ecology offers the most interesting field. A study of this sort would include, first, a list of the species of animals and plants living in a given locality, and then a consideration of the various factors that have brought them together. The climatic and the soil conditions would be of much importance, but the main interest would lie in a study of the relationship existing between the component species of the association. These relationships may be hostile, as where one animal feeds on another; mutually beneficial or symbiotic, as in the case of the sea anemone carried on the shell of a crab; commensal, as in the small crab living in the oyster shell, where neither animal is benefited; or parasitic, where one lives permanently attached to the body of the other; or they may merely amount to an occupation of the same general territory without the animals having any very definite influence on one another. The breeding habits of component species would also be considered in reference to their modification through the association. It is not to be understood that in all cases definite and precise reasons can be assigned for the distribution of animals, for because of their locomotive powers their appearance in a given locality might be quite accidental. Carefully conducted observations should, however, separate the accidental from the definitely significant distributions. A study of this sort might cover a considerable area, or it might be quite limited, as for example, the ant colonies studied by Wheeler, where in a very restricted area associations exist between a considerable number of animals, and complicated ecological conditions result.

Death. A question to which biologists have devoted much attention is whether death is an inevitable and necessary process, or whether, given a continuous optimum adjustment of internal to external conditions, any organism might, barring accident, be immortal. Protozoa reproduce by transverse fission. The body of the parent divides into two, usually equal, parts, each of which in its growth comes to resemble the parent in size and form. Each of these later divides, and this is continued indefinitely: no portion of any generation dies unless by accidental injury. It is evident that in this process which began with the first protozoön and will continue to the last, we have a true bodily immortality. Further, Carrel has been able to keep portions of the heart of an embryo chick alive in artificial culture media for a period of several times the normal length of life of the fowl, and there seems no reason why this might not be continued indefinitely. Similar results have been reported by others, and the conclusion must follow that there is nothing inherent in protoplasm itself which inevitably leads to senescense and death.

When, however, we combine these individually potentially immortal cells into a system of tissues and organs making up the body of a complex animal or plant, death appears as an apparently inevitable process at the end of a period which is, roughly speaking, characteristic for each race, although length of life varies in different families within a race and is undoubtedly an inherited trait. Several explanations for the senescense and death of many-celled organisms have been given, some referring them to changes in the relative sizes of nucleus and cytoplasm in the cell, others to a decrease, with advancing differentiation, of ability to assimilate nutrition and to eliminate waste, and still others to the fact that the combination of highly differentiated cells into tissues and their relations to one another make up so complicated a bit of machinery that failure to function normally in one part disorganizes the whole mechanism. It would appear, from any or all of these suggestions, that death is the price we pay for the differentiation of tissues making possible the efficiency of our highly organized bodies, and that had we been content to remain protozoa, we might all be immortal.

Economic Zoölogy. Important economic applications of zoölogy appear along both medical and nonmedical lines. Some protozoa cause disease, some plathelminthes and nemathelminthes are dangerous parasites, and some insects carry disease-producing organisms from one animal to another. These are obviously conditions of interest to physicians and sanitarians, who derive their information concerning the anatomy, life histories, ecology, and methods of combating these organisms from the researches of the zoologist, and the physician gets from the same source his knowledge of normal anatomy and embryology. Most of the nonmedical applications have to do with the production and preservation of man's food and clothing. Among the invertebrates, the most important are the insects, for while only a few of these produce food (e. g., the honeybee), and others material for clothing (e.g., the silkworm), a large number, which appears to be increasing, causes serious losses through their attacks on commercially valuable plants. An appreciable proportion of the cost of production of food and clothing is due to the expense involved in fighting the insect enemies of the plants from which these materials are obtained. In the United States, the boll weevil, the gypsy moth, the corn borer (to combat which a Federal appropriation of $10,000,000 was made in 1927), and the Japanese beetle are striking examples of this situation. Less spectacular but similar problems arise in all parts of the country, and large amounts of money are spent annually in attempting to solve them; this work is largely under supervision of State and Federal entomologists to whom applications should be made for advice or assistance on any problems connected with insect control. See ENTOMOLOGY, ECONOMIC.

Similar work is under way in other countries, although insect pests seem to be much more numerous in North America than in any part of Europe. Other applications of economic zoölogy are in the propagation of edible mollusca, crustacea, fish, terrapin, etc.; in the study of fur-bearing animals, such as seals, and in devising means of protection against predatory animals other than insects.

Bibliography. Recent works in this field are Parker and Haswell, *Text Book of Zoölogy*; Elton, *Animal Ecology*; Pearse, *Animal Ecology*; Morgan, *Experimental Embryology*; Rogers, *Text Book of Comparative Physiology*; Wilson, *The Cell in Development and Inheritance*; Loeb, *Forced Movements, Tropisms, and Animal Behavior*; Morgan, *Emergent Evolution.*

ZORN, tsôrn, ANDERS LEONHARD (1860–1920). A Swedish painter and etcher (see VOL. XXIII). His exhibition showed a curious juxtaposition of portraits of men and women in irreproachable conventional dress and strikingly realistic nudes. He continued the production of etchings of the old technical excellence and produced several fine pieces of sculpture, including "The Broken Pitcher" (1920).

ZSIGMONDY, shĭg'mŏn-dē, RICHARD (1865–). An Austrian chemist (see VOL. XXIII). He invented the *Membranefilter* in 1917 and wrote *Lehrbuch der Kolloidchemie* (1920).

ZUKOR, ADOLF (1873–). An American motion-picture producer, born at Riese in Hungary, and educated in Hungary and in the schools of New York City. He came to the United States in 1888. For several years, he engaged in business in New York City and Chicago and was later the owner of several vaudeville and motion-picture theatres in New York City. He founded the Famous Players Film Company in 1912 and later became president of the Famous Players-Lasky Corporation, and of its successor, the Paramount Famous-Lasky Corporation. Consult *The House that Shadows Built*, by Will Irwin (1928).

ZURICH. The capital of the Canton of Zurich and the largest city in Switzerland. The population in 1927 was estimated to be 215,460. Zurich is the centre of Swiss industry and commerce, the manufacture of silk, cotton, and machinery being its principal industries. It is also the junction of the great international railways connecting France, Germany, Austria, Hungary, Italy, Belgium, and the Netherlands. With the development of aviation, it has taken its place as an international air-traffic centre. In 1928 the military landing field of Duebendorf was enlarged by the purchase of land and construction of buildings, together with the installation of modern airport equipment, so that in the future it would be large enough for both civil and military use. In 1911–14 a new building was erected for the University of Zurich; it has two main wings connected by a massive square tower 215 feet high. In 1929 plans were announced for the construction of a new stock-exchange building at a cost of approximately $675,500. The Swiss Social Museum and the Pestalozzianum, an educational exhibition pertaining to the work of Johann Heinrich Pestalozzi, the famous Swiss educator, have been accommodated since 1927 in the Beckenhof.

ZWEIG, STEFAN (1881–). An Austrian poet, dramatist, critic, and translator, who was born in Vienna and studied philosophy at the university there. Among his works are the poems *Silberne Saiten;* the tragedies *Thersites* (1901), *Jeremias* (1917); the stories *Erstes Erlebniss* (1911), *Verwirrung der Gefühle* (1926, in English trans., *Conflicts*, 1928); essays on *Verlaine*, *Verhaeren* (translated into English), *Romain Rolland* (1920), *Erinnerungen an Verhaeren;* and the series *Baumeister der Welt*, containing studies of Balzac, Dickens, Dostoevski, Hölderlin, Nietzsche, Kleist, Casanova, Stendhal, and Tolstoy. The last three studies were published in English in 1928 under the title: *Adepts in Self-Portraiture.* He edited the life, *Marcelline Desbordes-Valmor, Sainte Beuve,* and *Literarische Charakterbilder,* and translated Baudelaire, Verhaeren, Romain Rolland, and others. He is becoming widely appreciated in America through his adaptation of Ben Jonson's *Volpone,* produced by the Theatre Guild of New York.

ZWEIG, Arnold (1887–). A German writer, born at Gross-Glogau, Silesia, who was educated for the teaching profession in the universities of Berlin, Munich, Rostock, Tübingen, and Heidelberg. He published his first volumes of short stories in 1910 and in 1913 his play, *Ritual Murder in Hungary,* was successfully produced by Reinhardt in Berlin and throughout Germany and Austria. His experiences in the German Labor Corps in Northern France, Serbia, and Macedonia during the World War were described in his novel *The Case of Sergeant Grischa* (1927, Eng. trans., 1928). His other works include *Drei Erzählungen* (1920); *Das neue Kanaan* (1925); *Pont und Anna* (1928); *Juden auf der deutschen Bühne* (1928). He also has translated works of Poe and Kipling.

ZWEMER, Samuel Marinus (1867–). An American missionary, traveler, and author (see Vol. XXIII). In 1929 he was appointed to a professorship of Christian missions in Princeton Theological Seminary, Princeton, N. J. His later writings include *The Disintegration of Islam* (1917); *Influence of Animism on Islam* (1920); *A Moslem Seeker after God* (1920); *Christianity, the Final Religion* (1921); *Call to Prayer* (1923); *The Law of Apostasy in Islam* (1924).